NUTRITION & HEALTH SURVEILLANCE SYSTEM
NSS
Indonesia

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Close Out Report 2003

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Nutrition and Health Surveillance System

Close-out Report 2003

Helen Keller International/Indonesia

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Acronyms

ACC	Administrative Committee on Coordination
ADB	Asian Development Bank
AED	Academy of Education Development
APRO	Asia Pacific Regional Office
ARO	Africa Regional Office
Am J Epidemiol	American Journal Epidemiology
Am J of Clin Nutr	American Journal of Clinical Nutrition
BCG	Bacillus of Calmette and Guerin
Biomed Env Sci	Biomedical and Environmental Sciences
BKKBN	Badan Koordinasi Keluarga Berencana Nasional (National Family Planning Coordinating Board)
BMI	Body Mass Index
BPS	Badan Pusat Statistik (Central Bureau of Statistics)
Bull WHO	Bulletin of the World Health Organization
CDC	Communicable Disease Control
CFI	Complementary Feeding Initiative
CWS	Church World Services
DAI	Development Alternatives Inc
DE	Data Entry
Dept	Department
DGLV	Dark Green Leafy Vegetables
DOV	Date of Visit
DTP	Diphtheria, Tetanus and Pertussis
FAC	Field Coordinator Activity
FAM	Food Aid Monitoring
FIVIMS	Food Insecurity and Vulnerability Information and Mapping Systems
Food and Nutr Bull	Food and Nutrition Bulletin
FODM	Field Operation and Data Management
GOI	Government of Indonesia
HH	Household
HKI	Helen Keller International
Hum Biol	Human Biology
IFAD	International Fund for Agricultural Development
IVACG	International Vitamin A Consultative Group
J Nutr	Journal of Nutrition
JHPIEGO	Johns Hopkins Program for International Education in Reproductive Health
Mal J Nutr	Malaysian Journal of Nutrition
MNH	Maternal and Neonatal Health
MOH	Ministry of Health
MSG	Monosodium Glutamate
MUAC	Mid-Upper Arm Circumference

NCHS	National Center for Health Statistics
NGO	Non Governmental Organization
NIHRD	National Institute of Health Research and Development
NRDC	Nutrition Research and Development Center
NSP	Nutritional Surveillance Project
NSS	Nutrition and Health Surveillance System
NTT	Nusa Tenggara Timur
OPHN	Office of Public Health Nursing
P2M	Pemberantasan Penyakit Menular (Communicable Diseases Control)
PIN	Pekan Imunisasi Nasional (National Immunization Week)
PVO	Private Voluntary Organization
POSYANDU	Pusat Pelayanan Terpadu (Integrated Health Post)
ppm	Parts per Million
PPS	Probability Proportional to Size
QC	Quality Control
RDI	Recommended Daily Intake
RE	Retinol Equivalent
RI	Republik Indonesia
RW	Rukun Warga (Hamlet/Sub-Village)
SCN	Standing Committee on Nutrition
SD	Standard Deviation
SEAMEO TROPMED	Southeast Asian Ministers of Education Organization Tropical Medicine
SES	Socio Economic Status
SOAG	Strategic Objective Grant Agreement
SPSS	Statistical Product and Service Solutions
SRS	Simple Random Sampling
UN	United Nations
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
VA	Vitamin A
VADD	Vitamin A Deficiency Disorder
VAC	Vitamin A Capsules
VAD	Vitamin A Deficiency
24-VASQ	24-Hour Vitamin A Semi-Quantitative
WFP	World Food Program
WHO	World Health Organization

Executive Summary

The Nutrition and Health Surveillance System (NSS) funded by USAID/Indonesia from 1999-2003 was a data gathering activity conducted by Helen Keller International (HKI) Indonesia in collaboration with the Government of Indonesia (GOI) to increase the capacity for assessing the impact of the crisis and crisis response programs in order to provide continuous, timely and updated information to aid other crisis-response initiatives.

Recognizing that many factors can contribute to issues of health and nutrition, the GOI/HKI NSS collected data on a range of health, nutrition, and socioeconomic indicators, including nutritional status, diarrhea, vitamin A intake and vitamin A capsule coverage, anemia, *Posyandu* (integrated health post) attendance, percentage of expenditures on food and other variables.

The GOI/HKI NSS, a repeated cross-sectional survey conducted four times per year with three months of data collection per round, was implemented in 12 different locations representing 70% of the country's total population. The analysis of NSS data collected between December 1999 and August 2003 from among Indonesia's rural population (covering the provinces: Banten, Central Java, East Java, Lampung, Lombok, South Sulawesi, West Java and West Sumatra) and the urban poor populations of four large cities (Jakarta, Makassar, Semarang and Surabaya*) revealed that despite some temporary improvements in some sites, there has not been a substantial recovery in health and nutrition after it had deteriorated due to Indonesia's crisis that started in 1997.*

Key findings of the GOI/HKI NSS activity reveal that *the general health and nutrition situation has changed little over the four years of data collection, and in some cases has become worse.* One of the two clear exceptions to this is vitamin A capsule coverage for children aged 6-59 months. In most provinces and urban slum locations surveyed, capsule coverage for children has reached the Government of Indonesia's target of 80%. This level is good and necessary, because vitamin A intake, of children as well as women, is less than half and in some cases less than one third of the recommended daily intake. The other positive finding is the reduction of the prevalence of diarrhea by approximately 50%. Other NSS findings relate to the alarmingly high rates of anemia among children under-five; the high prevalence of anemia among non-pregnant women; high levels of underweight and stunting in both rural and urban areas; a substantial decline of already low rates of exclusive breastfeeding among infants <6 months of age. Contrary to the VAC coverage among children, coverage among post partum women has remained very low (<20%) and even declined somewhat. While *Posyandu* attendance has increased, more than 27% of eligible children do not attend the *Posyandu* regularly. Complete immunization with official record tends to be higher in rural areas compared to urban slums, but is lower than desirable for both areas and declined considerably. Use of adequately iodized salt is lower in rural areas compared to urban slums. While the proportion of households that spent half to three-quarters of their expenditures on food

(now ~45%) declined over the past four years, especially in the urban slums, the proportion that spent three-quarters or more declined less (now 13-20%).

The GOI/HKI NSS contributed extensively to further knowledge on the importance of socio-economic status, maternal education, food prices, etc. for the nutrition and health status of the poor in Indonesia. It also contributed to changes in health policy and allocation of resources based on the evidence and advocacy that it generated. The GOI/HKI NSS created a substantial infrastructure and developed the capacity to monitor the health and nutrition status in 9 provinces providing high quality data for informed decision making. The GOI/HKI NSS influenced the focus of international organizations such as the Asian Development Bank, the World Food Program and UNICEF to prioritize assistance to urban slums. In addition to monitoring the National Vitamin A Supplementation program for Children, the GOI/HKI NSS provided unique assistance to the USAID Indonesia mission by documenting the depth and breadth of malnutrition and poor health status within the country for important policy and budget decisions. Evidence from the NSS enabled the GOI to re-examine the nation's breastfeeding policy and guidelines and to consider changing the age of recommended exclusive breastfeeding from four months to six months in accordance with recent WHO recommendations.

With USAID Indonesia's decision to discontinue the GOI/HKI NSS, the GOI has lost a major resource to plan and assess outcomes of current programs based on trends in nutrition and health. This is particularly alarming as the latest round of data collection indicates a worsening of the health and nutrition situation. Other effects of eliminating the GOI/HKI NSS include an inability to transfer the skills and knowledge accumulated since 1999 to district and local governments so that a sustainable surveillance effort can be undertaken by the GOI through a decentralizing system and an inability to monitor the success of the national vitamin A capsule program. It is now no longer possible to monitor vitamin A capsule rates among preschool age children as well as the factors that affect participation in this sight and life-saving national program; nor is it possible to monitor vitamin A capsule coverage rate among postpartum women as well as the factors that affect participation in this program that has important health benefits for women as well as their newborn infants. Since the GOI/HKI NSS was the only permanent surveillance system operating in urban slum areas, it will be difficult without it to monitor the fragile health and nutrition status of the rapidly expanding population of urban poor in Indonesia that suffer very specific problems. Without this system, there is an inability to determine the effect of the massive decentralization process on health and nutrition status; an inability to provide further trend data on important non-health indicators such as water, sanitation, expenditures, rice prices, home ownership, access to electricity, etc; it is no longer possible to track the media habits of Indonesians who live in rural areas that would allow the implementation of more cost-effective national and local health promotion programs.

This report indicates that the ability to monitor and evaluate program implementation and understanding program impacts are critical for decision makers at the district, provincial and national level to continuously improve the health of the nation. Recognizing that the GOI/HKI NSS provided the high quality evidence needed to enable decision makers to

make informed decisions about allocating scarce resources in the most efficient way, it can only be hoped that another instrument will soon be created to again provide regular and credible information on the health and nutrition status of the most vulnerable Indonesians.

1. OVERVIEW OF THE GOI/HKI NSS

Helen Keller International (HKI) initiated a nutrition and health surveillance system (GOI/HKI NSS) in Indonesia in 1995 in collaboration with the Government of Indonesia (GOI) to monitor and evaluate the Social Marketing of Vitamin A Rich Food Program in Central Java. When Indonesia experienced a severe economic crisis in 1997, the GOI/HKI NSS was re-established and expanded to monitor the impact of this crisis on nutrition and health. Beginning in 1998, the GOI/HKI NSS data demonstrated that the Asian economic crisis increased both malnutrition and micronutrient deficiencies such as anemia and Vitamin A deficiency among rural and urban Indonesian women and children. Results from the surveillance were used to direct social and economic programs to the urban poor, to continue to revitalize the national vitamin A capsule program and to introduce fortified complementary foods.

The GOI/HKI NSS collected cross-sectional data for four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was around 40,000 households. Since 1998, the GOI/HKI NSS was established in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

The variables, or indicators, selected for the GOI/HKI NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provided information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.

1.1. History of the GOI/HKI NSS

With more than 5 years experience in operating nutritional surveillance in Bangladesh, HKI initiated a nutritional surveillance system in Central Java, Indonesia in 1995, in collaboration with the Government of Indonesia (GOI). The objective of this surveillance was to monitor and evaluate the impact of a social marketing campaign that promoted consumption of dark-green leafy vegetables and eggs on nutritional status of mothers and their children underfive. During this surveillance HKI/I collected information on socio-demographics, including household composition, parental education and occupation; environmental sanitation, including drinking water source, place for defecation, and garbage disposal. Other information collected was on food production, including the ownership of agricultural land and access to home garden; food consumption at household level and frequency of consumption of several food items such as eggs and dark-green vegetables among mothers and underfive. This surveillance was completed in early 1997.

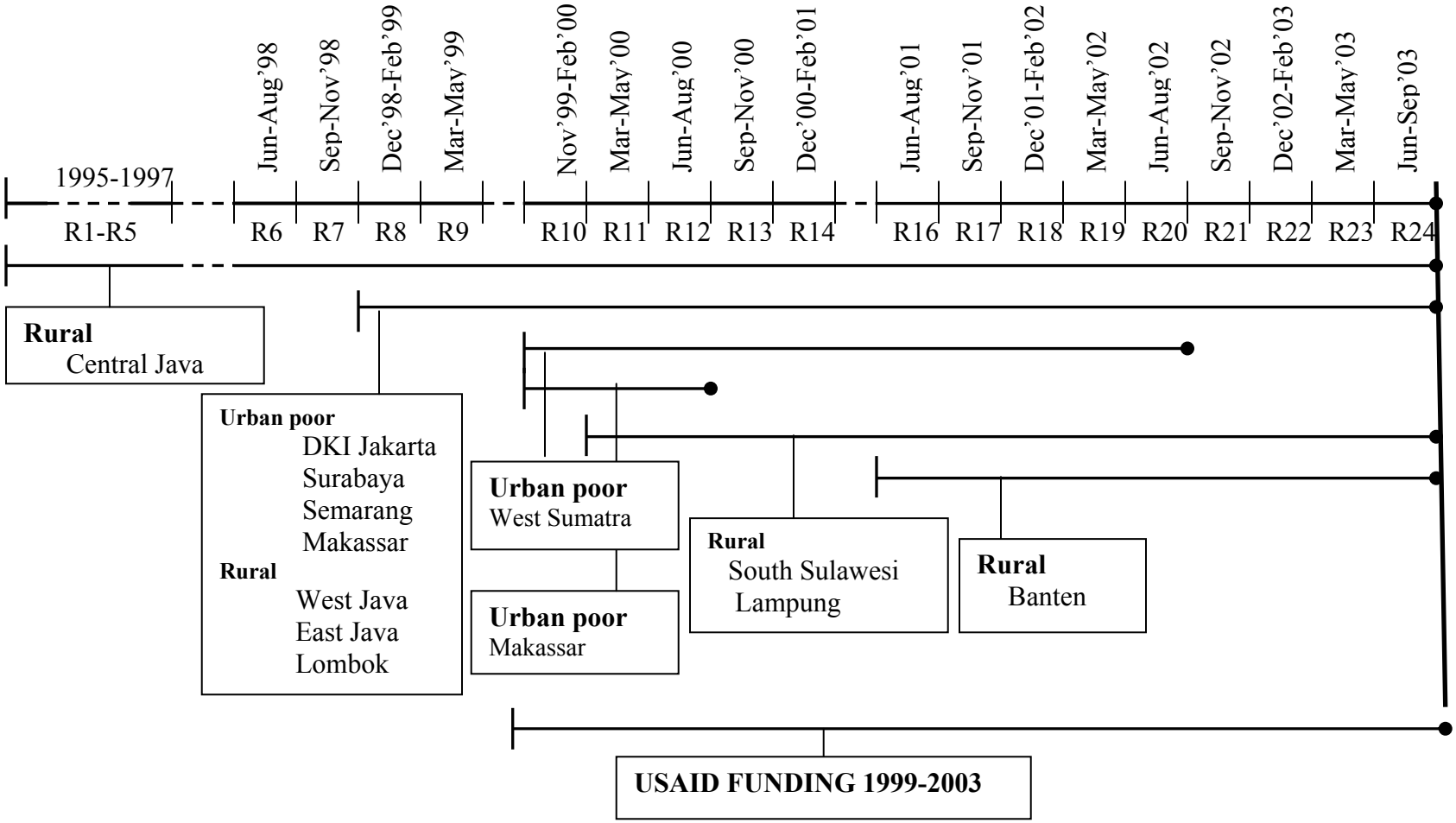
As Indonesia's dramatic economic collapse began in mid 1997, HKI Indonesia instigated the nutrition surveillance again and began to collect additional information along with those collected for the monitoring and evaluation activity of social marketing campaign in Central Java. HKI/I began the nutrition surveillance, later called GOI/HKI NSS (Nutrition and Health Surveillance System) in June 1998 in Central Java. The GOI/HKI NSS was able to compare the nutrition and health situation along with underlying factors to those collected in one round of nutrition surveillance in June 1996. This represents the before and after crisis period, respectively. Based on the information collected, The GOI/HKI NSS data revealed that there was an increase in the prevalence of micronutrient deficiencies, particularly anemia and night-blindness. These findings were supported results indication that the consumption of highly nutritious foods, such as eggs, meat and milk, decreased as a result of the economic crisis.

It was hypothesized that the economic crisis had affected people living in urban poor areas more and that the nutritional status of the population was worse than of those living in rural areas. Therefore, the GOI/HKI NSS was expanded to urban poor areas in Jakarta. THE GOI/HKI NSS data collected in urban poor Jakarta revealed that the prevalence of acute malnutrition (wasting) and anemia was indeed higher than that in rural provinces.

The GOI/HKI NSS had documented that the crises had severely affected nutrition and health status of the Indonesian population, particularly among women and underfive. This was the impetus for HKI and GOI with support from USAID/Indonesia, to expand the GOI/HKI NSS to other rural provinces (West Java, East Java, Lombok/NTB) and urban poor areas (Surabaya, Semarang, and Makassar) in the end of 1998. The GOI/HKI NSS was expanded to the rural area of West Sumatra province and urban poor areas in 4 cities in West Sumatra in the end of 1999, and to two other rural provinces (Lampung, and South Sulawesi) by mid 2000. The GOI/HKI NSS collected data in 9 provinces since this time (see Figure 1). The total population of those 9 provinces represents 70% of Indonesian total population. Data collection in urban poor areas West Sumatra was discontinued since September 2000, based on The GOI/HKI NSS documentation that the number of poor households available and eligible was too small to support a 1,200 sample of households. The newly created province of Banten (formerly part of West Java province) was adjusted as one of the GOI/HKI NSS sites in June 2001 (Round 16). In this way, the GOI/HKI NSS sites grew to 12 sites (8 rural sites and 4 urban slums sites), respectively. Figure 2 shows the GOI/HKI NSS' timeline in Indonesia.

Figure 1. The GOI/HKI NSS sites

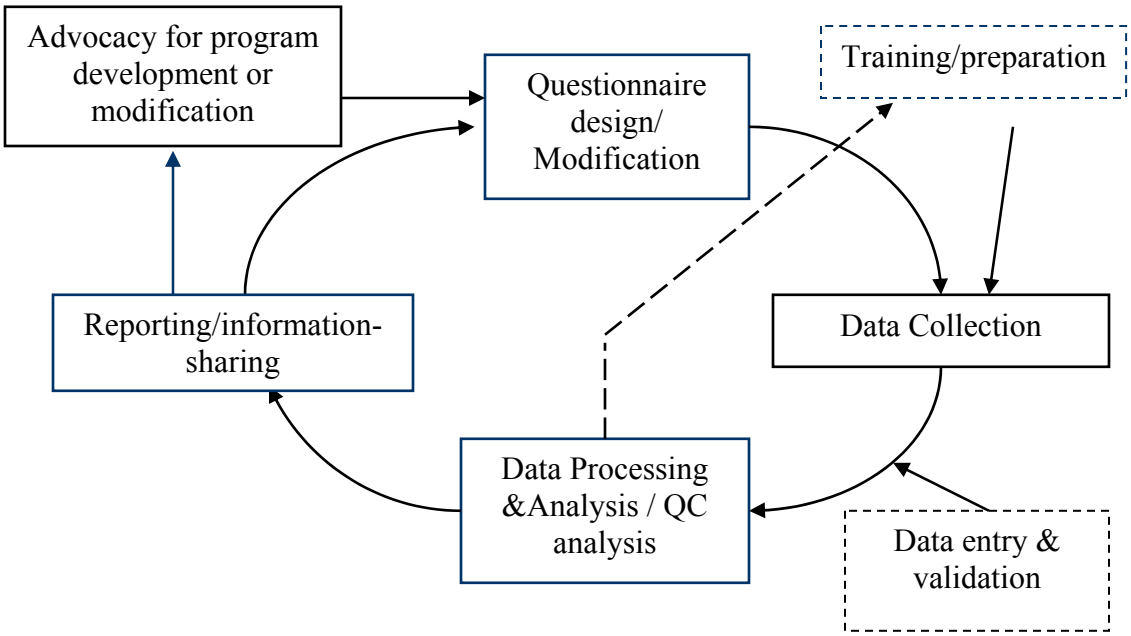
Figure 2. Timeline of the Indonesia Nutrition and Health Surveillance System (GOI/HKI NSS)



1.2. Description of GOI/HKI NSS

Like other nutrition surveillance programs, the GOI/HKI NSS involved several components in its daily operations including: design questionnaire; field preparation and training; data collection; data entry; validation and editing of the data; data processing and analysis; reporting/information sharing for advocacy; and modifying developed programs or develop programs. As it shows on Figure 3 below, the process of each component is continued and the whole cycle is repeated every time new data collection is began.

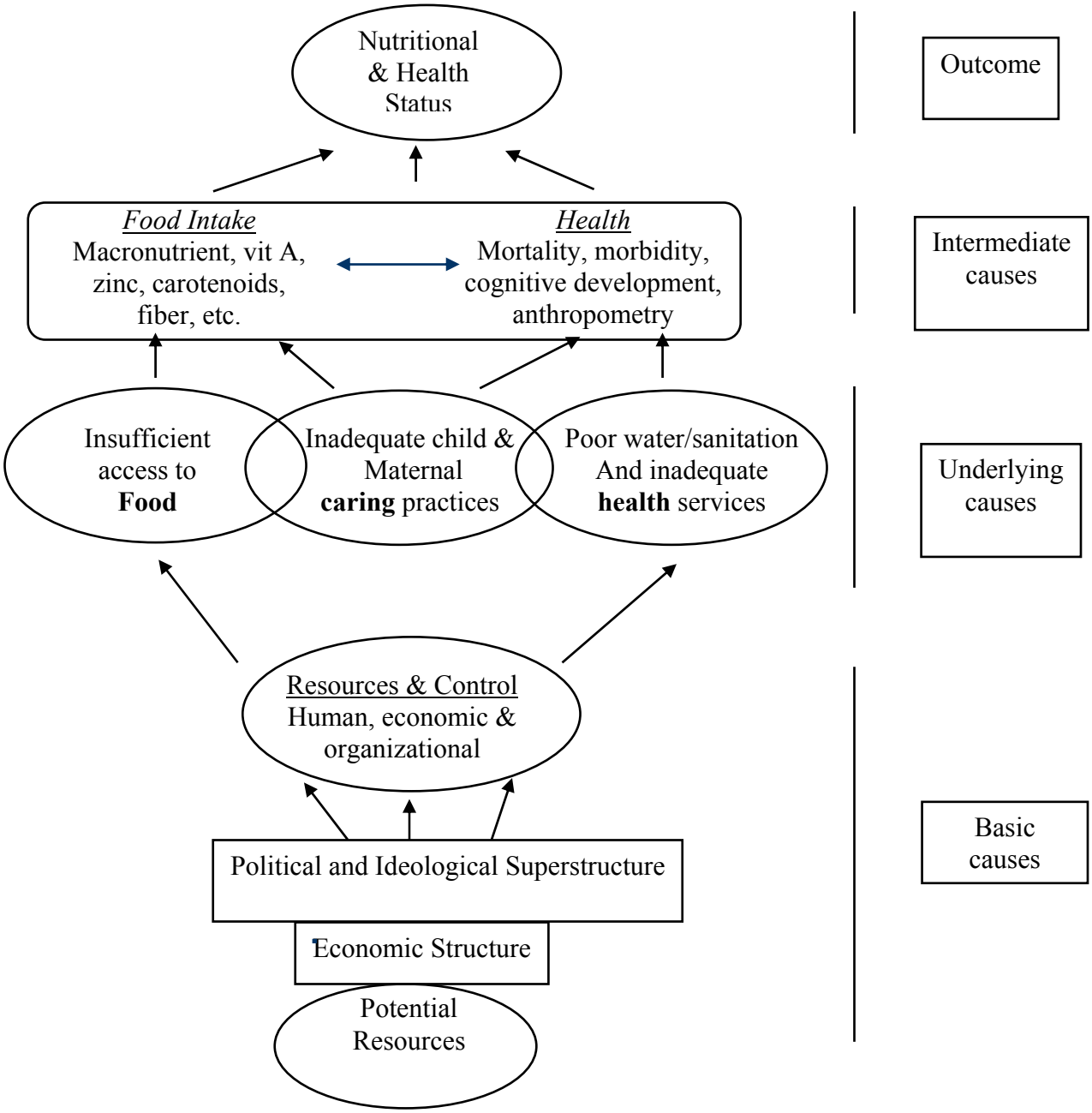
Figure 3. The process of Nutrition Surveillance



1.3. Conceptual Model

The GOI/HKI NSS was designed based on the UNICEF conceptual framework for nutrition and health and displays the underlying factors affecting these conditions (UNICEF, 1996) (Figure 4). This conceptual model allows the measurement of many different factors and situations on a variety of levels that affect nutritional status. These levels include basic, underlying and intermediate factors which influence nutrition and health status, as well as detailed information about these different factors.

Figure 4. Conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996)



1.4. Questionnaire Development

HKI used a conceptual model developed by UNICEF as a base for questionnaire development of nutritional surveillance, including the questionnaire for the Nutritional Surveillance Project (NSP) in Bangladesh. Since the GOI/HKI NSS was developed based on the extensive experience of nutrition surveillance in Bangladesh, it began with the NSP questionnaire as a guide, although the programs do not have the same specific objectives. However, both the NSP and the GOI/HKI NSS have similar main objectives and aims: monitoring and evaluating situation and their impact on the nutrition and health status of population.

The GOI/HKI NSS questionnaire consists of several sections including: demographic and socio-economic status, environmental sanitation, media exposure/vitamin A campaign, access to agriculture and home gardening, farming and fishery, food prices and food expenditures, household food consumption, mothers' and children underfive's vitamin A intake, participation in family planning and access to *posyandu* (integrated health post) and other health services, breastfeeding and complementary feeding practices, soy sauce consumption patterns, knowledge of anemia, health and anthropometric assessment. Questions differed slightly among GOI/HKI NSS provinces due to specific interests from each province or district. Each province or district was encouraged to include questions related to their specific interests or programs.

1.5. GOI/HKI NSS Methodology

1.5.1. Data Collection

The GOI/HKI NSS was designed to be a repeated cross-sectional survey conducted four times (rounds) per year with three months of data collection per round. A repeated cross sectional design was chosen for multiple reasons; situational information could be assessed more quickly, seasonality was captured and a quicker response to changes was made possible. For each round of GOI/HKI NSS data collection, a new sample of households with children underfive was selected. Rural and urban households were selected differently, with a randomly selected multi-stage cluster sample based on probability proportional to size (PPS) applied in rural areas. Each province in rural areas was divided into 3-4 zones based on geographical situation and logistic considerations. A total sample of 3,600-4,800 households was selected per rural province. The total sample size for the GOI/HKI NSS rural areas per round was ~33,600 households.

1.5.2. Sampling Strategy and sample size

In urban poor areas, a different sampling frame was applied. The urban sample includes only households residing in slum areas. In Jakarta and Surabaya, '*kelurahan'* (villages) with slum areas are listed and selected using simple random sampling (SRS) techniques. Then within each *kelurahan*, two or three *'Rukun Warga'* (RW; hamlet/sub-village) with slums were selected for a total of 60-120 RWs, or sample clusters per site. In Jakarta, the

GOI/HKI NSS collected data in three districts (West, East, and North) where the majority of slums are located. In Semarang and Makassar, the *kelurahan* was not used but 60-80 RWs with slum populations were randomly selected from each of the two cities. This slightly different sampling frame was applied because *kelurahan* categorized as poor in Semarang and Makassar are more limited than of those in Jakarta and Surabaya. The information on the *kelurahans* (village) and *RWs* (hamlet) that are categorized as poor was obtained from the Central Bureau of Statistics (BPS) and the National Family Planning Coordination Board (BKKBN). Within each RW, 20-30 poor households with at least one child younger than five years old were then randomly selected to participate in the survey round. In total, recent urban poor areas yielded 6,120 households per round (2520 households in Jakarta and 1200 households each in Surabaya, Semarang, and Makassar).

As for request of GOI/HKI NSS counterpart at provincial health offices, GOI/HKI NSS shared the list of underfive children who were severely wasted (weight for height z-score<-3SD) and the list of mothers and children aged 12-59 months who were night-blind in each round of data collection. This information was shared within two weeks after data collection of each round was completed. This information was requested by provincial health offices to enable them to follow-up and treat severely malnourished children and night-blindness women and underfive. In West Sumatra, there was different understanding on the night-blindness assessment from the local health officers. The local (provincial and district) health office verified night-blindness women and children 12-59 identified found by the GOI/HKI NSS by having them examined by an ophthalmologist using a different method from that of the GOI/HKI NSS'. The GOI/HKI NSS collected night-blindness following the field guide to detection and control vitamin A deficiency published by WHO (Sommer, 1995).[29] The discussion on this issue between provincial health officers and HKI is ongoing and had impacted in the cancellation of GOI/HKI NSS data collection in West Sumatera for Round 21-24 (Sep 2002 – Aug 2003). Therefore, the GOI/HKI NSS total sample size has decreased since Round 21. The detailed information on GOI/HKI NSS sample sizes per round per site since 1995 can be seen on ***Appendix I***.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, underfive children, and fathers (if available).

1.5.3. Training

The GOI/HKI NSS recruited graduates from nutrition academies, schools of public health, and schools of agriculture to serve as field staff. Training (for new field staff) and refresher training (for already trained field staff) was conducted every three months prior to data collection for each round. All field staff (enumerator/interviewer, quality controller, field supervisor, field coordinator) were required to participate in training or refresher training for three or (for previously trained staff) seven (for new staff) days. Government counterparts from district and provincial health offices were also invited and did participate. Topics during training included sampling procedures, anthropometric

measurement, hemoglobin assessment, 24-VASQ method for Vitamin A intake assessment, interview techniques, questionnaire development, and pre-testing of questionnaires in the field. This frequent training helped field workers to avoid bias or incorrect sample selection.

After the training was completed, both new and retrained enumerators were given a qualifying exam to measure their understanding of the training for each session of questionnaire. Prospective enumerators were required to have an average score of 80% correct answers in addition to satisfactory performance in anthropometry and hemoglobin assessment technique in order to pass the training.

1.5.4. Supervision

HKI employed several mechanisms to ensure that the data were collected properly. The survey teams were carefully selected and trained and a field supervisor and field coordinator regularly supervised their work on daily bases. This included on-site-unannounced field visits.

1.5.5. Quality Control in Data Collection

In addition to regular supervision, a quality-control (QC) team made random unannounced visits on 10% of the total sampled households that were visited by field workers. The QC teams were chosen from amongst the best field workers. The data collected by the quality-control team was compared with those of the field worker to ensure high quality data collection by field workers, and the differences in observations were discussed with the field workers in the refreshment training before they began a new round of data collection.

1.6. Data management

1.6.1. Data Entry

Data entry was conducted in Jakarta office since the nutrition surveillance began in Central Java in 1995. Data entry, in Surabaya, East Java, was started in 1999. This additional center for GOI/HKI NSS data entry was added because the GOI/HKI NSS was expanded to the central and eastern islands of Indonesia and it was more cost effective to have the GOI/HKI NSS data from eastern sites entered in Surabaya. The data entry center at the central office in Jakarta carried out data entry of GOI/HKI NSS data collected in Jakarta, Semarang, West Sumatra, Lampung, West Java and Central Java. The data entry centre in Surabaya carried out data entry for GOI/HKI NSS data from Lombok, East Java, South Sulawesi, and Makassar until June 2003, after that all data entry activities of GOI/HKI NSS were conducted in Jakarta office.

Several endeavors were undertaken by GOI/HKI NSS and the GOI in order to be more responsive to the decentralization process of the GOI. One of these efforts was to have Central Java as a trial province for data entry activity. Doubled entry of Central Java data

was conducted for Rounds 16-19 (June 2001 – May 2002) to evaluate the capacity and capability in data entry and data management. It was found that provincial staffs were capable of doing data entry, however more training in data management was needed.

1.6.2. Quality Control in Data Management

Similarly with data collected in the field, quality control activities were also done with data entered by data-entry operators. Data entry controls went through different stages and began after each questionnaire had been entered. It was compared to the questionnaire's data by the data-entry operators themselves. At this stage, each data entry operator also checked the consistency of key variables such as the code and the name of province, district, zone, cluster, village and household. In order to improve the quality of data entered by data-entry operators, the standard for recruitment and selection of data-entry operators were made.

1.6.3. Data Analysis

Data analysis is conducted using SPSS version 7.5, 10.0, or 11.5. The cross check of analysis was always done to make sure that the results were correct. Results from data analysis were shared with program policy makers at a variety of implementation and different level.

1.7. Special Activities/surveys

The GOI/HKI NSS was a very unique system and had a low marginal cost for additional uses. The GOI/HKI NSS has been proven to be the backbone of other HKI programs such as the vitamin A program and FAM program.

Within the auspices of the GOI/HKI NSS, HKI conducted several smaller studies such as efficacy of Complementary Feeding Initiative (CFI) – a collaboration program with UNICEF, in urban poor Jakarta and rural West Java. A recent survey conducted within GOI/HKI NSS system in June-September 2002 was related to malaria. The study was carried out in 3 districts in Central Java and Yogyakarta (Magelang, Purworejo, and Kulon Progo). The objective of the study was to determine the relationship between malnutrition and other health indicators (malaria). This sub-study was a collaborative Communicable Disease Control (P2M) of MOH. Data were collected among the full population in 6 villages located in the districts. Data was collected on standard GOI/HKI NSS variables such as nutrition, health, household economics, health service use, food consumption and other related indicators. Blood were collected among all samples to assess hemoglobin concentration and to assess malaria from blood smear.

The implementation of additional activities/surveys within the GOI/HKI NSS by using its available existing resources has lowered costs than when those additional activities were conducted separately.

Another special survey that was requested by the GOI was a nutritional and health assessment on the island of Flores, East Nusa Tenggara province. The survey was conducted in September 2002 – March 2003 to assess the nutritional and health status of underfive and women in 3 districts of the island of Flores.

2. ADMINISTRATIVE ISSUES

The GOI/HKI NSS was the largest sampled survey in the world and the administrative issues involved in the success of this monumental effort are striking. The scope of the project, the infrastructure it required, the capacity building it mandated, and the impact of the distribution and the use of data and results are unparalleled.

2.1. Scope of the GOI/HKI NSS

The GOI/HKI NSS surveyed approximately 37,500 households per year in 12 sites (8 rural and 4 urban slum areas) located in 9 provinces. The large scale and diverse survey sites required the establishment of different field offices (one for each GOI/HKI NSS site: 'base camps') that operated in conjunction with the central office in Jakarta. These field offices were staffed, equipped with surveying supplies including HemoCue machines for conducting hemoglobin assessment, length-boards and *microtoises,* scales, and mid-upper arm circumference tapes for conducting anthropometric assessment and questionnaires.

2.1.1. Organizational Set-up

There were slightly more than 250 personnel employed by the GOI/HKI NSS at any one time. With the exception of the Program Director, all GOI/HKI NSS employees were Indonesian. Between 1999-2003, a total of 842 Indonesians were employed by the GOI/HKI NSS. This provides an indication of the level of skills enhancement and capacity building that the GOI/HKI NSS provided over the four year period of data collection. Full time staff located in the field consisted of the field office administrator and field coordinator in each office. Because the GOI/HKI NSS worked in partnership with the GOI, a provincial health officer was appointed by the GOI/HKI NSS main counterpart at the national level (NIHRD) to be a provincial coordinator who supported GOI/HKI NSS activities in each province and acted as the liaison between the GOI/HKI NSS and the GOI. During data collection activities the field staff expanded considerably to include data enumerators, supervisors, quality control teams and field supervisors. Field activity coordinators (FAC) also made site visits during data collection periods. These FACs acted as liaisons between field offices and the central office in Jakarta and were ultimately responsible for all data collection and administrative activities for the field sites.

Jakarta staff included data entry operators, data management staff, a documentation team (whose responsibility it was to maintain and update the questionnaire and codebook), logistics and administrative staff, field operations manager, data management manager,

field operations and data management director, program director, program consultants and advisors, and the team from NIHRD assigned to participate in the GOI/HKI NSS.
The average number of staff working on the GOI/HKI NSS at any one time was 263 people. The list below details the positions of those working with the GOI/HKI NSS.

GOI/HKI NSS Men Power (personnel)

1. Interviewer = 251
2. Field Supervisor = 42
3. Quality Control Team = 37
4. Field Coordinator = 12
5. Field Activity Coordinator = 5
6. Documentation Officers = 2
7. Logistics and Administration Officers = 2
8. Provincial Coordinator = 13
9. Data Management officers = 13
10. Data Entry Operator = 17
11. Data management manager and assistant manager = 2
12. Field operation manager = 1
13. Field operation and data management director = 1
14. Program director = 1
15. Program consultant and advisor= 2
16. Technical oversight: 12 from ministry of health (NIHRD, NRDC, Directorate of Community Nutrition)

2.1.2. Equipment and Materials Needed for Data Collection

Field equipment:
Digital weighing scale UNICEF SECA and AND (Japan)
Length Board – for length measurement of children 0-23 months
Microtoise – for height measurement of women and children 24-59 months
Conversion table of Calendars – for estimation of children's age
MUAC tape
Iodine test kit
Digital Thermometer

Hemoglobin Assessment:
Hemocue + battery
Microcuvette
Softclix + Lancet
Alcohols, cotton, and tissues
Gloves

Field Workers tools:
Questionnaire
Clipboard and stationery (pencil, pen, marker, tape)
Raincoat, umbrella, jackets

2.2. Capacity Development as a Result of the GOI/HKI NSS

Capacity development was a major focus of the GOI/HKI NSS from its inception. All project staffs were Indonesian, with the exception of the project director, and staff members were regularly promoted to senior positions. In addition to internal capacity development, external training and skills transfer was conducted with local organizations and the Government of Indonesia (GOI).

In all, a total of 1127 GOI/HKI NSS staff were trained to collect and supervise data collection over the 1999-2003 period. These staff, graduates of nutrition academies, schools of public health and agriculture, did not possess these types of skills upon their graduation from school. The skills learned from employment with the GOI/HKI NSS have allowed many of them to advance to positions within the Indonesian government and with other international NGOs and donor agencies. Furthermore, the GOI/HKI NSS worked with local universities to provide data, capacity development and training to their employees. (One example related by another NGO was that if an employer knows that a prospective employee has worked with the GOI/HKI NSS, they are guaranteed an interview for the new position). In all, over 226 GOI/HKI NSS employees have transitioned to jobs with other organizations.

The GOI/HKI NSS staffs were trained in data collection techniques every three months, and each province and two of the districts covered by the GOI/HKI NSS were invited to send representatives of their staff for training as well. In this way, skills transfer took place so that local officials obtained new knowledge and had that knowledge tested along with the rest of the GOI/HKI NSS team. Over the period from 1999-2003, 263 provincial and district level health officials attended data collection training and testing.

The GOI/HKI NSS sponsored and conducted several trainings regarding nutrition surveillance and the 24-VASQ method (a means of determining the quantity of Vitamin A intake from a modified 24 hour dietary recall) to SEAMEO –TROPMED students in 2000, 2001 and 2002. A total of 75 students and other participants attended the trainings.

GOI/HKI NSS staffs have also provided capacity development to other NGO staffs, for example GOI/HKI NSS staff provided training to twenty members of Church World Services (CWS) in Anthropometric Assessment.

One of components added into the GOI/HKI NSS objectives beginning in 2001 was to increase local capacity to collect and analyze nutrition surveillance data. The GOI/HKI NSS CD-ROM has been proven to be a useful tool for capacity development for GOI/HKI NSS counterparts, particularly the MOH. Training seminars on GOI/HKI NSS data analysis, interpret, and presentation took place in April 2001 and February 2002. The GOI/HKI NSS trained 18 provincial level health officials how to manage and analyze data using real data collected by the GOI/HKI NSS. Training was a collaborative effort between HKI/I and the Ministry of Health (NIHRD, NRDC, and Directorate Health and Nutrition, Dept. of Health). Every GOI/HKI NSS provincial health office sent one of its

officers for this training seminar. Provincial level officials were then to train district level health officials so that a "training of trainers" effect would result.

The enormous capacity development efforts, both internally and externally, have been achieved during the project. The GOI/HKI NSS supported its own staff and GOI staff in both local and international seminars and conferences. From 1999-2003, the GOI/HKI NSS sent 40 people to training sessions within Indonesia, the Netherlands, Singapore, the United States, and to international conferences in Morocco, Thailand, the United States, Austria and other locations. GOI staffs have been sent to Singapore, Finland, the United States, and Australia, for capacity development as well.

2.3. Uses of The GOI/HKI NSS Data

2.3.1. Informing Policy and Programmers

Information and results from the GOI/HKI NSS have been presented to program planner and implementer and policy makers such as GOI and other institutions. As GOI/HKI NSS data has been collected every three months, it provides a quicker and wider range of information to different audiences. In informing policy makers and program planners, the GOI/HKI NSS target its message to audiences at different levels responsibilities such as at local level, including the population in surveyed areas; at the national level, including the Ministry of Health, National Planning Board, UN agencies and non-governmental organizations; and at the international level, such as donor agencies, international organizations (UNICEF, WHO, and the World Bank), other country governments, and the scientific community.

The GOI/HKI NSS has shared its results through Crisis Bulletins, presentations, coordinating meetings, Journal/Scientific articles, and data on CD-ROM. The Crisis Bulletins are a monthly publication discussing special themes and topics that reach wide range of audiences at different levels. Specific themes that have been discussed in Crisis Bulletins are: re-emergence of the threat of Vitamin A Deficiency Disorder (VADD), high prevalence of iron deficiency anemia among children, maternal thinness, successful maintenance of high-coverage of vitamin A capsules, breastfeeding and complimentary feeding practices, and others. For more detail information on topics that have been discussed in the Crisis Bulletins, visit and download the bulletins from the GOI/HKI NSS on HKI Asia Pacific website at: http://www.hkiasiapacific.org. In this way the GOI/HKI NSS can ensure that its results are accessible to a wider audience than merely those within Indonesia

The Ministry of Health used the GOI/HKI NSS to monitor and evaluate the National Vitamin A supplementation program and utilized data on capsule coverage rates at the provincial level to determine if goals for vitamin A capsule coverage were being met throughout the country. Furthermore, data presentations relating to Vitamin A capsule coverage and other nutritional indicators have been requested by individual districts in recent months in order to plan for district health budget and spending levels on health.

The Ministry of Health is currently utilizing GOI/HKI NSS data for its Food Security Project headed by Dr. Soekirman, analysis is being conducted, linking anthropometric indicators with economic and socio-demographic outcomes.

Local governments in Sikka, NTT have used GOI/HKI NSS special survey results to plan health and nutrition activities and to advocate for additional funding for improving health and nutrition status in Flores Island.

The Ministry of Health has used GOI/HKI NSS data to locate children who are below –3 Z scores for anthropometric indicators and to identify children who report night blindness in order to provide immediate treatment for these children.

The Ministry of Health has also used GOI/HKI NSS data as a basis to formulate policy on anemia control and has used hemoglobin data as a sensitive indicator of economic difficulties.

In addition to use by the GOI and HKI, GOI/HKI NSS data has been utilized by external sources. The GOI/HKI NSS information has been shared upon request within other institutions such as JHPIEGO, The World Bank, WHO, MNH. The GOI/HKI NSS data was utilized for developing PROFILE Indonesia, a process to obtain functional consequences by using epidemiological data in order to increase the awareness of senior decision-makers on the importance of nutrition and its functional consequences. PROFILE is one of the projects developed by the Academy of Education Development (AED) with the support from USAID. The GOI/HKI NSS was able to provide, on request, important information for breastfeeding/ complementary workshop organized by PATH, with support from the LINKAGES project and USAID in Jakarta in July 2002. As a follow-up, Special series on breastfeeding and complementary practices was produced as GOI/HKI NSS Annual report 2002 and now widely used to support and promote breastfeeding activities in Indonesia which lead to the change of National breastfeeding recommendations. GOI/HKI NSS data has been used by researchers at Tufts University and DAI to investigate a series of issues relating to rice prices and other economic indicators included in the dataset. The World Bank and the GOI has utilized GOI/HKI NSS data for an investigation of poverty analysis (2002-2003). GOI/HKI NSS data has also been used for analysis for practical internship training report, theses, and dissertation conducted by Indonesian students and international students, including one bachelor's degree, eight master's degree and one doctoral degree projects.

Presentations are made for GOI, USAID and other international donors, Universities, and other interested parties. At least once a year a presentation of a wide variety of data is made for a broad audience in order to present project results. Scientific articles for peer reviewed journals and conferences are yet another way that the GOI/HKI NSS disseminates results of data analyses and documents the association of malnutrition and poor health with other factors. This also ensures that the international community is aware of the current situation within Indonesia. With regard to presentations made for the GOI, GOI/HKI NSS results are presented and disseminated in each participating GOI/HKI NSS province to update GOI counterparts regarding the GOI/HKI NSS and its

findings once in a year or more depending on requests from the province/district. Presentations made at national and international conferences, for international donors and other stakeholders as well as scientific articles generated from GOI/HKI NSS results are listed on ***Appendix II , III.***

2.3.2. Data Sharing through CD-ROM

As of early 2001, the government of Indonesia (GOI) began a rapid process of decentralization. To accommodate the process of decentralization being undertaken in the government and all its branches, HKI has begun to implement more intensive collaborative initiatives with health counterparts in each of GOI/HKI NSS sites. Toward this end, the first (2001) and the second (2002) CD-ROM have been released. The main purpose of making these data available is to facilitate analyses aimed at gaining a better understanding of the underlying causes of malnutrition and poor health. The first CD-ROM was produced for each of the 12 GOI/HKI NSS sites including data from the beginning of the GOI/HKI NSS up to the most recent round at that time (Round 8-13). In addition to containing indictors on key program and nutrition and health outcomes, the GOI/HKI NSS CD-ROM also contained EpiInfo, a statistical analysis program. The second GOI/HKI NSS CD-ROM (updated from Round 8-16) was shared with GOI counterparts both at national and provincial level as well as with other international organizations audiences. This second CD-ROM represents HKI's strong commitment to the sharing and wide use of key nutrition and health information for policy setting and program action.

2.4. Counterparts and Donors

HKI is a non-governmental organization and the Indonesian government is the main partner in conducting all of its activities. The GOI/HKI NSS works closely with the Government of Indonesia (GOI), particularly the Ministry of Health at the national, provincial and at district levels. Since early 2001, there has been a push towards decentralization within the GOI that requires health and nutrition information that is specific to and representative of individual districts. Therefore, the partnership between HKI and government at district level has become very important. At the provincial level, the GOI/HKI NSS also established partnerships with local institutions and universities. As an international agency, GOI/HKI NSS built collaboration with many international agencies worldwide by focusing its technical resources toward a global understanding of micronutrient deficiencies and their causes. In this regard, the GOI/HKI NSS was recognized as an important source of information and for their potential contribution to global monitoring systems. The following is the list of counterparts who have worked with HKI in conducting the GOI/HKI NSS:

National level

1. National Institute for Health Research and Development (NIHRD), Ministry of Health, RI
2. Nutrition Research and Development Center (NRDC), Ministry of Health, RI
3. Department of Internal Affairs

Province and district level

1. Provincial and district health office, MOH, RI
2. University of Diponegoro, Central Java
3. University of Hasanuddin, South Sulawesi
4. Andalas University, West Sumatra

International level

1. UNICEF
2. World Food Program
3. World Bank
4. UN Food and Agriculture Organization's Food Insecurity and Vulnerable Information and Mapping System (FIVIMS)
5. Certain universities in Australia, Europe and USA.

The Ministry of Health is the main counterpart for implementation of HKI programs, including GOI/HKI NSS. The National Institute for Health and Research Development (NIHRD) of the MOH has been the main counterpart to the GOI/HKI NSS. As the GOI/HKI NSS main counterpart, the MOH at national, provincial and district levels was involved in every stage of GOI/HKI NSS activities ranging from GOI/HKI NSS preparation through coordinating meetings with both government and non-government officials. The MOH was also involved in each step of field activities, including training, data collection, and field supervision, disseminating the GOI/HKI NSS results and information in order to improve and modify nutrition and health programs within the Government of Indonesia. Together with the Department of Internal Affairs, MOH provided HKI with permission to conduct GOI/HKI NSS activities.

With regard to GOI/HKI NSS collaboration with other institution at the international level, the GOI/HKI NSS had a long experience working with UN agencies such as UNICEF, an efficacy study of Complementary Feeding Initiative (CFI) was conducted within the parameters of the GOI/HKI NSS and took place in urban poor Jakarta (2000) and another occurred in the rural areas of West Java province (2001) conducted in collaboration with UNICEF. The GOI/HKI NSS also worked with other UN agencies such as World Food Program (WFP) during the preparation stage of a study on a premix for a micronutrient-rich complementary food (soy-flour with micronutrients added to the rice while cooking) in 2000. Another collaborating agency was World Bank. The World Bank and the GOI have utilized GOI/HKI NSS data for an investigation of poverty analysis (2002-2003).

3. Main Findings

The collection of data on nutrition and health status over time among the rural population of eight provinces and the urban poor population of four large cities in Indonesia allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators for urban and rural areas surveyed by the Government of Indonesia/Helen Keller International (GOI/HKI) Nutrition and Health Surveillance System (NSS) in 1999-2003.This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. This report adds important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them. Data collected in 9 provinces - the provinces of Banten, West Java, Central Java, East Java, West Sumatra, Lampung, Lombok and South Sulawesi and for the urban poor populations of Jakarta, Makassar, Semarang and Surabaya between December, 1999 – September 2003.[1]

3.1. Anemia among Children 12-23 Months of Age

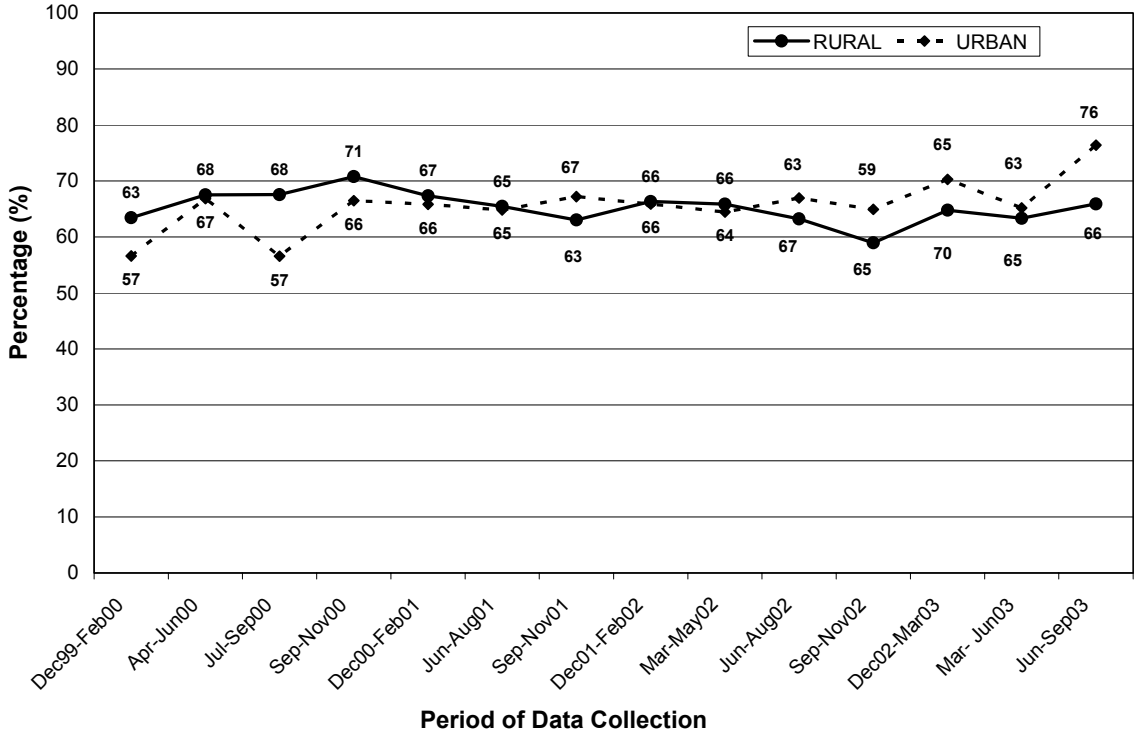
Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%. [2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold .[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfive in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: Levels of anemia following the economic crisis remain high and may be rising. In December 1999-February 2000, the prevalence of anemia was 63% in rural areas and 57% in urban slum areas. In the last round of data collection, from June to September 2003, levels were 66% in rural areas and 76% for urban slums.

Figure 5. Prevalence of Anemia Among Children 12-23 Months (HB < 11 g/dl)



3.2. Anemia among Non-Pregnant Mothers

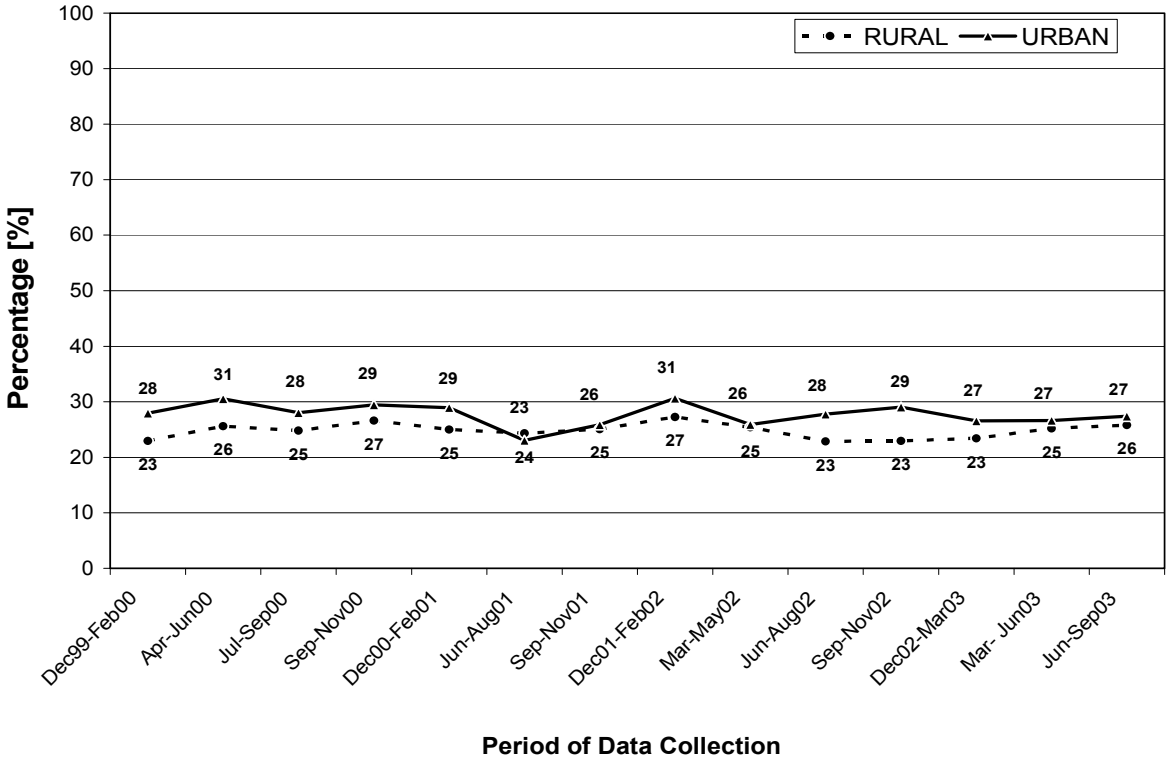
Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: Anemia levels in December 1999 to February 2000 were 23% and 28% for rural and urban slums respectively. From June to September 2003 the prevalence were found to be fairly unchanged at 26% for rural areas and 27% for urban slums.

Figure 6. Prevalence of Anemia among Non-Pregnant Mothers (HB<12 g/dl)



3.3. Prevalence of Underweight Children 12-23 Months of Age

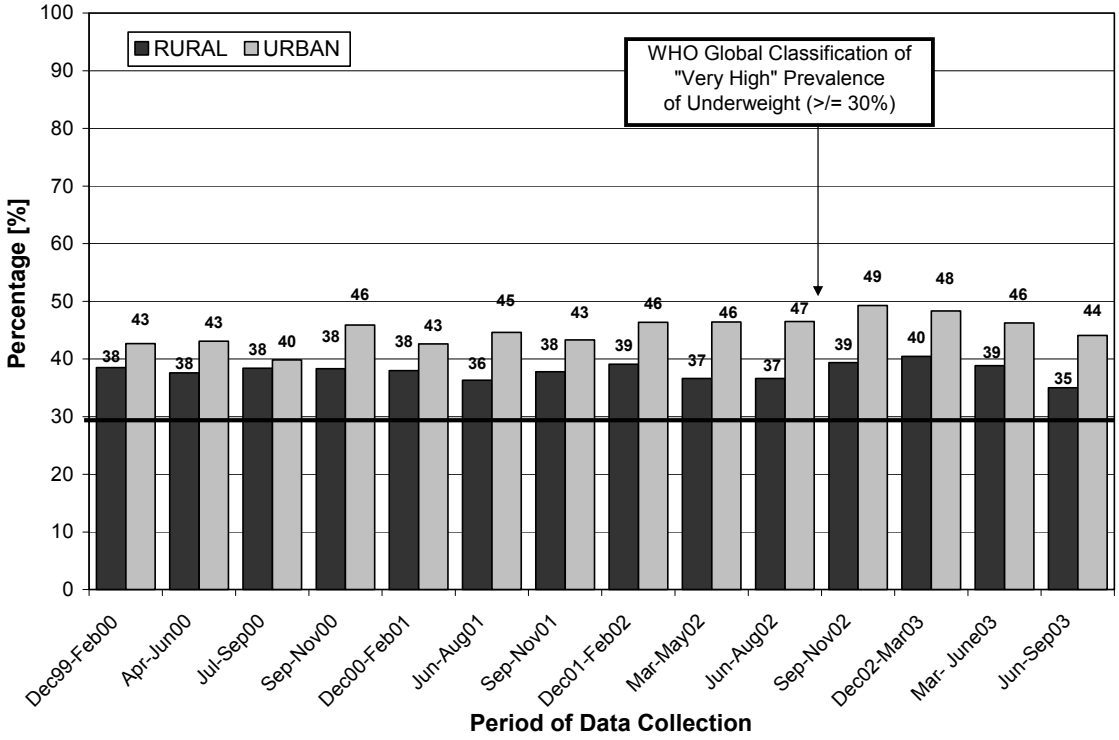
Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of ≥ 30% as "very high" for children underfive years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: The prevalence of underweight is similar for rural areas and urban slums, and has remained relatively unchanged over time. The main finding is that the levels are consistently 5-10 percentage points higher than the WHO criteria for a serious problem for children underfive years of age. The prevalence was 38% in rural areas and 43% in urban slums in December 1999-February 2000. In the last round of data collection, from June to September 2003, it was 35% in rural areas and 44% in urban areas.

Figure 7. Prevalence of Underweight Children 12-23 Months of Age (% < -2 SD)



3.4. Prevalence of Stunted Children 12-23 Months of Age

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

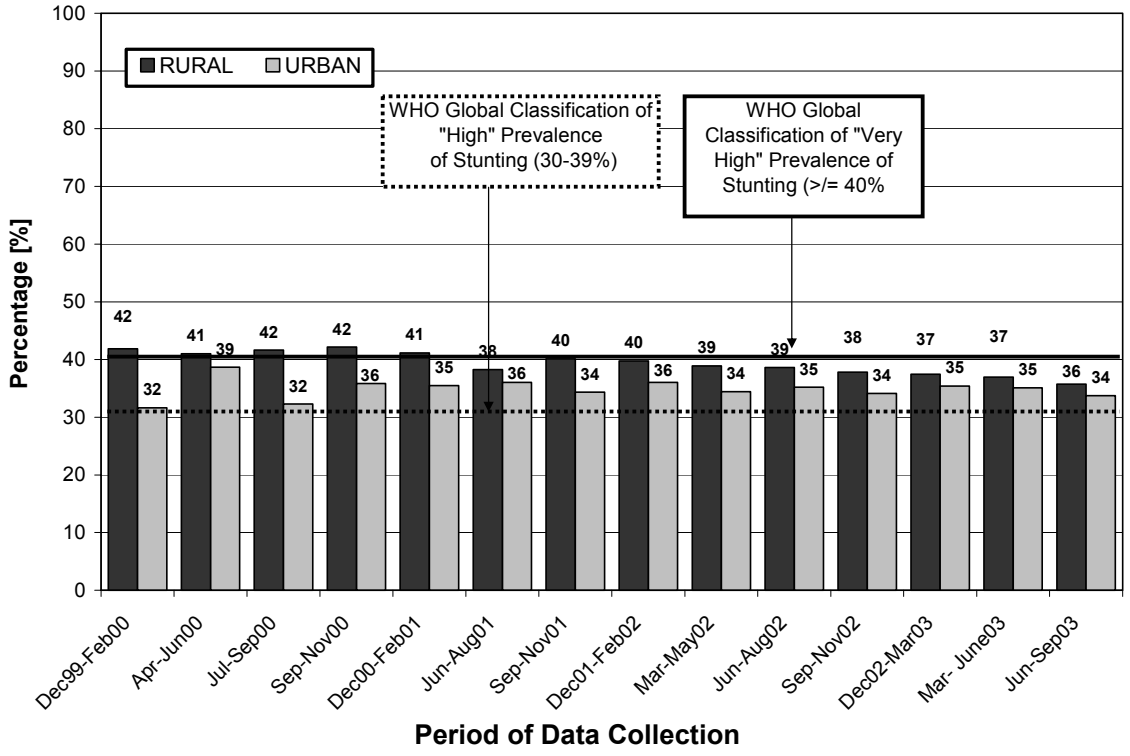
Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: Initially, the prevalence of stunting ranged from 5-10 percentage points higher in rural areas than urban slums. Further, children in rural areas were classified as having "very high" rates of stunting by WHO standards for children underfive years of age for many rounds of data collection. The level of stunting in rural areas was found to be 42% in December 1999 to February 2000, and was 36% in the last round of data collection from June to September 2003. The level of stunting in urban slums is lower than rural

areas, but is still classified as "high" by the WHO for all rounds of data collection; the prevalence of stunting was 32% in the first data collection period and 34% in the last.

Figure 8. Prevalence of Stunted Children 12-23 Months of Age (% <-2 SD)



3.5. Prevalence of Wasted Children 12-23 Months of Age

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation" .[4]

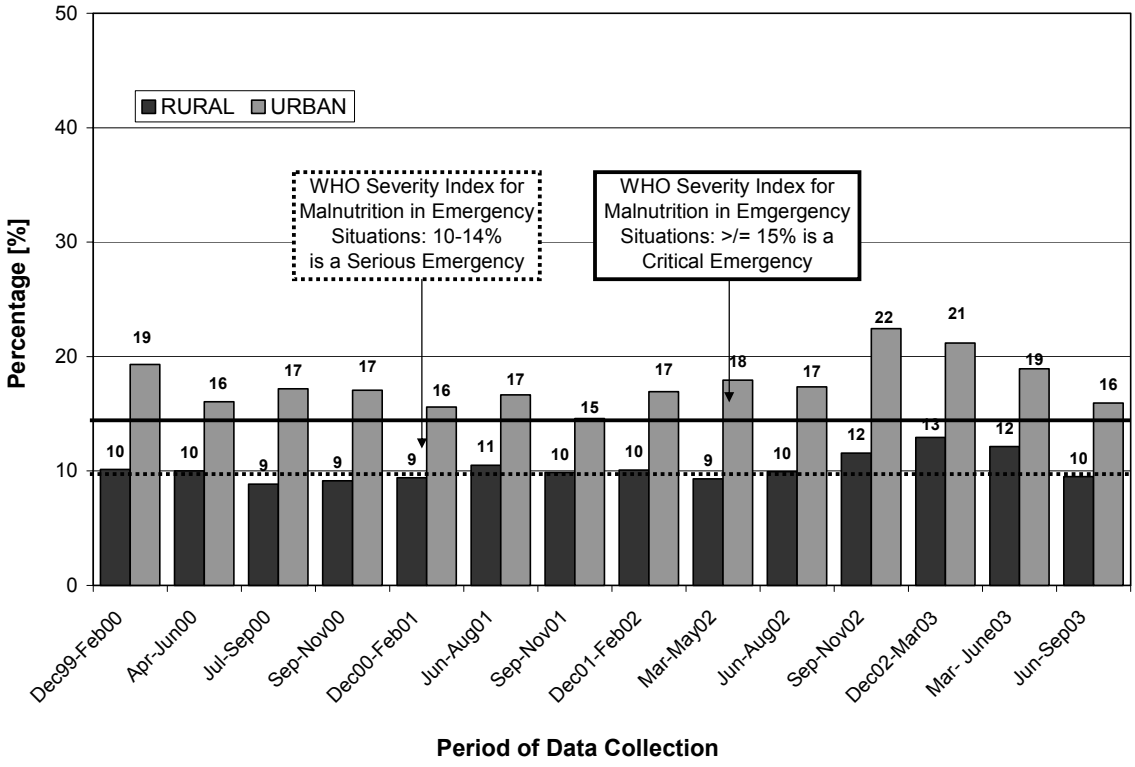
Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: For all rounds of data collection the levels of wasting observed in urban slums were over 15%, which classifies these areas as experiencing a "critical emergency" by WHO for children underfive years of age. In December 1999 to February 2000, wasting was found to be 19% in urban slums. It appeared to improve for a time, but returned to higher levels and was 16% in the last round of data collection. Although rural areas had

lower levels of wasting than urban slums, the levels were often greater than 10%, which classifies these areas as experiencing a "serious emergency" situation by WHO standards.

Figure 9. Prevalence of Wasted Children 12-23 Months of Age (% <- 2 SD)



3.6. Percentage of Non-Pregnant Mothers with Low Body Mass Index

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

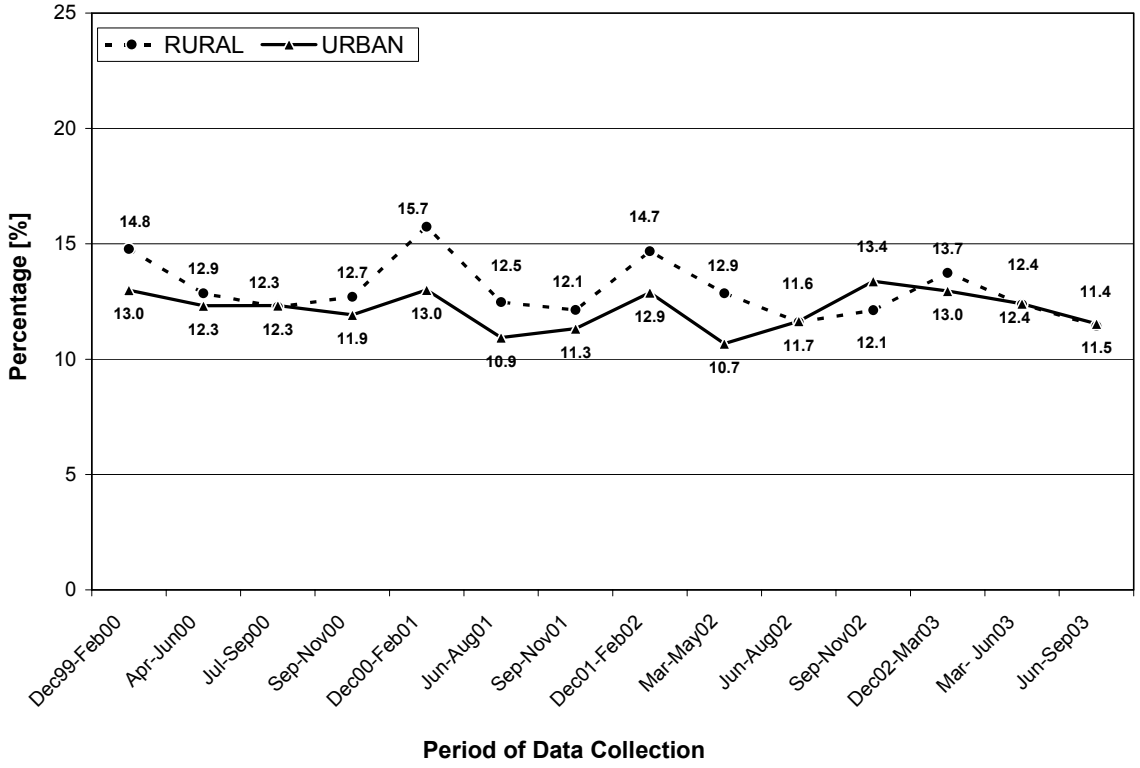
Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m^2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: The trend of maternal thinness in urban slums and rural areas seems to follow a pattern. There were two large peaks in the prevalence of maternal thinness in the December 2000- February 2001 and December 2001- February 2002 periods of data collection. The peaks might be related to the floods and the month of Ramadan during these years, in which fasting occurs during the day. Nevertheless, overall it appears that maternal wasting is declining, particularly in the rural areas. At the start of data collection levels were 13.0% for urban slums and 14.8% for rural areas. By June –

September 2003, they had declined to 11.5% in urban slum areas and 11.4% in rural areas.

Figure 10. Percentage of Non-Pregnant Mothers with Low Body Mass Index (BMI < 18.5)



3.7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

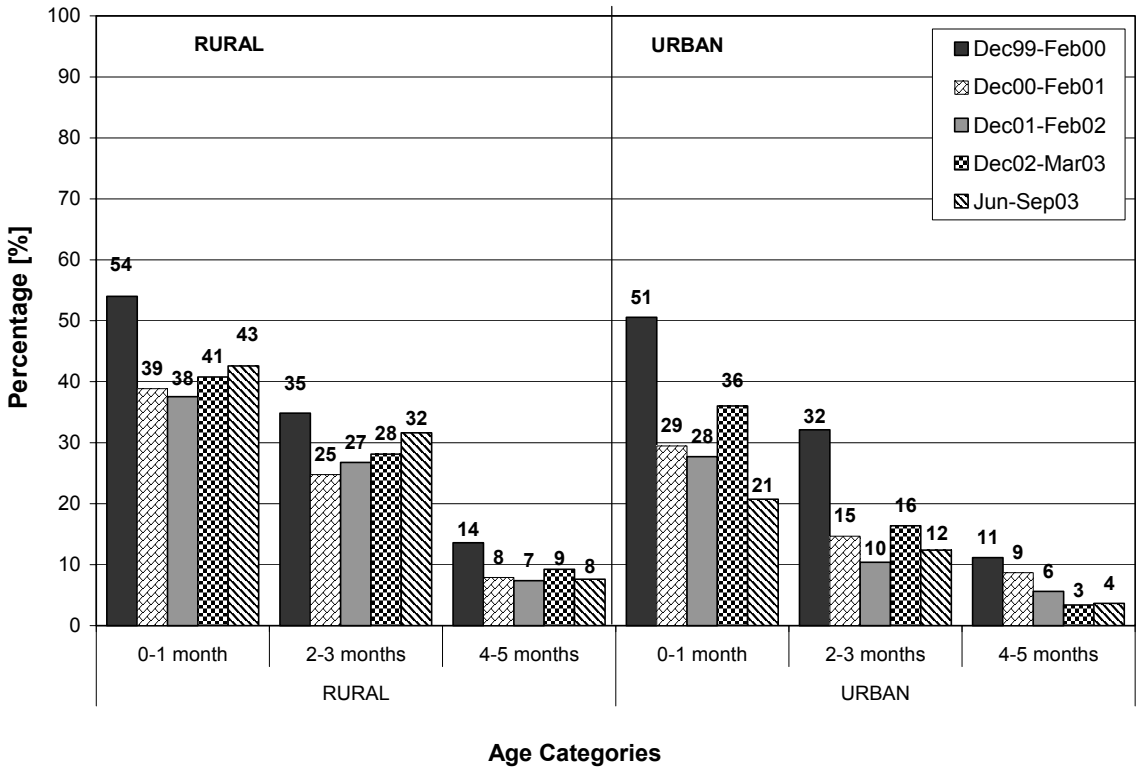
Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: The prevalence of exclusive breastfeeding is declining in both rural areas and urban slums, and in all three age categories. From the first to the last rounds of data

collection, the prevalence dropped from 54% to 43% in rural areas for 0-1 month old children. In urban slums it dropped from 51% to 21% among 0-1 month old children for the same rounds. Exclusive breastfeeding for children 2-3 months in both areas shows similar declines. Less than 10% of 4-5 month old children in both areas were found to be exclusively breastfeed in the June- September 2003 period of data collection. However, it is important to point out that a large proportion of infants, although not exclusively breastfed at all or not for very long, is breastfed well into the second year of life (data not shown).

Figure 11. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age



3.8. Household Use of Adequately Iodized Salt

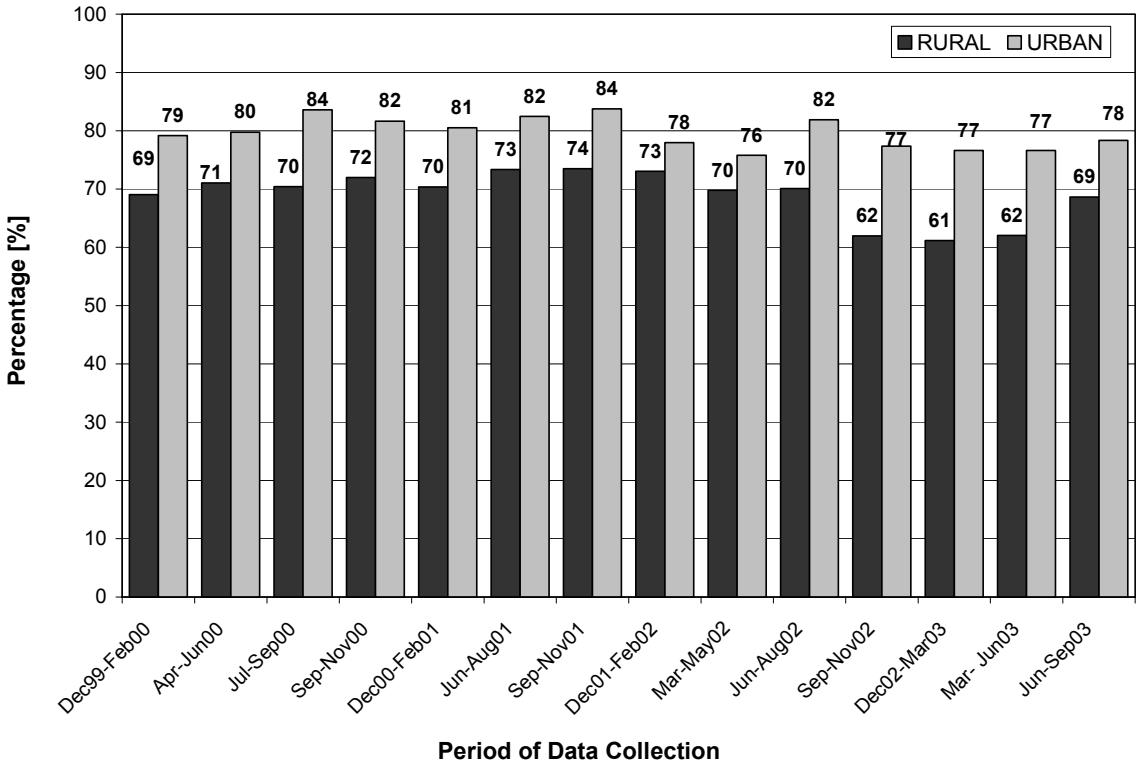
Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development .[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: In December 1999-February 2000, use of adequately iodized salt was 69% and 79% for rural areas and urban slums, respectively. By September to November 2001, levels had increased to 74% and 84%. However, universal salt iodization use seems to be declining with levels returning to 69% in rural areas and 78% in urban slums in the June to September 2003 round of data collection. Levels may be lower in rural areas due to a variety of reasons that include improper iodization or lack of availability as well as household issues such as cost or availability of iodized salt, or lack of knowledge of its benefits.

Figure 12. Household Use of Adequately Iodized Salt (>30 ppm)



3.9. Vitamin A Intake of Children 12-59 months of age

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

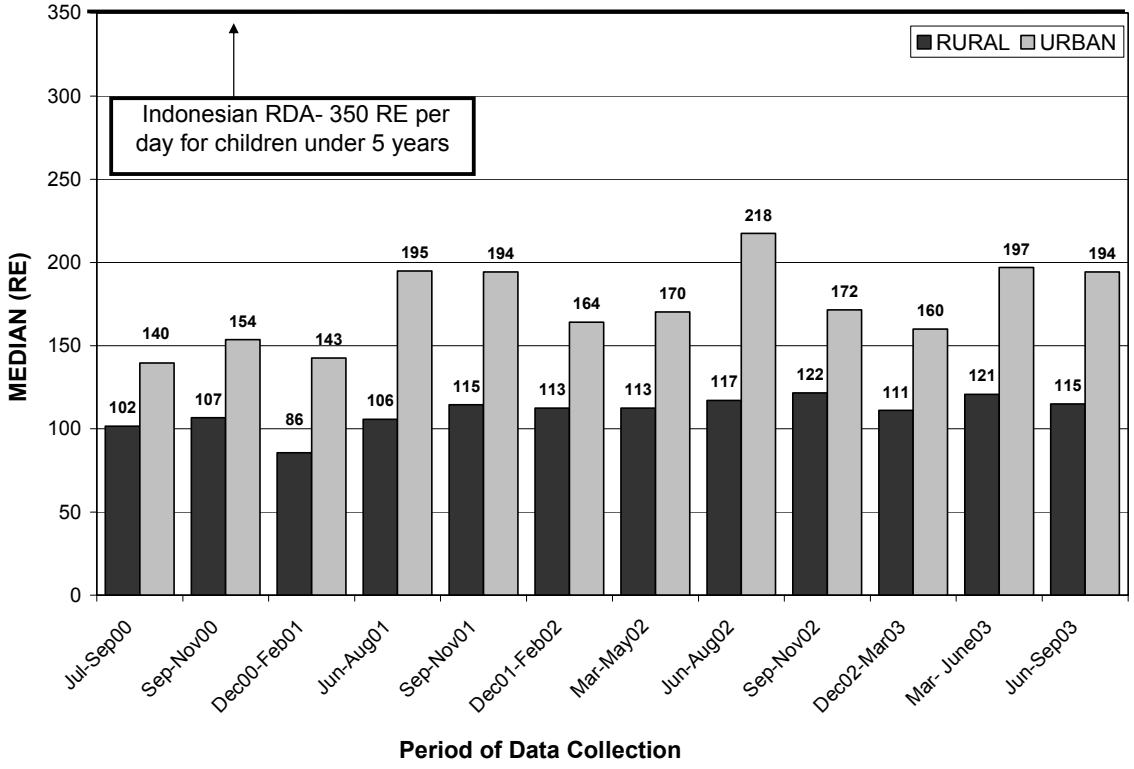
Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease .[10]

However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: Based on the Indonesian recommended dietary allowance of VA for children underfive, both urban slum and rural children are not eating enough VA. The current method of assessment has been applied since the July to September 2000 round and there does seem to be a slight improvement over time in urban slums; from July – September 2000 intake was 140 retinol equivalents (RE) and increased to 194 RE in June to September 2003. A much smaller increase was observed in rural areas from 102 RE to 115 RE for the same rounds of data collection. However, this is still far below the RDI of vitamin A for children 12-59 months old.

Figure 13. Total Vitamin A Intake among Children 12-59 Months of Age (Median Intake in Retinol Equivalents Based on 24 Hour Recall)



3.10. Vitamin A Capsule Coverage among Children 6-59 Months of Age

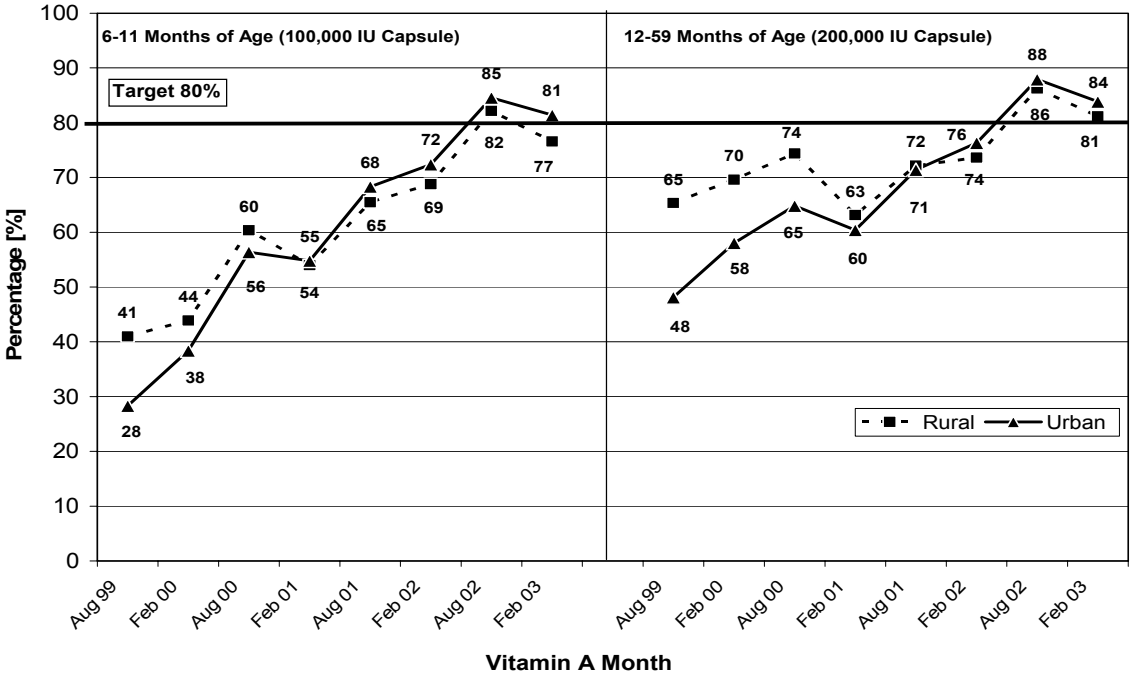
In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta- analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: Children 6-11 months of age were not officially targeted by the VAC program until 1999. At that time coverage levels among this group were 41% in rural areas and 28% in urban slum areas. Since then the coverage levels have markedly increased, and by August 2002 reached levels of 82% and 85% in rural and urban slum areas, respectively. The VAC coverage level among 12-59 month old urban slum children was also increased by 36% from August 1999 to February 2003. At the same time, the high coverage level among rural children 12-59 months of age was maintained and improved. The most important observation, however, is that VAC coverage has reached the target level in both age categories of both urban slum and rural areas. The goal now is to maintain those levels.

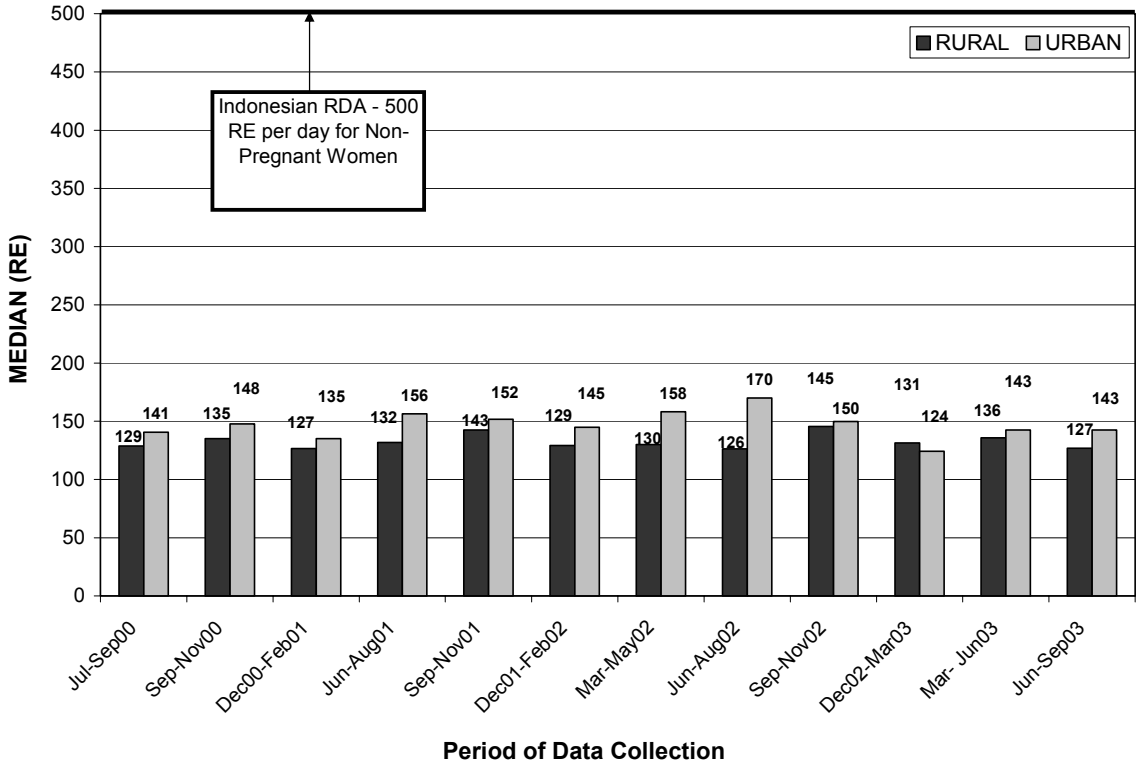
Figure 14. Vitamin A Capsule Coverage among Children 6-59 Months of Age



3.11. Total Vitamin A Intake among Non- Pregnant Mothers

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.
Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.
Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.
Findings: The Indonesian RDI for non-pregnant non-breastfeeding women is 500 retinol equivalents (RE)/ day, 850 RE/day if they are lactating. Both rural area and urban slum women consumed less than half that amount in every round of data collection and there were virtually no changes of intake over time.

Figure 15. Total Vitamin A Intake among Non- Pregnant Mothers (Median Intake in Retinol Equivalents Based on 24 Hour Recall)



3.12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

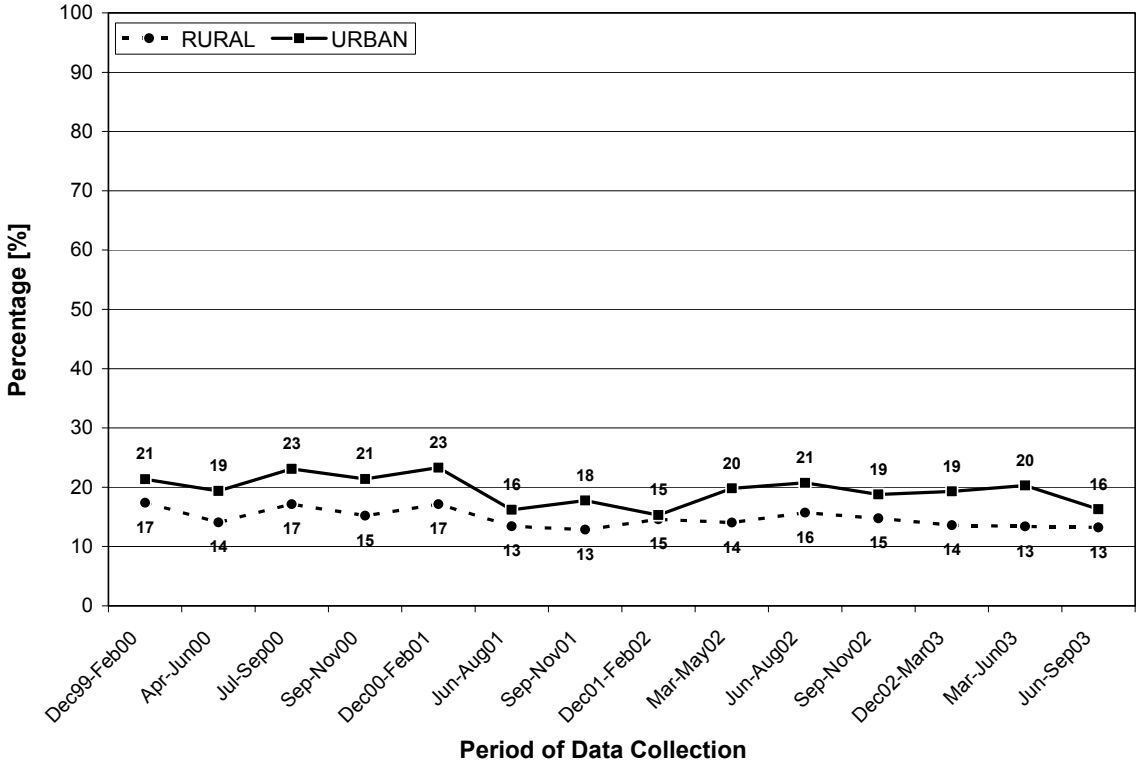
Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: VAC coverage levels have remained fairly static in the last four years among post partum women. It appears that urban slum levels have increased slightly and rural areas have decreased slightly. Both remain very low at 21% in the first round of data

collection and 16% for urban slums in the last round of data collection from June-September 2003 and 17% and 13% for rural areas over the same time period. This is probably best explained by the fact that there is currently no widespread program to improve capsule coverage among post partum women.

Figure 16. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



3.13. Complete Immunization Status of Children 12-17 Months of Age

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

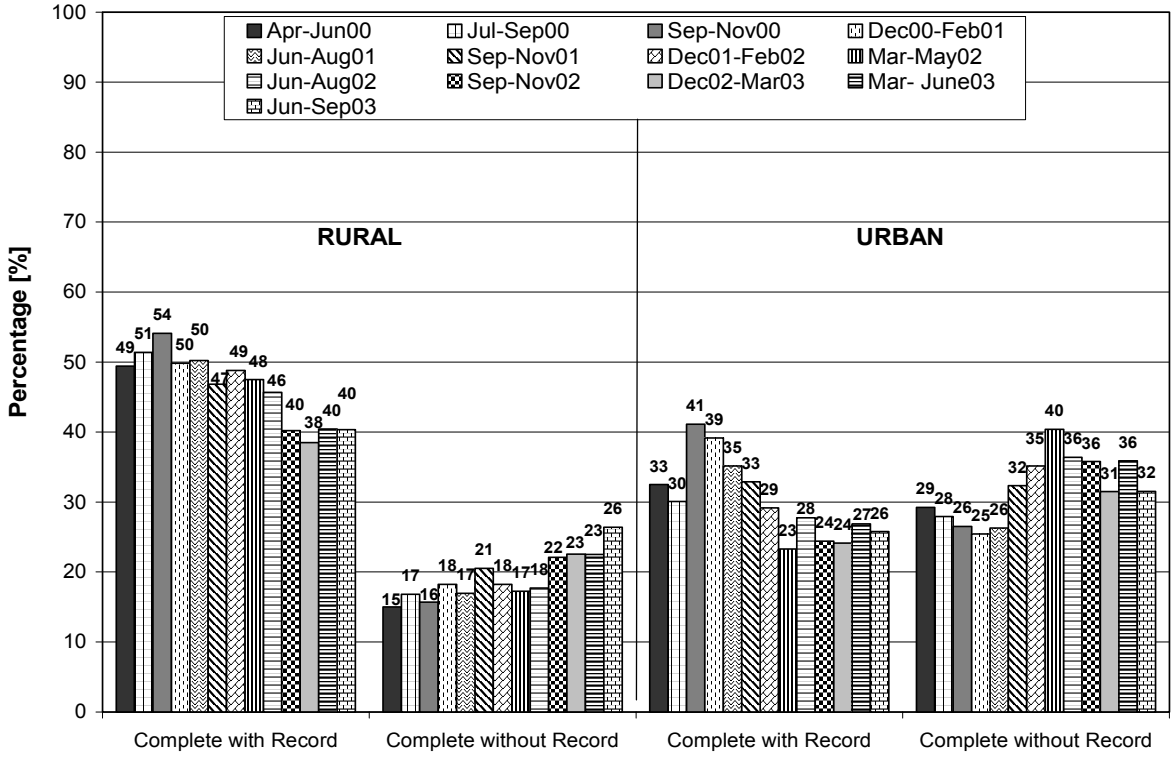
Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record,

the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: Complete immunization with official record tends to be higher in rural areas compared to urban slums, but is lower than desirable for both areas. Rates appear to be declining, while at the same time complete immunizations without record is increasing. This is cause for concern because, without an official record, less confidence can be placed in the knowledge that these children are actually receiving all standard vaccinations. From April – June 2000, 49% of children in rural areas and 33% in urban slums were fully vaccinated with a complete record. From June to September 2003, only 40% of rural children and 26% of urban slum children had a complete immunization status documented by an official record.

Figure 17. Completed Immunization Status of Children 12-17 Months of Age



3.14. Posyandu Attendance in the Previous Month

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

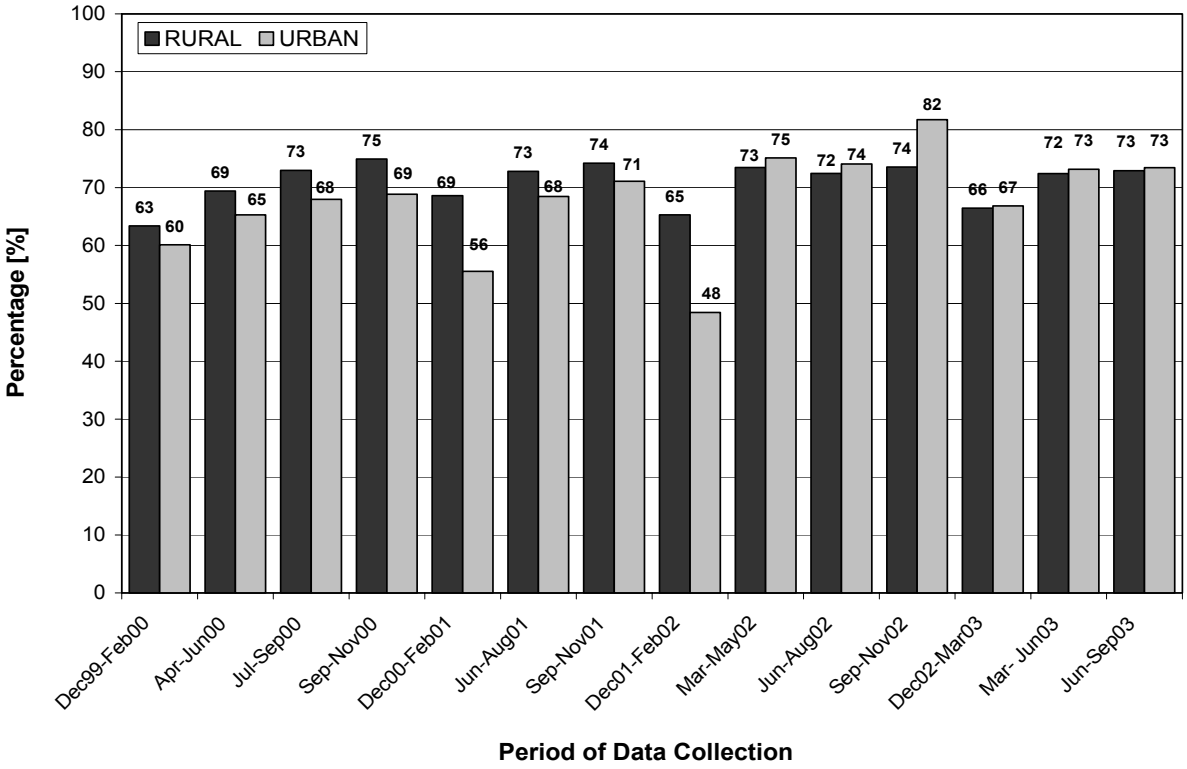
Importance: Children underfive years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number

of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child underfive years of age to the *Posyandu*.

Findings: Household *Posyandu* attendance appears to be increasing slightly over time, indicating a sustainable and active health system. Nevertheless, attendance does fall off at times, particularly in urban slums. The attendance tended to be lower around the December months, which during these years coincides with the Ramadan and Eid Celebrations, Muslim big holidays. While improved attendance is encouraging, it is important to note that more than one quarter of all eligible children do not attend the *Posyandu* regularly.

Figure 18. Household Attending the Posyandu in the Previous Month



3.15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

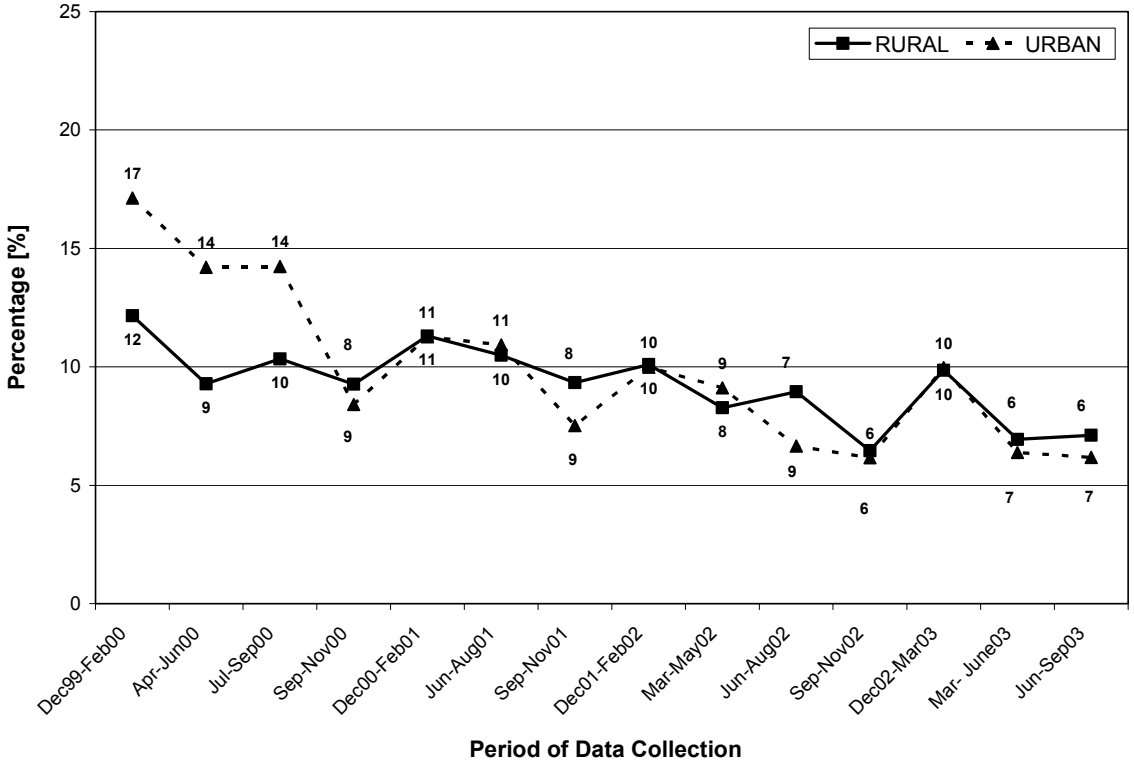
Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: The incidence of diarrhea appears to be declining over time in both urban slum and rural areas. Prevalence rates from the beginning to end of data collection have been cut in half. The peaks in occurrence may be due to seasonal variations, particularly in relation to the rainy season which begins in late September and reaches its height in December.

Figure 19. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days



3.16. Household Expenditures on Food Items

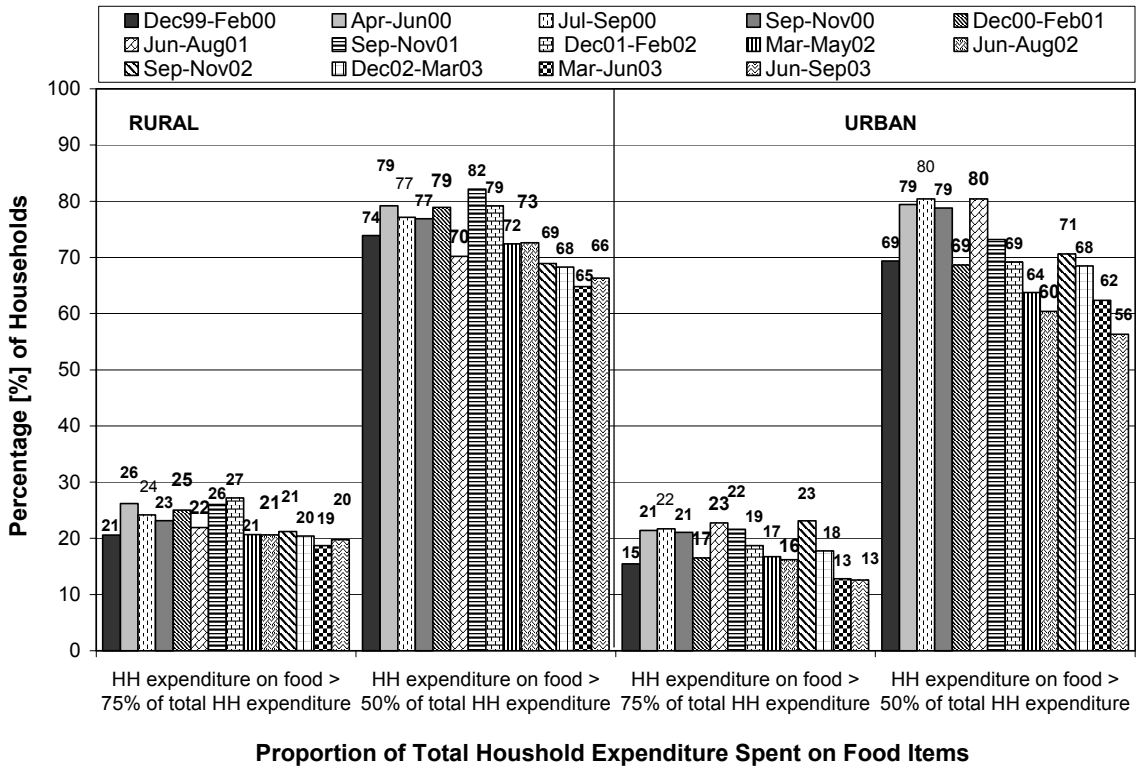
The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: In December 1999 to February 2000, 21% of rural and 15% of urban slum households spent more than 75% of their total expenditures on food. This is compared to 20% of rural and 13% of urban slum households that spent more than 75% of their total expenditures on food in the last round of data collection, from June to September 2003. The percentage of households spending more than 50% of their total expenditures on food was 74% and 69% for rural areas and urban slums respectively, in the first round of data collection. These rates declined to 66% for rural areas and 56% for urban slums in the last round of data collection. Although, the actual trend seems to fluctuate, an overall improvement in proportion of expenditures among those spending more than 50% of their expenditures on food can be observed. However, it appears that for those who spend the vast majority (>75%) of their expenditures on food (e.g. the poorest of the poor) little improvement has been seen over time.

Figure 20. Household Expenditure on Food Items



4. Conclusions

4.1. THE GOI/HKI NSS Findings

In summary, the analyses for mothers and children underfive years of age have shown that only a few indicators in either urban slum areas or rural areas have improved over the period of data collection. The two exceptions to these are the increase of vitamin A capsule coverage for children and reduction of the diarrhea prevalence. The analyses have revealed the following about the health and nutrition situation in urban slum and rural areas in Indonesia:

- Anemia levels for children underfive is alarmingly high and have not declined over time. Disturbingly, children 12-23 months in urban slum areas appear to have an increasing prevalence of anemia over time, with more than 75% of all children surveyed being anemic.

- The prevalence of anemia among mothers has remained high (20-30%) and fairly unchanged over time.

- Anthropometry for children has changed little over time.
    - Underweight among 12-23 mo old children is in the "very high" category according to WHO standards for children underfive years of age. There is a slight decline over the last three rounds of data collection, but the prevalence is still very high.
    - Wasting among 12-23 mo old children remained in the "critical emergency" level in urban areas and the "serious emergency" level in rural areas as categorized by the WHO for children underfive years of age. There is a slight decline in prevalence over the last three rounds of data collection for both urban and rural areas.
    - Stunting levels are in the "high" range according to WHO standards for children underfive years of age. Urban areas remained virtually unchanged over time, while rural areas have experienced a small decline over the period of data collection.

- Maternal Thinness appears to have declined very slightly over the period of data collection, however seasonal peaks appear to occur with regularity in the December-February months of data collection. Whether this is due to seasonality issues, fasting month, or some other factors is unknown.

- Exclusive breastfeeding among children under six months of age is declining in both urban and rural areas. Less than half of children 0-1 months of age are exclusively breastfed and fewer than 10% of those 4-5 months of age are exclusively breastfed. Recently, the Government of Indonesia changed its recommendation for the duration of exclusive breastfeeding from 4-6 months to 6 months. However, even the first recommendation of 4-6 months was not practiced very well.

- Vitamin A intake for both mothers and children is extremely low- in either group intake does not reach 50% of the recommended daily intake over time.

- Vitamin A capsule coverage for children is a true success story. Coverage among eligible children has met or surpassed the Government of Indonesia's target rate of 80% of all eligible children 6-59 months of age in almost all provinces and urban poor population surveyed. However, coverage for post-partum women is another story. Over the period of data collection, less than 25% of women reported receiving a capsule within four weeks of delivery.

- Complete Immunization with an official record has declined over time. While the percentage of mothers reporting that their child received the full set of vaccinations without being able to show an official record has risen over the period of data collection, some caution must be placed in these results. Mothers may not be aware of the number and timing of the full series of immunizations and thus less confidence can be placed in this information. However, even if mothers did report correctly, the percentage of children receiving their full series of immunizations has not changed over the previous four years and is still below the Government of Indonesia's 80% target.

- *Posyandu* attendance has increased over the period of data collection but more than a quarter of children in both urban and rural areas do not attend regularly (every month).

- Diarrhea among children 12-23 months has dropped over time- declining by over 50% in both urban and rural areas.

- Universal use of iodized salt remained high, but is still low in some provinces such as Lombok and Banten.

- The trend for household expenditures on food items seems to fluctuate, an overall reduction of the proportion of households that spend more than 50% of their expenditures on food can be observed. However, the proportion that spends the vast majority (>75%) of their expenditures on food (e.g. the poorest of the poor) has declined little over time.

4.2. THE GOI/HKI NSS Achievements

Over the USAID funding period 1999-2003, the GOI/HKI NSS contributed extensively to the understanding of the impact of the Asian economic crisis on the nutrition and health status of Indonesians. The program also contributed to further knowledge on the importance of socio-economic status, maternal education, food prices, etc. on the nutrition and health status. The GOI/HKI NSS results provided evidence to advocate for

decision making and health policy change and the allocation of resources. A summary of some of the NSS achievements are listed below:

- The GOI/HKI NSS has provided relevant and high quality data in a timely manner that has had important outcomes on health policy and planning over the previous four years in Indonesia. Information resulting from the GOI/HKI NSS data has provided a means to monitor the health and nutrition status of mothers and children underfive years of age in provinces that, together, host 70% of the country's population. Furthermore, it will provide uses in the future, serving as background or baseline information for future surveillance, evaluation, or other programmatic needs.

- The scale and scope of the GOI/HKI NSS is unparalleled in both the developing and developed world. The number of households surveyed, the amount of information obtained and compiled, and the speed with which information became available is an example of excellence of the entire GOI/HKI NSS staff and of the collaboration which existed between the Government of Indonesia and Helen Keller International. Few other surveillance systems in the world provide data and crucial results within three months after the completion of data collection. Furthermore, few other surveillance systems can achieve the level of quality that the GOI/HKI NSS consistently provided. With the multi-layered system of quality controls and rigorous and repeated training, The GOI/HKI NSS was able to ensure that data was of the highest quality.

- The GOI/HKI NSS also provided invaluable monitoring of the National Vitamin A Supplementation program as well as the USAID funded Vitamin A Promotion program coordinated by HKI and the Ministry of Health, Republic of Indonesia. The GOI/HKI NSS was able to demonstrate the effectiveness of the Vitamin A Supplementation program in reaching eligible children throughout the country. Because of the GOI/HKI NSS and its results, the effectiveness and the overall success of the program in meeting the established target rate has been documented. Furthermore, the GOI/HKI NSS was able to demonstrate through which means of promotion that mothers learned of the campaign providing free capsules to children underfive. The GOI/HKI NSS data also provided ways to improve targeting of promotion materials by ascertaining television and radio access, times of access and favorite channels. This type of information is not available in rural areas from any other private or public entity.

- Throughout the history of the project, the flexibility of the system allowed for additional components, questions, and areas to be surveyed, yielding a wealth of information that would not otherwise be available. Information regarding that anemia is already a problem among infants as young as 3-5 months old, relationship between malaria and nutrition status, incidence of death by drowning, injuries and death due to accidents, nutrition assessment in Flores, and innovative linkages between food policy and nutrition leading to new insights both in

Indonesia and globally are all examples of research and information that the GOI/HKI NSS was able to undertake and provide.

- The capacity building efforts of both Helen Keller International and Government of Indonesia staff have provided skills and knowledge to a large number of people and have allowed them to move to other positions within the GOI, to other NGOs, donors and universities seamlessly.

- The presentation of findings both locally and internationally, the creation of Crisis Bulletins, and publication of results in peer reviewed journals have ensured that important linkages and cutting edge techniques are shared throughout the world. This information dissemination is one of the greatest components of the project and ensures that important findings and experiences are shared with all interested parties.

5. Recommendations

Because of the numerous ways that the GOI/HKI NSS has provided information and data for policy makers and planners, it is clear that surveillance efforts should be maintained within Indonesia. The process of decentralization affect a country that has not yet recovered from the Asian economic crisis of 1997, however without a household based surveillance system, the effects of this will not be known. The sustainability of such an endeavor is directly related to its value. Because of the importance of the information provided, surveillance should be seen as a sustainable activity to monitor program performance and delivery, and to identify and address declines in health and nutrition status as soon as possible. Information on urban slum areas is not provided by any other type of monitoring system, and with this being the fastest growing population within the country- it is clear that surveillance particularly in these areas should be a priority.

Based on the GOI/HKI NSS findings and importance, the following are recommended:

- Interventions should be developed to lower the rates of anemia among children younger than five years. The recent rise in anemia prevalence in urban slum children is alarming and requires immediate attention. Extremely high level of anemia among children underfive may herald a 'LOST GENERATION' because of the long lasting and probably irreversible negative impact on cognitive development. The resulting benefits in lowering anemia rates far outweigh the costs of such interventions.

- Strengthen and further develop existing interventions for preventing micronutrient deficiencies among mothers, in particular iron and vitamin A deficiency.

- Continue support for the Vitamin A Supplementation Program for Children.

- Support the Vitamin A Supplementation for post partum women in order to increase coverage.

- Iodized salt should be available in many more households. Special efforts should be made to improve usage of iodized salt in low coverage areas such as Lombok and Banten.

- New initiatives for limiting the prevalence of micronutrient deficiencies, among children as well as mothers, should be piloted and be intensively monitored and evaluated.

- Exclusive breastfeeding should be promoted and supported. A full range of activities from training health care personnel on importance and ways to facilitate successful exclusive breastfeeding to reinforcing the strict implementation of the Indonesian Code on the Marketing of Breast Milk Substitutes should be done to improve exclusive breastfeeding rates.

- *Posyandu* activities should be encouraged and strengthen in order to maintain and extend the gains seen in attendance and vitamin A capsule coverage.

- Further efforts should be placed on ensuring that children receive the full series of immunizations in a timely manner. Efforts such as the PIN campaign provide encouraging evidence that this is possible.

- The Information provided by the GOI/HKI NSS should and must be utilized for new research, plan new interventions and strengthen existing systems.

- The lessons learned from the GOI/HKI NSS project should be utilized to the greatest extent within Indonesia and internationally as well as the knowledge and skills maintained within the GOI/HKI NSS staff should be shared with a large audience within and outside Indonesia. Skills transfer both domestically and internationally should be supported and encouraged. This level of expertise should be consulted and applied particularly for south-to-south collaboration.

Appendix I. Date of Visit Data Collection

DATE OF VISIT RURAL AREA ROUND 10 - 24

ROUND	LAMPUNG			SOUTH SULAWESI			WEST SUMATERA			BANTEN		
10	N/A			N/A			24-Aug-99	-	05-Dec-99	27-Dec-99	-	01-Feb-00
11	13-Apr-00	-	10-Jun-00	10-Apr-00	-	03-Jun-00	09-Mar-00	-	16-May-00	05-May-00	-	07-Jun-00
12	11-Jul-00	-	02-Sep-00	10-Jul-00	-	05-Sep-00	26-Jun-00	-	05-Sep-00	03-Jul-00	-	07-Aug-00
13	27-Sep-00	-	20-Nov-00	06-Oct-00	-	25-Nov-00	28-Sep-00	-	25-Nov-00	06-Oct-00	-	09-Nov-00
14	13-Dec-00	-	16-Mar-01	18-Dec-00	-	14-Feb-01	16-Dec-00	-	24-Feb-01	11-Jan-01	-	16-Feb-01
16	05-Jun-01	-	29-Jul-01	19-Jun-01	-	16-Aug-01	22-Jun-01	-	24-Aug-01	05-Jun-01	-	20-Jul-01
17	02-Sep-01	-	26-Oct-01	03-Sep-01	-	16-Oct-01	14-Sep-01	-	14-Nov-01	03-Sep-01	-	23-Oct-01
18	02-Dec-01	-	09-Feb-02	03-Dec-01	-	30-Jan-02	01-Dec-01	-	24-Feb-02	01-Dec-01	-	06-Feb-02
19	02-Mar-02	-	26-Apr-02	05-Mar-02	-	18-Apr-02	11-Mar-02	-	12-May-02	11-Mar-02	-	24-Apr-02
20	03-Jun-02	-	29-Jul-02	06-Jun-02	-	18-Jul-02	03-Jun-02	-	02-Aug-02	03-Jun-02	-	29-Jul-02
21	16-Sep-02	-	24-Nov-02	18-Sep-02	-	14-Nov-02	N/A			13-Sep-02	-	11-Nov-02
22	23-Dec-02	-	03-Mar-03	26-Dec-02	-	06-Mar-03	N/A			23-Dec-02	-	27-Feb-03
23	26-Mar-03	-	06-Jun-03	05-Apr-03	-	08-Jun-03	N/A			03-Apr-03	-	13-Jun-03
24	28-Jun-03	-	04-Sep-03	03-Jul-03	-	09-Sep-03	N/A			30-Jun-03	-	07-Sep-03

ROUND	CENTRAL JAVA			EAST JAVA			LOMBOK			WEST JAVA		
10	06-Sep-99	-	04-Nov-99	10-Dec-99	-	12-Feb-00	06-Dec-99	-	10-Feb-00	06-Dec-99	-	02-Feb-00
11	07-Apr-00	-	05-Jun-00	30-Mar-00	-	21-May-00	06-Mar-00	-	04-May-00	12-Apr-00	-	14-Jun-00
12	05-Jul-00	-	05-Sep-00	12-Jun-00	-	04-Aug-00	05-Jun-00	-	20-Jul-00	03-Jul-00	-	25-Aug-00
13	17-Sep-00	-	10-Nov-00	12-Sep-00	-	10-Nov-00	13-Sep-00	-	08-Nov-00	14-Sep-00	-	10-Nov-00
14	10-Dec-00	-	22-Feb-01	06-Dec-00	-	13-Feb-01	08-Dec-00	-	10-Feb-01	07-Dec-00	-	09-Feb-01
16	29-Jun-01	-	30-Aug-01	17-Jun-01	-	11-Aug-01	22-Jun-01	-	17-Aug-01	05-Jun-01	-	30-Jul-01
17	17-Sep-01	-	17-Nov-01	03-Sep-01	-	28-Oct-01	05-Sep-01	-	01-Nov-01	03-Sep-01	-	30-Oct-01
18	03-Dec-01	-	06-Feb-02	01-Dec-01	-	09-Feb-02	01-Dec-01	-	07-Feb-02	01-Dec-01	-	08-Feb-02
19	05-Mar-02	-	04-May-02	01-Mar-02	-	28-Apr-02	04-Mar-02	-	30-Apr-02	04-Mar-02	-	30-Apr-02
20	03-Jun-02	-	03-Aug-02	03-Jun-02	-	26-Jul-02	03-Jun-02	-	29-Jul-02	03-Jun-02	-	13-Aug-02
21	23-Sep-02	-	01-Dec-02	20-Sep-02	-	29-Nov-02	16-Sep-02	-	28-Nov-02	16-Sep-02	-	19-Nov-02
22	28-Dec-02	-	07-Mar-03	23-Dec-02	-	04-Mar-03	26-Dec-02	-	09-Mar-03	23-Dec-02	-	02-Mar-03
23	04-Apr-03	-	08-Jun-03	31-Mar-03	-	14-Jun-03	27-Mar-03	-	10-Jun-03	30-Mar-03	-	12-Jun-03
24	01-Jul-03	-	05-Sep-03	29-Jun-03	-	30-Sep-03	26-Jun-03	-	02-Sep-03	30-Jun-03	-	06-Sep-03

DATE OF VISIT URBAN AREA ROUND 10 - 24

ROUND	JAKARTA			SURABAYA			SEMARANG			MAKASAR			PADANG		
10	05-Nov-99	-	22-Jan-00	10-Dec-99	-	10-Feb-00	06-Sep-99	-	07-Oct-99	N/A			25-Aug-99	-	15-Oct-99
11	12-Apr-00	-	17-Jun-00	29-Mar-00	-	17-May-00	07-Apr-00	-	08-May-00	10-Apr-00	-	02-Jun-00	09-Mar-00	-	15-May-00
12	12-Jul-00	-	06-Sep-00	08-Jun-00	-	28-Jul-00	05-Jul-00	-	20-Aug-00	10-Jul-00	-	02-Sep-00	26-Jun-00	-	26-Aug-00
13	25-Sep-00	-	21-Nov-00	11-Sep-00	-	08-Nov-00	18-Sep-00	-	11-Nov-00	06-Oct-00	-	29-Nov-00	N/A		
14	11-Dec-00	-	16-Feb-01	05-Dec-00	-	10-Feb-01	11-Dec-00	-	16-Feb-01	18-Dec-00	-	21-Feb-01	N/A		
16	10-May-01	-	21-Jul-01	15-Jun-01	-	09-Aug-01	30-Jun-01	-	01-Sep-01	19-Jun-01	-	10-Aug-01	N/A		
17	03-Sep-01	-	08-Nov-01	01-Sep-01	-	19-Oct-01	17-Sep-01	-	13-Nov-01	08-Sep-01	-	25-Oct-01	N/A		
18	25-Nov-01	-	28-Feb-02	01-Dec-01	-	19-Jan-02	04-Dec-01	-	12-Feb-02	01-Dec-01	-	08-Feb-02	N/A		
19	11-Mar-02	-	29-Apr-02	01-Mar-02	-	25-Apr-02	05-Mar-02	-	26-Apr-02	04-Mar-02	-	27-Apr-02	N/A		
20	03-Jun-02	-	16-Jul-02	03-Jun-02	-	20-Jul-02	04-Jun-02	-	30-Jul-02	04-Jun-02	-	26-Jul-02	N/A		
21	16-Sep-02	-	08-Nov-02	16-Sep-02	-	25-Nov-02	23-Sep-02	-	30-Nov-02	16-Sep-02	-	25-Nov-02	N/A		
22	27-Dec-02	-	01-Mar-03	23-Dec-02	-	06-Mar-03	26-Dec-02	-	3-Mar-03	23-Dec-02	-	11-Mar-03	N/A		
23	31-Mar-03	-	27-May-03	28-Mar-03	-	13-Jun-03	31-Mar-03	-	07-Jun-03	01-Apr-03	-	12-Jun-03	N/A		
24	24-Jun-03	-	27-Aug-03	30-Jun-03	-	11-Sep-03	26-Jun-03	-	30-Aug-03	30-Jun-03	-	07-Sep-03	N/A		

Appendix II. Presentations for National and International Audiences

No	Title of Presentation	Place where it's presented/Audience (s)	Date
1	Monitoring of the Indonesian Crisis on Health Status and Nutritional Surveillance and Protecting the Health of the Most Vulnerable Children and Women during the Crisis through Vitamin A Supplementation *Presented by Martin W Bloem (HKI)*	USAID Indonesia Jakarta, Indonesia	15 October 1999
2	The Impact of Economic Crisis on Nutrition and Health *Presented by Martin W Bloem*	WFP – Food Security Forum Jakarta, Indonesia	15 April 2000
3	The Impact of the Asian Economic Crisis on Health and Nutrition Status in Indonesia *Presented by Martin W Bloem (HKI)*	At IFAD conference, Rome, Italy	16 May 2000
4	Nutrition and Health Surveillance System (NSS): A presentation to the government of Indonesia *Presented by Mayang Sari (HKI)*	GOI, USAID, Other Agencies In Jakarta, Indonesia	8 June 2000
5	GOI/HKI: Update for counterparts on current status and future plans *Presented by Lynnda Kiess (HKI)*	GOI, USAID, NGOs In Jakarta, Indonesia	8 September 2000
6	NSS finding presentation *Presented by Mayang Sari, Elviyanti Martini*	GOI, NGO's, University, USAID, other agencies in Jakarta	30 January 2000
7	NSS finding presentation *Presented by Siti Halati, Elviyanti Martini*	GOI, NGO's, University, in Surabaya, East Java	20 December 2000
8	NSS finding presentation *Presented by Siti Halati, Elviyanti Martini*	GOI, NGO's, University, in Bandung, West Java	16 January 2000

No	Title of Presentation	Place where it's presented/Audience (s)	Date
9	Helen Keller International and NSS *Presented by Martin W Bloem (HKI)*	George McGovern (from USAID), PVOs In Jakarta, Indonesia	15 March 2001
10	Trend of Maternal and Underfive Nutritional and Health Status: Data from NSS *Presented by Eddi (NIHRD-MOH)*	GOI, USAID, Other Agencies In Jakarta, Indonesia	15 April 2001
11	NSS: An update *Presented by Lynnda Kiess (HKI)*	USAID Indonesia In Jakarta, Indonesia	31 August 2001
12	NSS and Food Policy Implications in Urban Jakarta *Presented by Lynnda Kiess (HKI)*	DAI/USAID In Jakarta, Indonesia	15 September 2001
13	24-VASQ method for estimating vitamin A intake *Presented by Siti Halati (HKI)*	Lecturer for master degree student in SEAMEO Tropmed, University of Indonesia, Jakarta	September 2001
14	Nutrition Surveillance System *Presented by Elviyanti Martini (HKI)*	Lecturer for master degree student in SEAMEO Tropmed, University of Indonesia, Jakarta	September 2001
15	Nutrition Surveillance System *Presented by Elviyanti Martini (HKI)*	Lecturer for master degree student in SEAMEO Tropmed, University of Indonesia, Jakarta	September 2002
16	GOI/HKI NSS: Success and Future Plans *Presented by Mayang Sari (HKI)*	USAID/Indonesian and USAID/Washington In Jakarta, Indonesia	11 April 2002
17	GOI/HKI Nutritional and Health Surveillance System *Presented by Yusleli Usman (NIHRD-MOH) and Mayang Sari (HKI)*	GOI, USAID, Other NGOs under Strategic Objective Agreement of USAID (SOAG) In Bogor, West Java, Indonesia	30 April 2002

No	Title of Presentation	Place where it's presented/Audience (s)	Date
18	Impact of the Economic Crisis on Nutrition in Indonesia *Presented by Steven Block (Tufts Univ. USA) and Lynnda Kiess (HKI)*	GOI, USAID Indonesia In Jakarta, Indonesia	1 July 2002
19	Breastfeeding and Complementary Feeding Practice: NSS Findings. *Presented by Mayang Sari and Elviyanti Martini (HKI)*	At a workshop with LINKAGES In Jakarta, Indonesia	23 July 2002
20	Breastfeeding and Complementary Feeding Practice: NSS Findings. *Presented by Mayang Sari (HKI)*	At a workshop held by the Directorate of Community Nutrition, MOH In Jakarta, Indonesia	27 July 2002
21	24-VASQ method for estimating vitamin A intake *Presented by Siti Halati (HKI)*	Lecturer for master degree student in SEAMEO Tropmed, University of Indonesia, Jakarta	September 2002
22	Nutrition Surveillance System *Presented by Elviyanti Martini (HKI)*	Lecturer for master degree student in SEAMEO Tropmed, University of Indonesia, Jakarta	September 2002
23	Anemia in Children Aged 0-2 Years – a need for concerted action *Presented by Saskia de Pee (HKI)*	GOI-MOH, USAID, NGO's, Unicef, other organizations	3 October 2002
24	Maternal Anemia Prevention in South East Asia. *Presented by Ame Stormer (HKI)*	Directorate of Community Nutrition, MOH , Jakarta Indonesia	8 August 2003
25	Nutritional Status Situation in Flores *Presented by Soewarta Kosen(NIHRD-MOH), Elviyanti Martini (HKI)*	Dissemination Workshop held by Health office of Sikka, Endeh and East Flores districts, MOH, East Nusatenggara	13 August 2003

No	Title of Presentation	Place where it's presented/Audience (s)	Date
26	Dissemination of NSS finding and future direction *Presented by Elviyanti Martini, Siti Halati, Ame Stormer (HKI)*	GOI-MOH, USAID, NGO's, University, Jakarta	25 September 2003
27	Dissemination of NSS finding and future direction *Presented by Elviyanti Martini (HKI)*	40 District Health Offices, MOH, Jakarta	6 October 2003
28	The use of NSS data for Vitamin A acceleration *Presented by Elviyanti Martini (HKI)*	District Health Offices, MOH, North Jakarta	7 October 2003
29	Interactions between Malaria and Nutrition in Central Java *Presented by Elviyanti Martini (HKI)*	District and province health office, MOH, CDC-MOH, malaria association,	21 October 2003
30	NSS finding : Nutritional Status in Central Java *Presented by Roy Tjiong (HKI)*	Province Health Office-MOH	17 December 2003
31	NSS finding : Nutritional status in North Jakarta *Presented by Elviyanti Martini (HKI)*	Workshop on Nutrition planning for urban slums area, based on evidence, conducted by health district office, Jakarta	18 December 2003
32	24-VASQ method for estimating vitamin A intake: an evaluation of its performance *Presented by Saskia de Pee (HKI)*	The fifth international conference on dietary assessment methods, Chiang Rai, Thailand	January 26-29, 2003
33	Poster Presentation: 24-VASQ method for estimating vitamin A intake: experiences with its use in Indonesia, Bangladesh, Nepal, and Cambodia *Presented by Siti Halati(HKI)*	The fifth international conference on dietary assessment methods, Chiang Rai, Thailand	January 26-29, 2003

Prior to USAID funding, the NSS data has been presented to the following audiences :

No	Title of Presentation	Place where it's presented/Audience (s)	Date
1	The Possible Impact of the Crisis on Maternal and Child Survival Through Micronutrient Deficiency *Presented by Martin W Bloem (HKI)*	At Early and Childhood Nutrition meeting: Growth, Health and Economics. In Kuala Lumpur, Malaysia.	2 November 1998
2	Crisis, Food, Micronutrient Deficiencies and Maternal Malnutrition *Presented by Fasli Jalal (MOE) and Martin W Bloem (HKI)*	GOI (Provincial Health Office in West Sumatera), Andalas University (in Padang, West Sumatera).	15 February 1999
3	NSS finding presentation *Presented by Mayang Sari, Elviyanti Martini*	GOI (Provincial Health Office in West Sumatera), Andalas University (in Padang, West Sumatera).	August'99
4	Crises Surveillance: Nutrition, Health, Economics changes and input for policies *Presented by Soewarta Kosen (NIHRD-MOH) and Martin W Bloem (HKI)*	GOI Jakarta, Indonesia	15 April 1999
5	Using Micronutrients as Indicators for surveillance *Presented by Martin Bloem (HKI)*	8 th Asian Congress of Nutrition in Seoul, South Korea	31 August 1999
6	Poster Presentation : 24-VASQ methods for estimating vitamin A intake, its use in Asia *Presented by Siti Halati (HKI)*	8 th Asian Congress of Nutrition in Seoul, South Korea	August 29 – September2, 1999
7	Poster Presentation : Meal frequency among children in urban and rural areas of Indonesia *Presented by Siti Halati (HKI)*	8 th Asian Congress of Nutrition in Seoul, South Korea	August 29 – September2, 1999

No	Title of Presentation	Place where it's presented/Audience (s)	Date
8	Food consumption in urban slums worst affected by Indonesia's crisis *Presented by Elviyanti Martini (HKI)*	8 th Asian Congress of Nutrition in Seoul, South Korea	August 29 – September2, 1999
9	Breast-feeding practices among mothers in urban and rural areas of Indonesia need to be improved *Presented by Elviyanti Martini (HKI)*	8 th Asian Congress of Nutrition in Seoul, South Korea	August 29 – September2, 1999

Appendix III. List of Publication Generated from NSS Data

Crisis Bulletin

Published in 1999

- High prevalence of acute malnutrition in urban slums. Yr. 1, Iss 7, Nov 1999
- Increasing coverage of high-dose vitamin A capsules to prevent crisis-induced re-emergence of vitamin A deficiency. Yr. 1, Iss 8, Dec 1999

Published in 2000-2001

- High prevalence of anemia among young children in urban and rural areas. Yr. 2, Iss 1, Jan 2000
- Nutrition Surveillance: How does it work? HKI Technical Programs Series. Yr. 2, Iss 2, Feb 2000
- Decreasing 'prevalence of anemia among urban children: Does it indicate increased access to micronutrient rich foods? Yr. 2, Iss 3, Mar 2000
- Decreasing prevalence of maternal wasting: Does it indicate increased access to food? Yr. 2, Iss 4, Apr 2000
- Vitamin A capsules: Red and Blue- What's the difference? Yr.2, Iss 5, May 2000

Provincial Findings (Nov 1998-Jun 2000) series

- Nutrition Surveillance in rural West Java – Key results for the period: Feb 1999-Feb 2000. Yr. 2, Iss 6, Jun-Sept 2000
- Nutrition Surveillance in Central Java – Key results for the period: Nov 1998-Nov 1999. Yr. 2, Iss 7, Jun-Sept 2000
- Nutrition Surveillance in Jakarta – Key results for the period: Jan 1999-Jan 2000. Yr. 2, Iss 8, Jun-Sept 2000
- Nutrition Surveillance in East Java – Key results for the period: Feb 1999-Feb 2000. Yr. 2, Iss 9, Jun-Sept 2000
- Nutrition Surveillance in Surabaya – Key results for the period: Jan 1999-Feb 2000. Yr. 2, Iss 10, Jun-Sept 2000
- Nutrition Surveillance in Semarang – Key results for the period: Feb-Oct 1999. Yr. 2, Iss 11, Jun Sept 2000
- Nutrition Surveillance in Lombok – Key results for the period: Feb 1999-Feb 2000. Yr. 2, Iss 12, Jun-Sept 2000
- Nutrition Surveillance in Makassar – Key results for the period: Feb-May 1999. Yr. 2, Iss 13, Jun Sept 2000
- Nutrition Surveillance in West Sumatra – Key results for the period: Sept-Nov 1999. Yr. 2, Iss 14, Jun-Sept 2000
- Nutrition Surveillance in urban West Sumatra – Key results for the period: Sept-Oct 1999. Yr. 2, Iss 15, Jun Sept 2000

- Nutrition Surveillance in rural Lampung – Key results for the period: Apr-Jun 2000. Yr. 2, Iss 16, Jun Sept 2000
- Nutrition Surveillance in South Sulawesi – Key results for the period: Apr-Jun 2000. Yr. 2, Iss 17, Jun Sept 2000
- Decision-Making during Decentralization: New Role of the Nutrition and Health Surveillance System (NSS). Yr 3, Iss 1, Aug 2001.

Published in 2002

Provincial Findings (Nov 1998-Aug 2001) series

- Nutrition and Health Surveillance in urban slums of Jakarta – Key results for the period: Jan 1999-Jul 2001. Yr. 4, Iss 1, Jan 2002
- Nutrition and Health Surveillance in urban slums of Surabaya – Key results for the period: Jan 1999-Aug 2001. Yr. 4, Iss 2, Jan 2002
- Nutrition and Health Surveillance in urban slums of Semarang – Key results for the period: Feb 1999-Aug 2001. Yr. 4, Iss 3, Jan 2002
- Nutrition and Health Surveillance in urban slums of Makassar – Key results for the period: Feb 1999-Aug 2001. Yr. 4, Iss 4, Jan 2002
- Nutrition and Health Surveillance in urban slums in 4 cities of West Sumatra – Key results for the period: Aug 1999-Aug 2001. Yr. 4, Iss 5, Jan 2002
- Nutrition and Health Surveillance in rural West Sumatra – Key results for the period: Aug 1999-Aug 2001. Yr. 4, Iss 6, Jan 2002
- Nutrition and Health Surveillance in rural Lampung – Key results for the period: Apr 2000-Jul 2001. Yr. 4, Iss 7, Jan 2002
- Nutrition and Health Surveillance in rural Banten – Key results for the period: Feb 1999-Jul 2001. Yr. 4, Iss 8, Jan 2002
- Nutrition and Health Surveillance in rural West Java – Key results for the period: Feb 1999-Jul 2001. Yr. 4, Iss 9, Jan 2002
- Nutrition and Health Surveillance in rural Central Java – Key results for the period: Nov 1998-Aug 2001. Yr. 4, Iss 10, Jan 2002
- Nutrition and Health Surveillance in rural East Java – Key results for the period: Feb 1999-Aug 2001. Yr. 4, Iss 11, Jan 2002
- Nutrition and Health Surveillance in rural Lombok – Key results for the period: Feb 1999-Aug 2001. Yr. 4, Iss 12, Jan 2002
- Nutrition and Health Surveillance in rural South Sulawesi – Key results for the period: Apr 2000-Aug 2001. Yr. 4, Iss 13, Jan 2002

Published in 2003

- Vitamin A capsule coverage improves between the August 1999 and February 2002 vitamin A distribution months, Yr. 5, Iss 1, Jan 2003

Provincial Findings (Dec 2001-May 2002) series

- Special series on breastfeeding and complementary feeding practices. Yr. 4, Iss 14, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Urban Poor Jakarta. Yr. 4, Iss 15, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Urban Poor Surabaya. Yr. 4, Iss 16, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Urban Poor Semarang. Yr. 4, Iss 17, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Urban Poor Makassar. Yr. 4, Iss 18, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural West Sumatera. Yr. 4, Iss 19, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural Lampung. Yr. 4, Iss 20, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural Banten. Yr. 4, Iss 21, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural West Java. Yr. 4, Iss 22, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural Central Java. Yr. 4, Iss 23, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural East Java. Yr. 4, Iss 24, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural Lombok. Yr. 4, Iss 25, Dec 2002
- Breastfeeding and Complementary Feeding – Practices in Rural South Sulawesi. Yr. 4, Iss 26, Dec 2002

Annual Report

- Helen Keller International/Indonesia, Nutrition and Health Surveillance System (2000). *Monitoring the Economic Crisis: Impact and Transition ,1998 – 2000.* Jakarta, Indonesia: Helen Keller Worldwide.
- Helen Keller International, Nutrition and Health Surveillance System (2002). *New Insight on the Health & Nutrition Situation in Indonesia through Data Sharing*. 2001 Annual Report of the Nutrition and Health Surveillance System (NSS). Jakarta, Indonesia: Helen Keller Worldwide.
- S. de Pee, J. Diekhans, G. Stallkamp, L. Kiess, R. Moench-Pfanner, E. Martini, M. Sari, A. Stormer, S. Kosen and M.W. Bloem (2002). *Breastfeeding and Complementary Feeding Practices in Indonesia*. Nutrition and Health Surveillance System Annual Report 2002. Jakarta, Indonesia: Helen Keller Worldwide.

Data Distribution Initiative

HKI and the NIHRD developed the Data Distribution Initiative to ensure wider and more rapid access to NSS data.

- Data set distributed: CD set – Round 21 A, 21 B, 21 C, 22 A, 22 B and 23 A. (Set A includes data on nutritional and health status, socio-economic data, environmental sanitation and other variable related with nutrition and health programs in Indonesia. Set B includes immunization coverage, *Posyandu* attendance, distribution of iron tablets among pregnant women and delivery assistance along with other information. Set C includes information about vitamin A rich food consumption, access to agriculture and home gardening, breastfeeding and complementary feeding information, smoking behavior and family planning participation)

Scientific Publications

- De Pee S, Bloem MW, Sari M, Soekarjo DD, Tjiong R, Kosen S, Muhilal, and Satoto (2000). *Indonesia's Crisis Causes Considerable Weight Loss among Mothers and Adolescents*. Mal J Nutr; 6(2): 203-214.
- Bloem MW and Darnton-Hill I (2000). *Micronutrient Deficiencies. First Link in a Chain of Nutritional and Health Events in Economic Crises.* In: Bendich A and Deckelbaum RJ (eds.). Primary and Secondary Preventive Nutrition, 357-373. Totowa, New Jersey: Humana Press Inc.
- Kiess L, Moench-Pfanner R, Bloem MW, de Pee S, Sari M, and Kosen S (2000). *New Conceptual Thinking about Surveillance: Using Micronutrient Status to Assess the Impact of Economic Crises on Health and Nutrition*. Mal J Nutr; 6(2): 223-232.
- De Pee S, Bloem MW, Kiess L, Panagides D, Talukder A (2003). *Integrating strategies for combating vitamin A deficiency: Successes in Asia.* In: Elmadfa I, Anklam E, Koenig J (eds). Modern Aspects of Nutrition – Present Knowledge and Future Perspectives. Forum of Nutrition (formerly 'Bibliotheca Nutritio et Dieta') Vol 56. S. Karger Publishers, Basel, Switzerland.
- Bloem MW, Kiess L, Moench-Pfanner R (2002). *Process indicators for monitoring and evaluating vitamin A programs*. J Nutr;132:2934S-2939S.
- De Pee S, Bloem MW (2001). *Assessing and communicating impact of nutrition and health program*. In: Semba RD, Bloem MW (eds). Nutrition and Health in Developing Countries. Towota, New Jersey, USA: Humana Press.
- De Pee S, Bloem MW, Sari M, Kiess L, Yip R and Kosen S (2002). *The high prevalence of Low Hemoglobin Concentration among Indonesian Infant aged 3-5 Months Is related to Maternal Anemia*. American Society for Nutritional Sciences:2215-2221
- Bloem MW, Moench-Pfanner R, Kiess L (2001). *Combating Micronutrient Deficiencies-An Important Component of Poverty Reduction*. Biomed Env Sci; 14:92-97
- Kiess, L,Moench-Pfanner, R, Bloem MW (2001). *Food based strategies: Can they play a role in poverty alleviation?* Food and Nutr Bull; Vol 22 (4) p. 436-442.

- De Pee S, Moench-Pfanner R, Bloem MW (2003). *Insight into Breastfeeding and Complementary Feeding Practices: A Case Study from Indonesia*. In: Meeting the challenge to improve Complementary Feeding. SCN news 2003; 27, p.23-27.
- Block SA, Kiess L, Webb P, Kosen S, Moench-Pfanner R, Bloem MW, Timmer PC. (2003) *Macro Shocks and Micro(scopic) Outcomes: Child Nutrition during Indonesia's Crisis.* Nutrition Working Paper No.1, Bappenas/Deptan/USAID/DAI. Jakarta.
- Block, S., et. al., (2002). *Did Indonesia's Crises of 1997/98 Affect Child Nutrition? A Cohort Decomposition Analysis of National Nutrition Surveillance Data*, Working Paper No. 90, Center for International Development, Harvard University: Cambridge, MA.
- Block, S. (2002). *Nutrition Knowledge Versus Schooling in the Demand for child Micronutrient Status*, Working paper No. 93, Center for International Development, Harvard University: Cambridge, MA.
- Block, S. *Nutrition Knowledge and Parental Schooling as Inputs to Child Nutrition in the Long and Short Run*.(submitted)
- Block, S. *Nutrition Knowledge, rice prices, and the micronutritional effect of Indonesia's crisis of 1997-98.* (submitted)

Prior to USAID funding, the NSS already generated the following key documents :

<u>Crisis Bulletin</u>

Published in 1998-1999

- Re-emergence of the threat of vitamin A deficiency. Yr 1,Iss 2, Oct 1998
- Alarming rise of iron deficiency anemia may herald 'Lost Generation.' Yr. 1, Issue 3, Oct 1998
- Have 30 years of nutritional improvement in Southeast Asia disappeared in one year of the crisis? Yr. 1, Iss 4, Oct 1998
- Why and How to prevent Vitamin A Deficiency in times of crisis. Special edition, Yr.1, Iss 6, Sept 1996

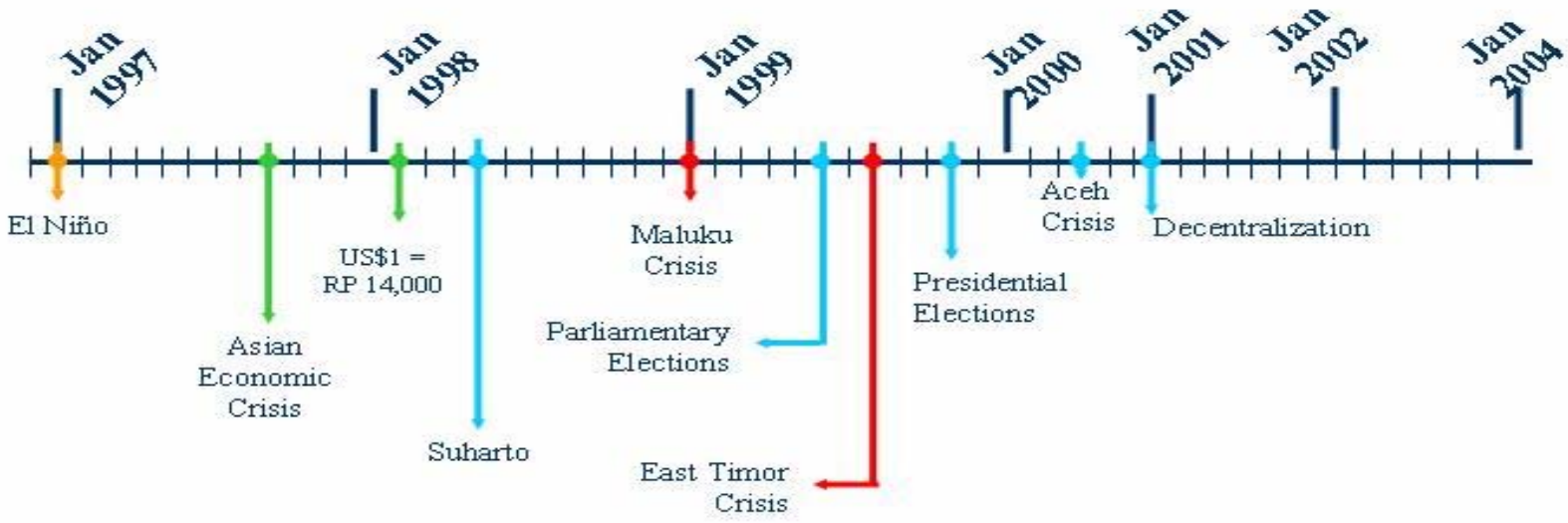
<u>Special Report</u>

Nutrition and Health-related Issues resulting from Indonesia's Crisis : Summary and Recommendations, October 1998.

Scientific Publications

- De Pee, S, Bloem MW, Gorstein J, Sari M, Satoto, Yip R, Shrimpton R, Muhilal (1998). *Reappraisal of the role of vegetables in the vitamin A status of mothers in Central Java, Indonesia.* Am J Clin Nutr ; 68:1068-74
- De Pee, S, Bloem MW, Tjiong R, Martini E, Satoto, Gorstein J, Shrimpton R, Muhilal (1999). *Who has high vitamin A intake from plant food, but a low serum retinol concentration? Data from women in Indonesia*. Eur J Clin Nutr; 53:288-297.
- De Pee S, Bloem MW, Satoto, Yip R, Sukaton A, Tjiong R, Shrimpton R, Muhilal, Kodyat B (1998). *Impact of Social Marketing campaign promoting dark-green leafy vegetables and eggs in Central Java, Indonesia*. Int J Vit Nutr Res 68:389-398.

Appendix IV. Chronology of recent key events affecting Indonesia



Appendix V. Annual Report 2003

Provincial Findings (Dec 1999-Sep 2003) series:

- Nutrition and Health Surveillance in rural & urban slums areas in Indonesia – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 1, Jan 2004
- Nutrition and Health Surveillance in urban slums of Jakarta – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 2, Jan 2004
- Nutrition and Health Surveillance in urban slums of Surabaya – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 3, Jan 2004
- Nutrition and Health Surveillance in urban slums of Semarang – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 4, Jan 2004
- Nutrition and Health Surveillance in urban slums of Makassar – Key results for the period: Apr 2000-Sep 2003. Yr. 5, Iss 5, Jan 2004
- Nutrition and Health Surveillance in rural West Sumatra – Key results for the period: Dec 1999-Aug 2002. Yr. 5, Iss 6, Jan 2004
- Nutrition and Health Surveillance in rural Lampung – Key results for the period: Apr 2000-Sep 2003. Yr. 5, Iss 7, Jan 2004
- Nutrition and Health Surveillance in rural Banten – Key results for the period: Jun 2001-Sep 2003. Yr. 5, Iss 8, Jan 2004
- Nutrition and Health Surveillance in rural West Java – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 9, Jan 2004
- Nutrition and Health Surveillance in rural Central Java – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 10, Jan 2004
- Nutrition and Health Surveillance in rural East Java – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 11, Jan 2004
- Nutrition and Health Surveillance in rural Lombok – Key results for the period: Dec 1999-Sep 2003. Yr. 5, Iss 12, Jan 2004
- Nutrition and Health Surveillance in rural South Sulawesi – Key results for the period: Apr 2000-Sep 2003. Yr. 5, Iss 13, Jan 2004

I N D O N E S I A

Year 5, Issue 1
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural & urban slums areas in Indonesia

Key results for the period: Dec 1999 – Sep 2003

This overall bulletin accompanies a series of provincial findings bulletins on nutrition and health status over time among the rural population of eight provinces and the urban poor population of four large cities in Indonesia. Findings for these bulletins were regularly collected by the Government of Indonesia/Helen Keller International(GOI/HKI) Nutrition and Health Surveillance System (NSS). For this bulletin series data collected between December, 1999 – August 2003 were analyzed and presented for the provinces of Banten, West Java, Central Java, East Java, West Sumatra, Lampung, Lombok and South Sulawesi and for the urban poor populations of Jakarta, Makassar, Semarang and Surabaya. In summary, the analyses among mothers and children under five years have shown that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 months, but also among those aged 12-59 months, and the decline of diarrhea prevalence by approximately 50%.

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the GOI/HKI NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites,

Helen Keller
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a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this overall bulletin highlighting urban and rural averages have been weighed in order to make the data representative of total urban and rural populations surveyed by the NSS.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: Levels of anemia following the economic crisis remain high and may be rising. In December 1999-February 2000, the prevalence of anemia was 63% in rural areas and 57% in urban slum areas. In the last round of data collection, from June to September 2003, levels were 66% in rural areas and 76% for urban slums.

Anemia among Non-Pregnant Mothers

(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate

Fig. 1 Anemia among Children 12-23 Months of Age

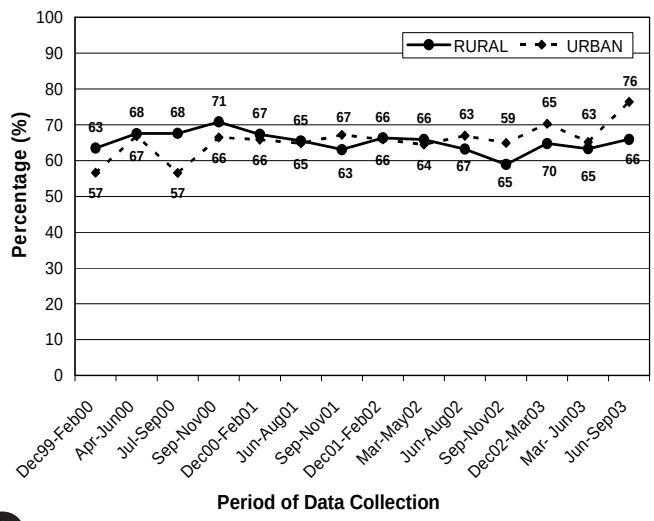
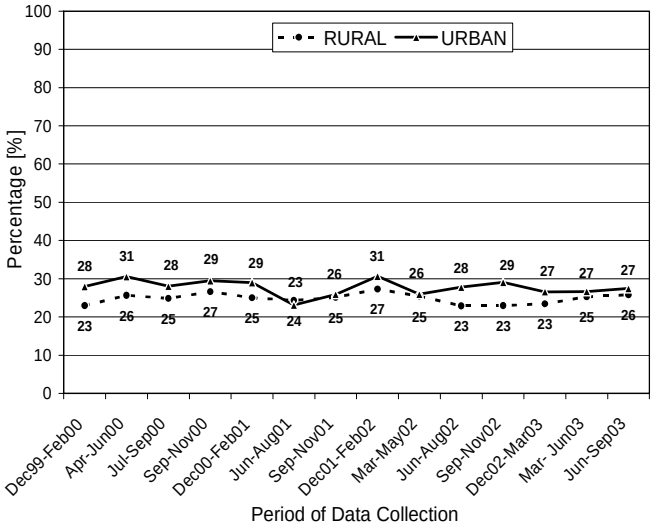


Fig. 2 Anemia among Non-Pregnant Mothers



anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: Anemia levels in December 1999 to February 2000 were 23% and 28% for rural and urban slums respectively. From June to September 2003 the prevalence were found to be fairly unchanged at 26% for rural areas and 27% for urban slums.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of ≥ 30% as "very high" for children under 5 years. [4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: The prevalence of underweight is similar for rural areas and urban slums, and has remained relatively unchanged over time. The main finding is that the levels are consistently 5-10 percentage points higher than the WHO criteria for a serious problem for children under five years of age. The prevalence was 38% in rural areas and 43% in urban slums in December 1999-February 2000. In the last round of data collection, from June to September 2003, it was 35% in rural areas and 44% in urban areas.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to

FIG. 3 Prevalence of Underweight Children 12-23 Months of Age

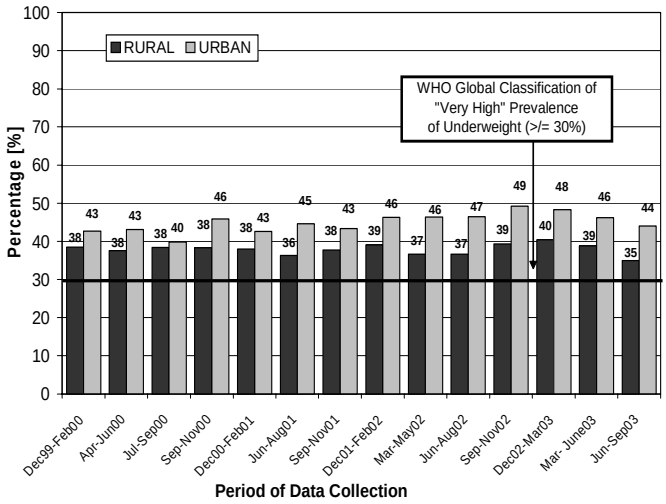
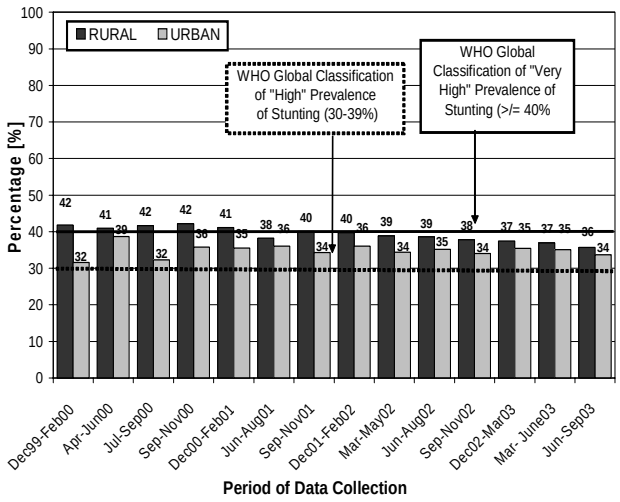


FIG. 4 Prevalence of Stunted Children 12-23 Months of Age



lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: Initially, the prevalence of stunting ranged from 5-10 percentage points higher in rural areas than urban slums. Further, children in rural areas were classified as having "very high" rates of stunting by WHO standards for children under five years of age for many rounds of data collection. The level of stunting in rural areas was found to be 42% in December 1999 to February 2000, and was 36% in the last round of data collection from June to September 2003. The level of stunting in urban slums is lower than rural areas, but is still classified as "high" by the WHO for all rounds of data collection; the prevalence of stunting was 32% in the first data collection period and 34% in the last.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years $\geq$ 15% as a "critical emergency situation" and levels $\geq$ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: For all rounds of data collection the levels of wasting observed in urban slums were over 15%, which classifies these areas as experiencing a "critical emergency" by WHO for children under five years of age. In December 1999 to February 2000, wasting was found to be 19% in urban slums. It appeared to improve for a time, but returned to higher levels and was 16% in the last round of data collection. Although rural areas had lower levels of wasting than urban slums, the levels were often greater than 10%, which classifies these areas as experiencing a "serious emergency" situation by WHO standards.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

FIG. 5 Prevalence of Wasted Children 12-23 Months of Age

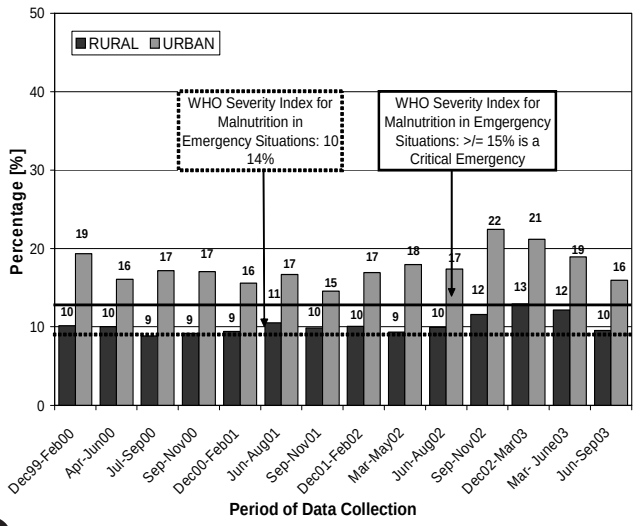
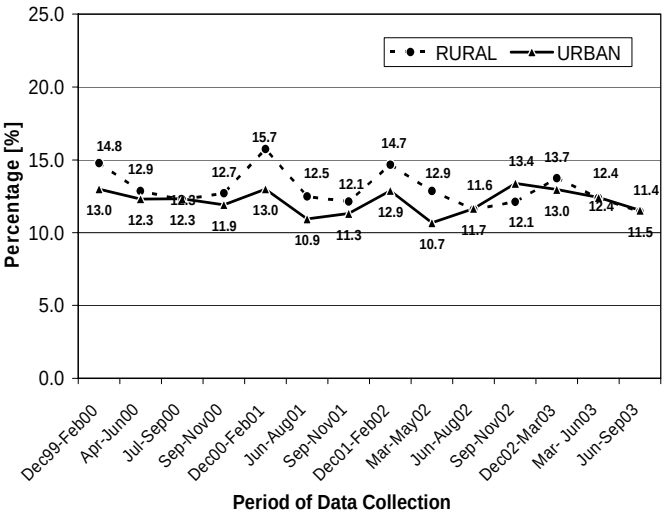


FIG. 6 Percentage of Non-Pregnant Mothers with Low Body Mass Index



Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: The trend of maternal thinness in urban slums and rural areas seems to follow a pattern. There were two large peaks in the prevalence of maternal thinness in the December 2000- February 2001 and December 2001- February 2002 periods of data collection. The peaks might be related to the floods and the month of Ramadan during these years, in which fasting occurs during the day. Nevertheless, overall it appears that maternal wasting is declining, particularly in the rural areas. At the start of data collection levels were 13.0% for urban slums and 14.8% for rural areas. By June – September 2003, they had declined to 11.5% in urban slum areas and 11.4% in rural areas.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

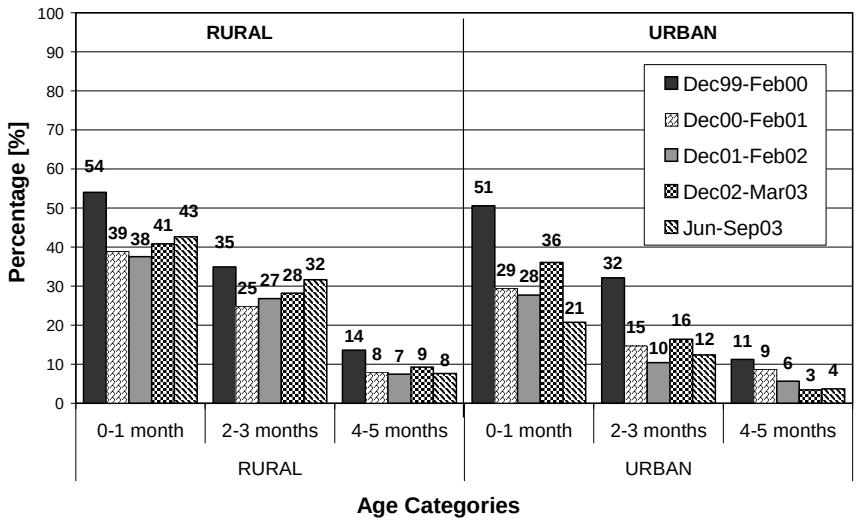
Findings: The prevalence of exclusive breastfeeding is declining in both rural areas and urban slums, and in all three age categories. From the first to the last rounds of data collection, the prevalence dropped from 54% to 43% in rural areas for 0-1 month old children. In urban slums it dropped from 51% to 21% among 0-1 month old children for the same rounds. Exclusive breastfeeding for children 2-3 months in both areas shows similar declines. Less than 10% of 4-5 month old children in both areas were found to be exclusively breastfeed in the June-September 2003 period of data collection. However, it is important to point out that a large proportion of infants, although not exclusively breastfed at all or not for very long, is breastfed well into the second year of life (data not shown).

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development. [9]

FIG. 7 Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age



Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.
Findings: In December 1999-February 2000, use of adequately iodized salt was 69% and 79% for rural areas and urban slums, respectively. By September to November 2001, levels had increased to 74% and 84%. However, universal salt iodization use seems to be declining with levels returning to 69% in rural areas and 78% in urban slums in the June to September 2003 round of data collection. Levels may be lower in rural areas due to a variety of reasons that include improper iodization or lack of availability as well as household issues such as cost or availability of iodized salt, or lack of knowledge of its benefits.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)
Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).
Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease[10]. However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.
Findings: Based on the Indonesian recommended dietary allowance of VA for children under 5, both urban slum and rural children are not eating enough VA. The current method of assessment has been applied since the July to September 2000 round and there does seem to be a slight improvement over time in urban slums; from July – September 2000 intake was 140 retinol equivalents (RE) and increased to 194 RE in June to September 2003. A much smaller increase was observed in rural areas from 102 RE to 115 RE for the same rounds of data collection. However, this is still far below the RDI of vitamin A for children 12-59 months old.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)
In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.
Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such

FIG. 8 Household Use of Adequately Iodized Salt

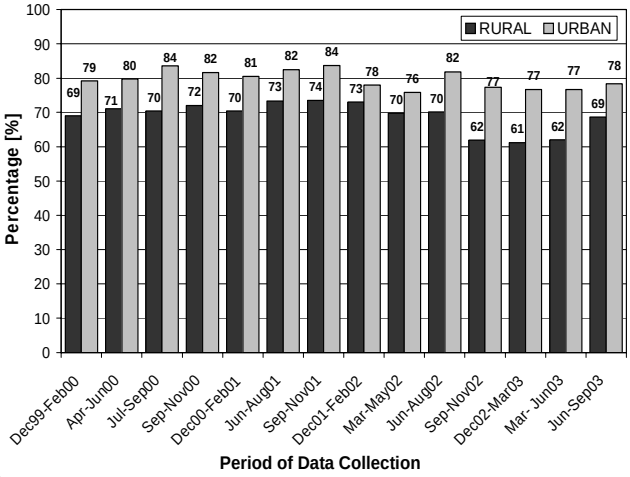


FIG. 9 Vitamin A Intake of Children 12-59 months of age

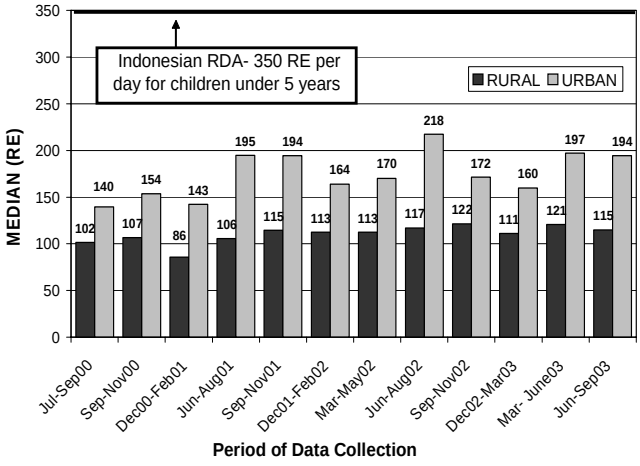
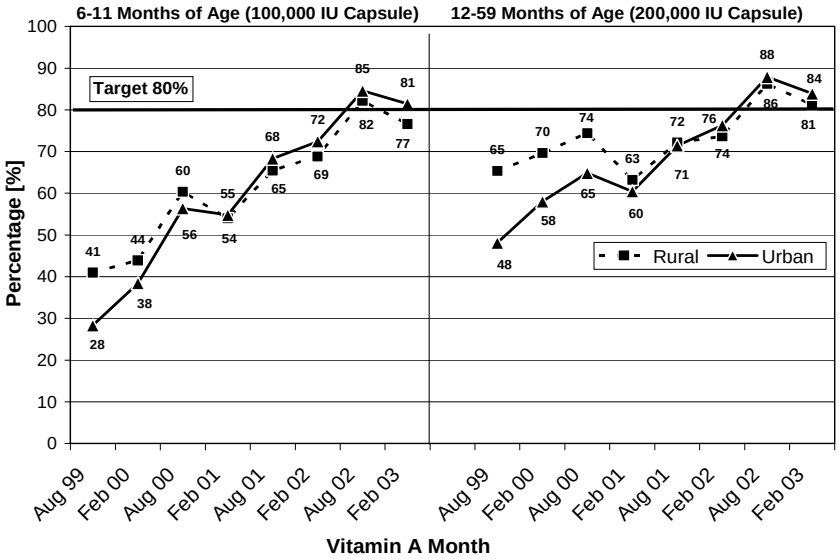


FIG. 10 Vitamin A Capsule Coverage among Children 6-59 Months of Age



as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: Children 6-11 months of age were not officially targeted by the VAC program until 1999. At that time coverage levels among this group were 41% in rural areas and 28% in urban slum areas. Since then the coverage levels have markedly increased, and by August 2002 reached levels of 82% and 85% in rural and urban slum areas, respectively. The VAC coverage level among 12-59 month old urban slum children was also increased by 36% from August 1999 to February 2003. At the same time, the high coverage level among rural children 12-59 months of age was maintained and improved. The most important observation, however, is that VAC coverage has reached the target level in both age categories of both urban slum and rural areas. The goal now is to maintain those levels.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: The Indonesian RDI for non-pregnant non-breastfeeding women is 500 retinol equivalents (RE)/ day, 850 RE/day if they are lactating. Both rural area and urban slum women consumed less than half that amount in every round of data collection and there were virtually no changes of intake over time.

FIG. 11 Total Vitamin A Intake among Non- Pregnant Mothers

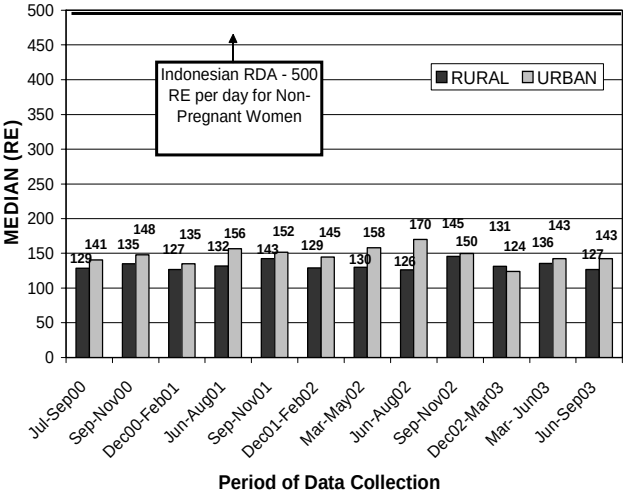
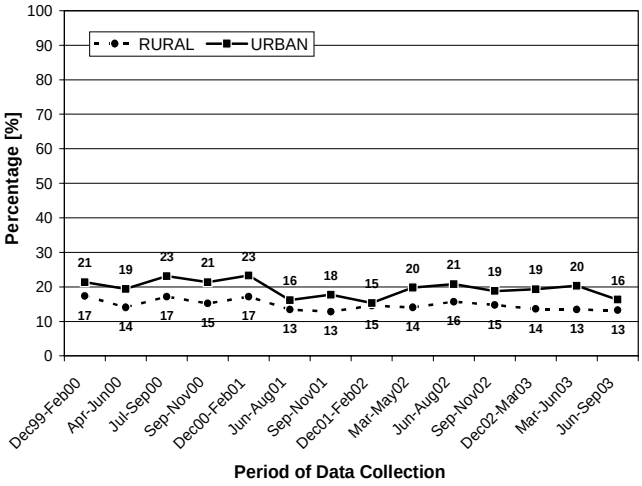


FIG. 12 Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: VAC coverage levels have remained fairly static in the last four years among post partum women. It appears that urban slum levels have increased slightly then decreased again and rural areas have decreased slightly. Both remain very low at 21% in the first round of data collection and 16% for urban slums in the last round of data collection from June-September 2003 and 17% and 13% for rural areas over the same time period. This is probably best explained by the fact that there is currently no widespread program to improve capsule coverage among post partum women.

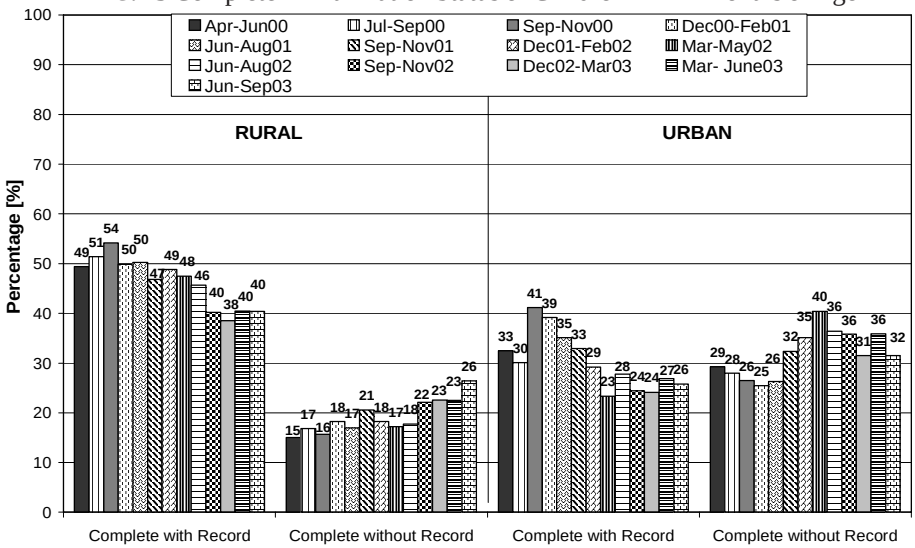
Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

FIG. 13 Complete Immunization Status of Children 12- 17 Months of Age



Findings: Complete immunization with official record tends to be higher in rural areas compared to urban slums, but is lower than desirable for both areas. Rates appear to be declining, while at the same time complete immunizations without record is increasing. This is cause for concern because, without an official record, less confidence can be placed in the knowledge that these children are actually receiving all standard vaccinations. From April – June 2000, 49% of children in rural areas and 33% in urban slums were fully vaccinated with a complete record. From June to September 2003, only 40% of rural children and 26% of urban slum children had a complete immunization status documented by an official record.

***Posyandu* Attendance in the Previous Month** (SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: Household *Posyandu* attendance appears to be increasing slightly over time, indicating a sustainable and active health system. Nevertheless, attendance does fall off at times, particularly in urban slums. The attendance tended to be lower around the December months, which during these years coincided with the Ramadan and Eid Celebrations, big Muslim holidays. While improved attendance is encouraging, it is important to note that more than one quarter of all eligible children do not attend the *Posyandu* regularly.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a

Fig. 14 *Posyandu* Attendance in the Previous Month

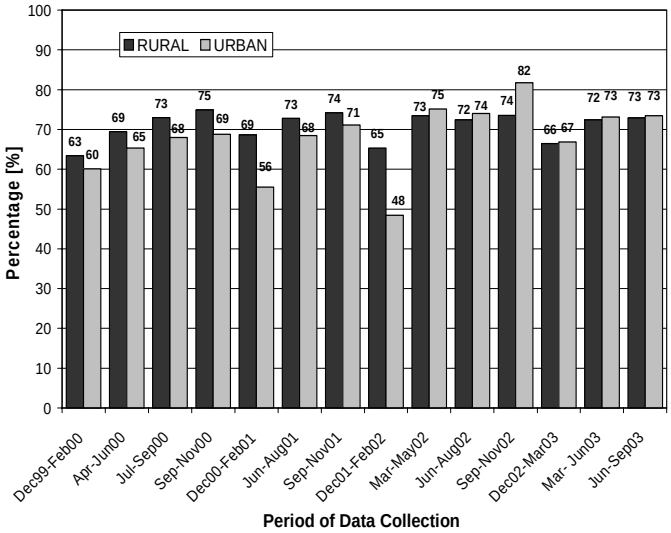
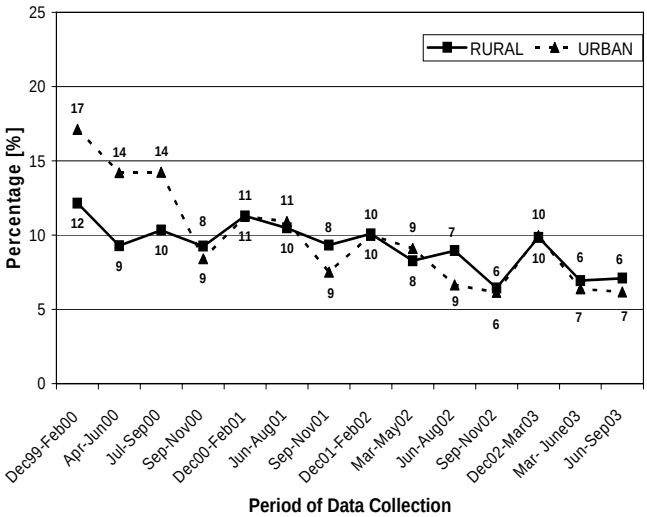


FIG. 15 Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days



contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: The incidence of diarrhea appears to be declining over time in both urban slum and rural areas. Prevalence rates from the beginning to end of data collection have been cut in half. The peaks in occurrence may be due to seasonal variations, particularly in relation to the rainy season which begins in late September and reaches its height in December.

Household Expenditures on Food Items
(SEE FIG.16)

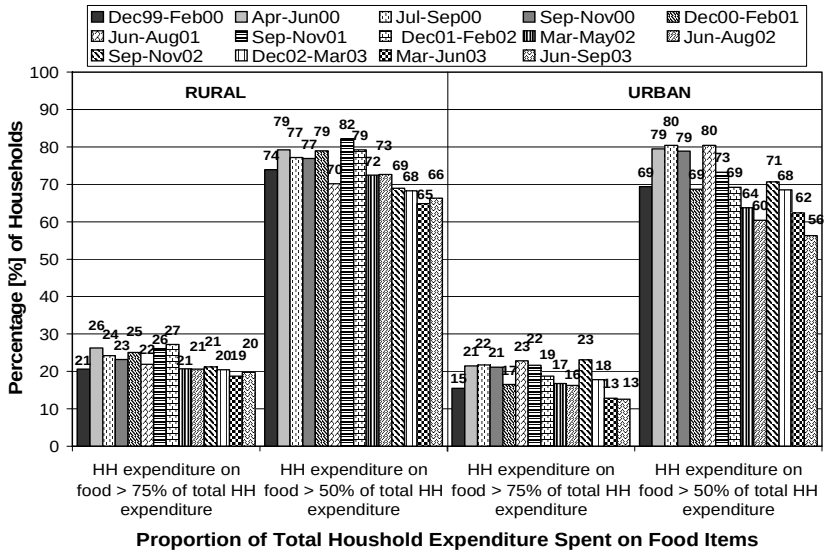
The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: In December 1999 to February 2000, 21% of rural and 15% of urban slum households spent more than 75% of their total expenditures on food. This is compared to 20% of rural and 13% of urban slum households that spent more than 75% of their total expenditures on food in the last round of data collection, from June to September 2003. The percentage of households spending more than 50% of their total expenditures on food was 74% and 69% for rural areas and urban slums respectively, in the first round of data collection. These rates declined to 66% for rural areas and 56% for urban slums in the last round of data collection. Although, the actual trend seems to fluctuate, an overall improvement in proportion of expenditures among those spending more than 50% of their expenditures on food can be observed. However, it appears that for those who spend the vast majority (>75%) of their expenditures on food

Fig. 16 Household Expenditures on Food Items



(e.g. the poorest of the poor) little improvement has been seen over time.

Conclusions

In summary, the analyses for mothers and children under five years of age have shown that only a few indicators in either urban slum areas or rural areas have improved over the period of data collection. The two exceptions to these are the increase of vitamin A capsule coverage for children and reduction of the diarrhea prevalence. The analyses have revealed the following about the health and nutrition situation in urban slum and rural areas in Indonesia:

- Anemia levels for children under five are alarmingly high and have not declined over time. Disturbingly, children 12-23 months in urban slum areas appear to have an increasing prevalence of anemia over time, with more than 75% of all children surveyed being anemic.

- The prevalence of anemia among mothers has remained high (20-30%) and fairly unchanged over time.

- Anthropometry for children has changed little over time.
    - Underweight among 12-23 mo old children is in the "very high" category according to WHO standards for children under five years of age. There is a slight decline over the last three rounds of data collection, but the prevalence is still "very high".
    - Wasting among 12-23 mo old children remained in the "critical emergency" level in urban areas and the "serious emergency" level in rural areas as categorized by the WHO for children under five years of age. There is a slight decline in prevalence over the last three rounds of data collection for both urban and rural areas.
    - Stunting levels are in the "high" range according to WHO standards for children under five years of age. Urban areas remained virtually unchanged over time, while rural areas have experienced a small decline over the period of data collection.

- Maternal Thinness appears to have declined very slightly over the period of data collection, however seasonal peaks appear to occur with regularity in the December-February months of data collection. Whether this is due to seasonality issues, fasting month, or some other factors is unknown.

- Exclusive breastfeeding among children under six months of age is declining in both urban and rural areas. Less than half of children 0-1 months of age are exclusively breastfed and fewer than 10% of those 4-5 months of age are exclusively breastfed. Recently, the Government of Indonesia changed its recommendation for the duration of exclusive

breastfeeding from 4-6 months to 6 months. However, even the first recommendation of 4-6 months was not practiced very well.

- Vitamin A intake for both mothers and children is extremely low- in either group intake does not reach 50% of the recommended daily intake over time.

- Vitamin A capsule coverage for children is a true success story. Coverage among eligible children has met or surpassed the Government of Indonesia's target rate of 80% of all eligible children 6-59 months of age in almost all provinces surveyed. However, coverage for post-partum women is another story. Over the period of data collection, less than 25% of women reported receiving a capsule within four weeks of delivery.

- Complete Immunization with an official record has declined over time. While the percentage of mothers reporting that their child received the full set of vaccinations without being able to show an official record has risen over the period of data collection, some caution must be placed in these results. Mothers may not be aware of the number and timing of the full series of immunizations and thus less confidence can be placed in this information. However, even if mothers did report correctly, the percentage of children receiving their full series of immunizations has not changed over the previous four years and is still below the Government of Indonesia's 80% target.

- *Posyandu* attendance has increased over the period of data collection, but more than a quarter of children in both urban and rural areas do not attend regularly (every month).

- Diarrhea among children 12-23 months has dropped over time- declining by over 50% in both urban and rural areas.

- Universal use of iodized salt remained high, but is still low in some provinces such as Lombok and Banten.

- The trend for household expenditures on food items seems to fluctuate, an overall improvement in proportion of expenditures among those spending more than 50% of their expenditures on food can be observed. However, it appears that for those who spend the vast majority (>75%) of their expenditures on food (e.g. the poorest of the poor) little improvement has been seen over time.

Recommendations

Because of the numerous ways that the GOI/HKI NSS has provided information and data for policy makers and planners, it is clear that surveillance efforts should be maintained within Indonesia. The process of decentralization affect a country that has not yet recovered from the Asian economic crisis of 1997, however without a household based surveillance system, the effects of this will not be known. The sustainability of such an endeavor is directly related to its value. Because of the importance of the information provided, surveillance should be seen as a sustainable activity to monitor program performance and delivery, and to identify and address declines in health and nutrition status as soon as possible. Information on urban slum areas is not provided by any other type of monitoring system, and with this being the fastest growing population within the country- it is clear that surveillance particularly in these areas should be a priority.

Based on the GOI/HKI NSS findings and importance, the following are recommended:

- Interventions should be developed to lower the rates of anemia among children younger than five years. The recent rise in anemia prevalence in urban slum children is alarming and requires immediate attention. Extremely high level of anemia among children underfives may herald a 'LOST GENERATION' because of the long lasting and probably irreversible negative impact on cognitive development. The resulting benefits in lowering anemia rates far outweigh the costs of such interventions.

- Strengthen and further develop existing interventions for preventing micronutrient deficiencies among mothers, in particular iron and vitamin A deficiency.

- Continue support for the Vitamin A Supplementation Program for Children.

- Support the Vitamin A Supplementation for post partum women in order to increase coverage.

- Iodized salt should be available in more households. Special efforts should be made to improve usage of iodized salt in low coverage areas such as Lombok and Banten.

- New initiatives for limiting the prevalence of micronutrient deficiencies, among children as well as mothers, should be piloted and be intensively monitored and evaluated.

- Exclusive breastfeeding should be promoted and supported. A full range of activities from training health care personnel on importance and ways to facilitate successful exclusive breastfeeding to reinforcing the strict implementation of the Indonesian Code on the Marketing of Breast Milk Substitutes should be done to improve exclusive breastfeeding rates.

- *Posyandu* activities should be encouraged and strengthened in order to maintain and extend the gains seen in attendance and vitamin A capsule coverage.

- Further efforts should be made to ensure that children receive the full series of immunizations in a timely manner. Efforts such as the PIN campaign provide encouraging evidence that this is possible.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 2
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in urban poor Jakarta

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. The main findings for Jakarta are that – ***Anemia rates in children age 12-23 months has been consistently high over time and appear to be on the rise. Maternal anemia was relatively high between 23-35%. Jakarta was a site where wasting has been categorized in the critical emergency zone according to WHO standards. The percentage of children suffering from diarrhea declined from 16% to 4%. The coverage of adequately iodized salt use is the lowest among the urban slums areas, 52% in Jun – Sep 2003.***

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

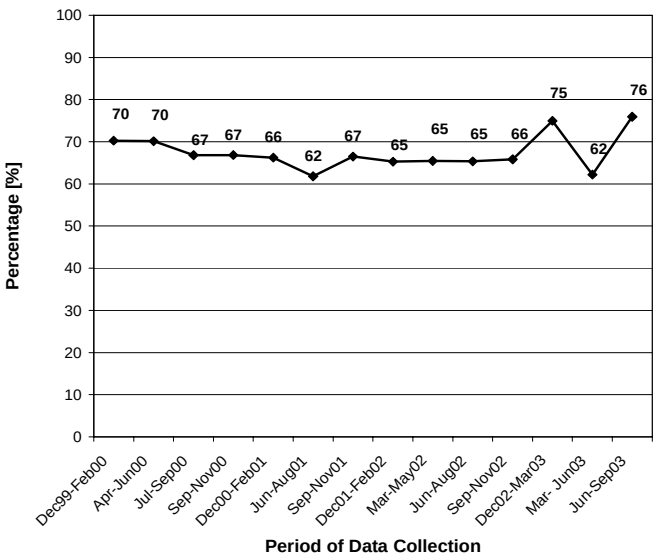
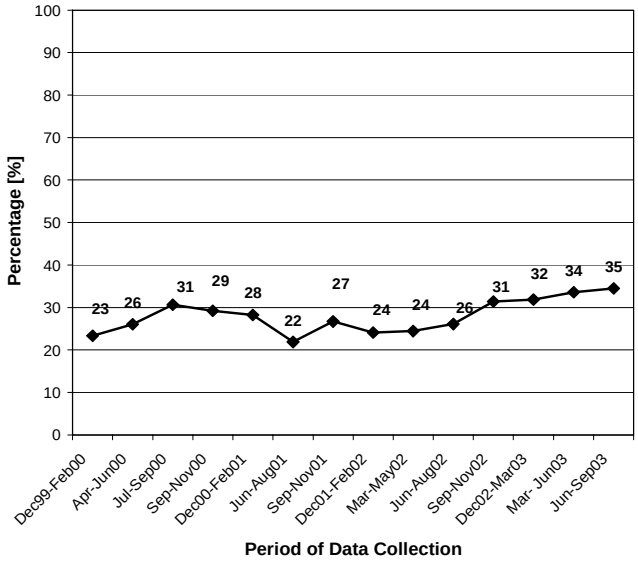


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation among the urban poor living in slums of the city of Jakarta.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%. [2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

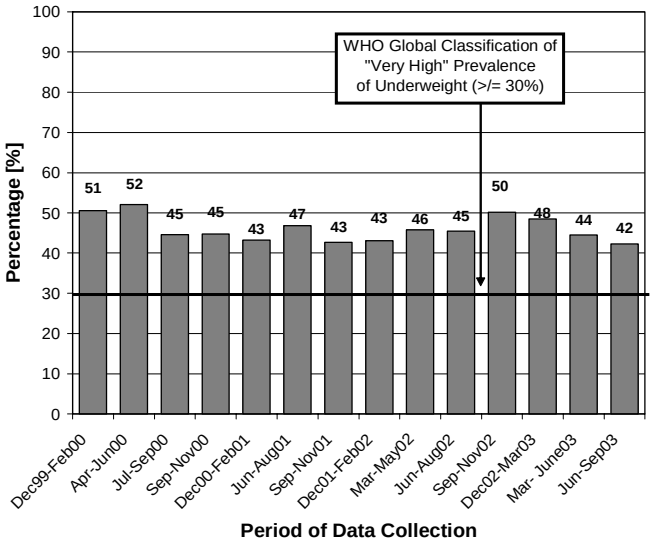
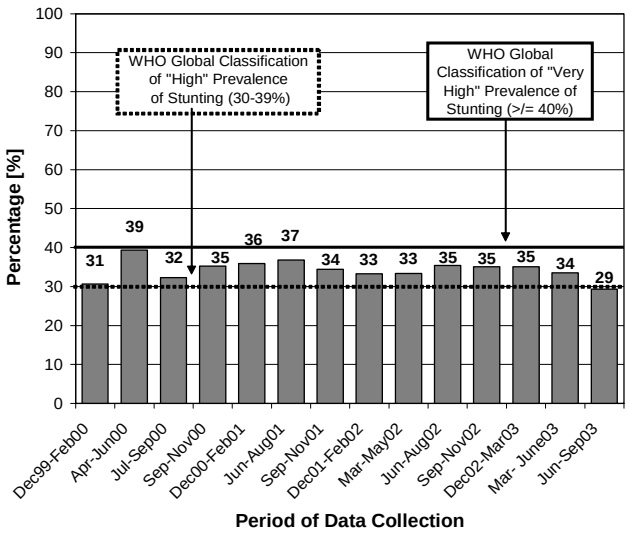


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia have been consistently high over time (60-70%) and appear to be on the rise. *Jakarta* - The prevalence of anemia in Jakarta's urban slums appeared to be relatively constant (62-70%), until Dec 02 - Mar 03 and Jun-Sep 03 when the prevalence reached 75% and 76%, respectively. Between those periods, in Mar-Jun 03, prevalence declined to 62%.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels ranged from 23-31% and showed little sign of improvement. *Jakarta* - In contrast to other areas, the prevalence of maternal anemia in urban slums of Jakarta has shown a slight but gradual increase from 23% in Dec 99 - Feb 00 to 35% in Jun-Sep 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

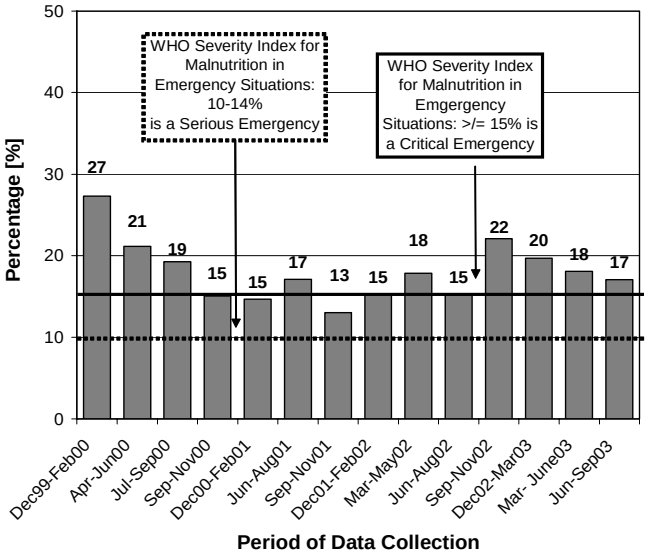
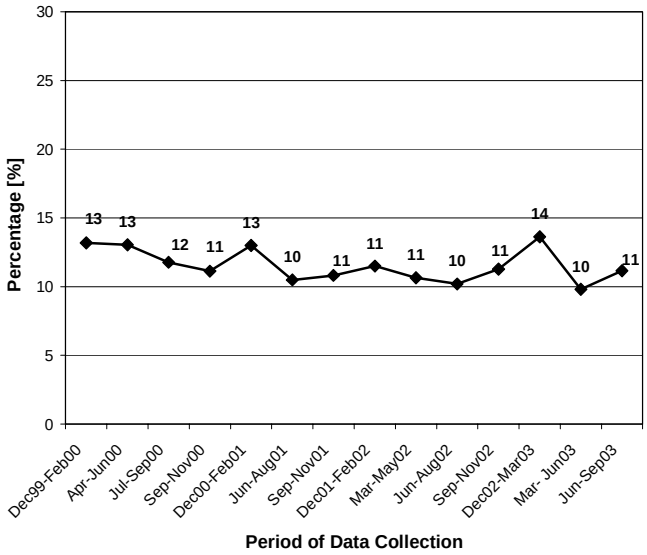


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - Prevalence of underweight was constant at 40-50%, which is above the cut-off for a "very high" prevalence by WHO standards for children 12-59 mo of age. *Jakarta* - The prevalence of underweight children ranged from 42-52% and was relatively constan.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high". [4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Levels of stunting in urban slums were high at 30-40% and varied much among cities. *Jakarta* - The levels of stunting in the urban slums of Jakarta (30-40%) are classified as "high" for every round of data collection except in Jun-Sep 03 when they reached 29%. There seems to be a very gradual decrease of the prevalence of stunting.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

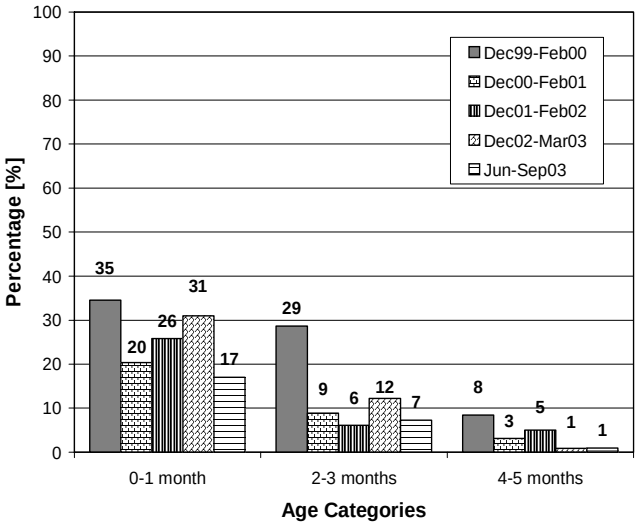
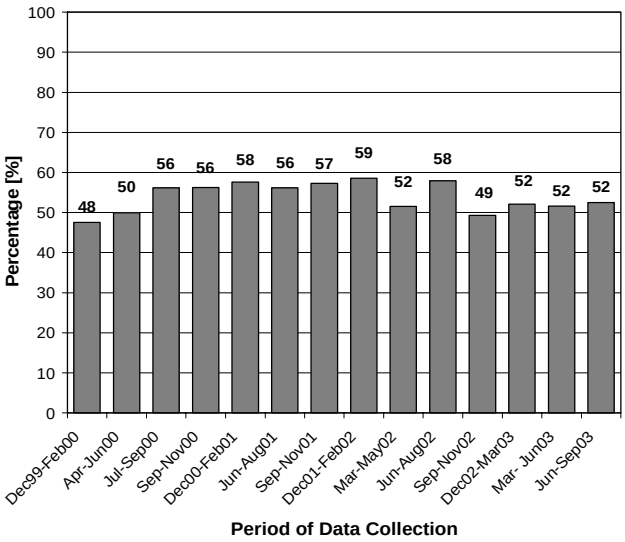


Fig 8. Household Use of Adequately Iodized Salt



measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - The levels of wasting among children in urban slums were extremely high at 15-22%, higher than WHOs cut off for a critical emergency situation among children 12-59 mo of age. *Jakarta* - The prevalence of wasting was 27% in Dec 99 - Feb 00, then declined to 13% by Sep - Nov 00 and then rose again to 17% in Jun-Sep 03 with a high of 22% in Sep-Nov 02.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - The percentage of non-pregnant women with low Body Mass Index (BMI) varied between 11-13%. *Jakarta* - In urban slums in Jakarta, the prevalence of maternal thinness appears to decline very slowly.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding among infants<6 mo old has dropped dramatically between December 1999 and September 2003. *Jakarta* - Exclusive

Fig 9. Vitamin A Intake of Children 12-59 months of age

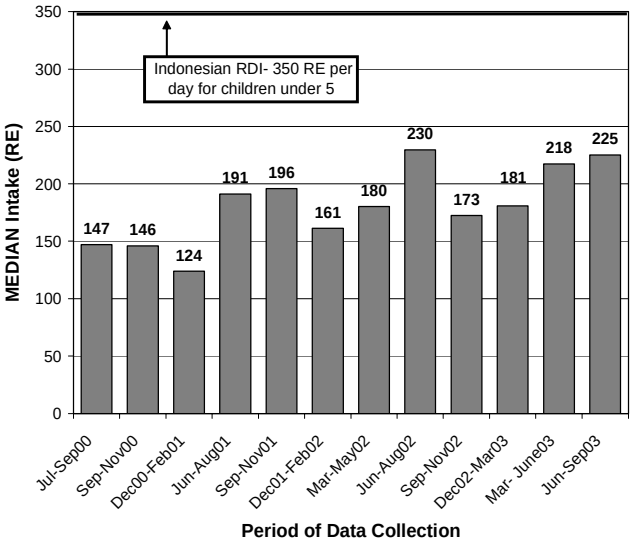
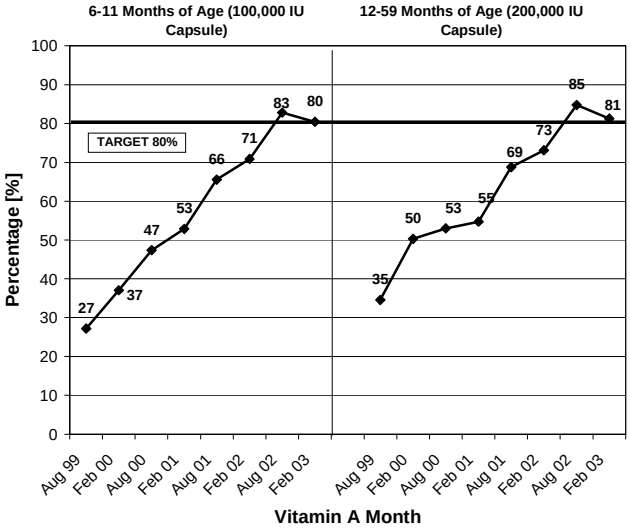


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



breastfeeding declined in Jakarta from 35%, 29% and 8% among infants aged 0-1, 2-3 and 4-5 mo, respectively, in Dec 99 - Feb 00 to 17%, 7% and 1%, respectively, in Jun-Sep 03.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Use of adequately iodized salt differed among urban areas, and decreased slightly in recent rounds of data collection to 77-78%. *Jakarta* - Among the slums, the level of adequately iodized salt was lowest in the slums of Jakarta. Use of iodized salt increased from 48% in Dec 99 - Feb 00 to 59% in Dec 01 - Feb 02 and then declined to 49-52% in the last year.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among children in urban slums was approximately half of

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

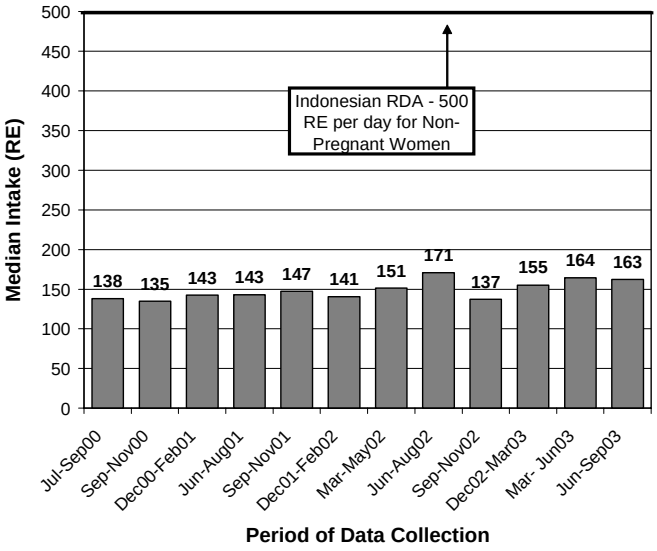
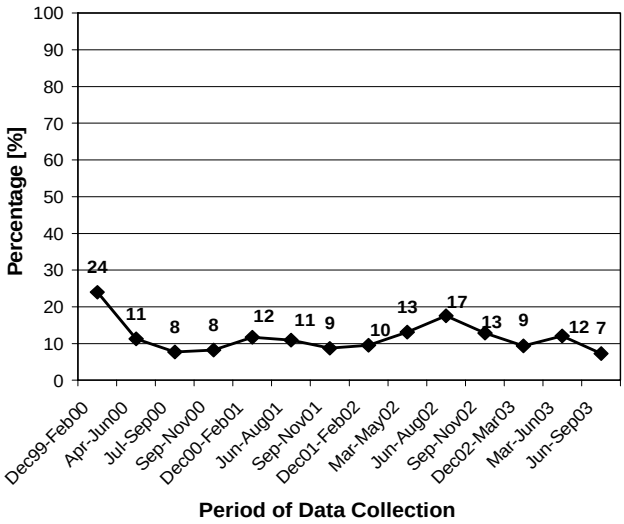


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



the Indonesian Recommended Daily Intake. *Jakarta* - Total Vitamin A intake increased somewhat, but was still below two-thirds of the recommended daily intake.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage levels increased steadily among children 6-59 months of age, and reached the target of 80% in August 2002 and February 2003. *Jakarta* - Vitamin A capsule coverage levels in Jakarta increased dramatically for both age categories of 6-11 months and 12-59 month old children. In August 1999, coverage was 27% and 35%, respectively, and since August 2002 they have been above 80%.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

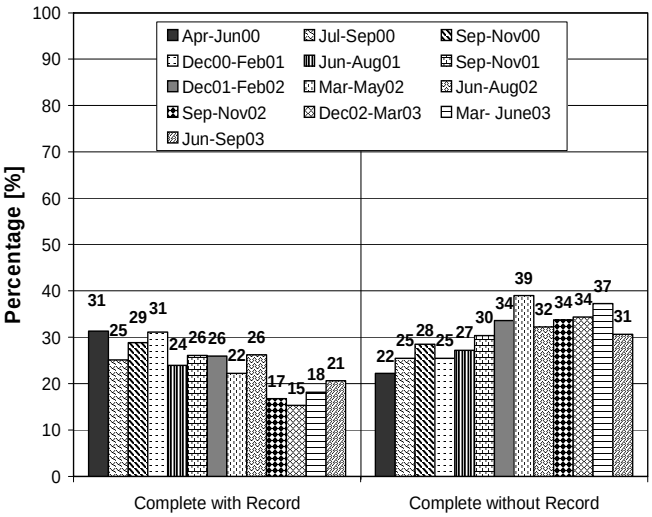
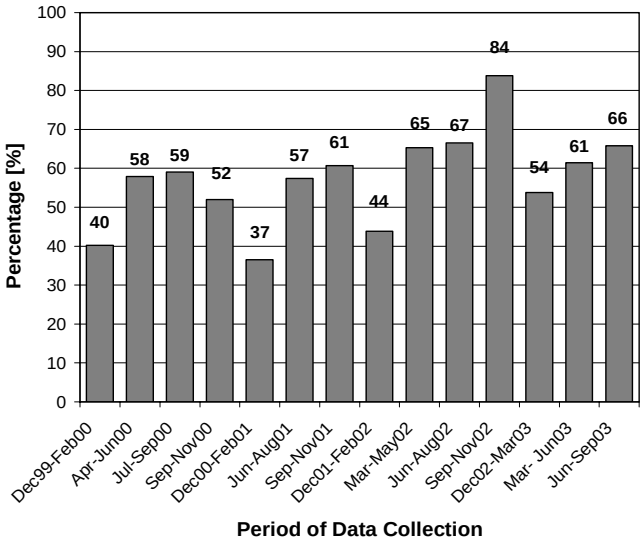


Fig 14. Posyandu Attendance in the Previous Month



concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - The total Vitamin A Intake for non-pregnant mothers was less than one half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for all urban slum areas in every round of data collection. *Jakarta* - Total vitamin A intake among non-pregnant mothers was around one-third of the amount recommended for non-pregnant non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Postpartum VAC coverage was very low at 17-24%. *Jakarta* - Postpartum VAC coverage had been at its highest in 1999 (24%) and then ranged from 7-17% in the subsequent years.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

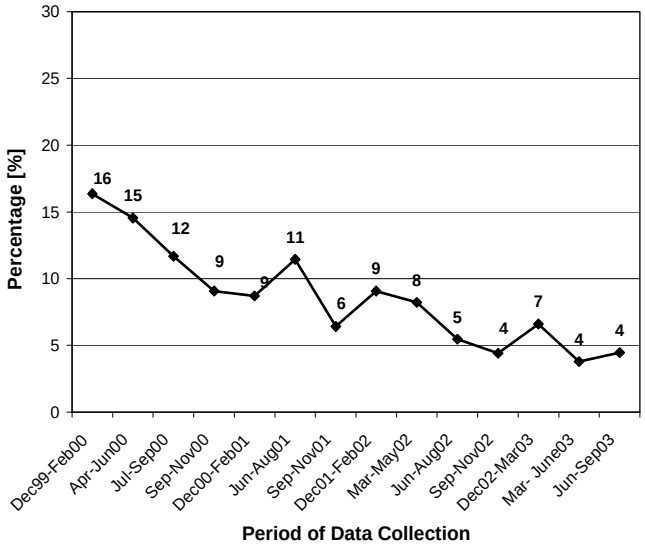
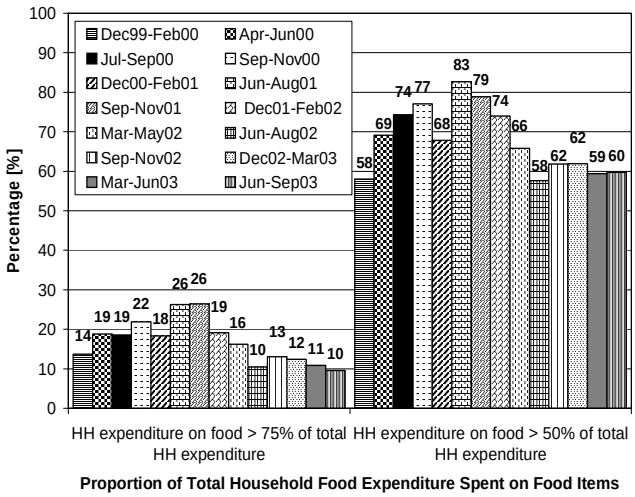


Fig 16. Household Expenditures on Food Items



from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization coverage rates range from 60-70% and the proportion with an official record declines. *Jakarta* - In Jakarta the percentage of children who had been completely immunized with an official record was never greater than 31% and is declining. Complete immunization without an official record is below 40% and increasing. Incomplete immunization ranged between 37% to 46%.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu* records. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance increased over time, but fell off considerably during certain times of the year. *Jakarta* - *Posyandu* attendance increased overall over time, although it oscillated seasonally. Previous month's attendance was 40% in Dec 99 -Feb 00. Regular attendance reached a height of 84% in Sep-Nov 02, but was only 66% in Jun-Sep 03. This means that one-third of families did not attend the *Posyandu* regularly.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - The percentage of children suffering from diarrhea declined steadily, but seems to vary considerably among urban slums. *Jakarta* - In Jakarta, the percentage of children suffering from diarrhea declined from 16% in Dec 99 - Feb 00 to 4% in Jun-Sep 03.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - Proportion of household expenditures on food has decreased gradually to 56% spending >50% of expenditures on food. *Jakarta* - The proportion of expenditure on food started to decline from Sep-Nov 01 and reached its lowest in Jun-Sep 03, with 60% spending more than 50% of expenditures on food and 10% spending more than 75% of expenditures.

Conclusions

General - Findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However,

coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. *Jakarta* – Anemia rates in children age 12-23 months has been consistently high over time and appear to be on the rise. Maternal anemia was relatively high between 23-35%. Jakarta was a site where wasting has been categorized in the critical emergency zone according to WHO standards. The percentage of children suffering from diarrhea declined from 16% to 4%. The coverage of adequately iodized salt use is the lowest among the urban slums areas, 52% in Jun – Sep 2003.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 3
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in urban poor Surabaya

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. The main findings for Surabaya are that - *Prevalence of anemia among young children was very high and appeared to be increasing (77%), as it also did among mothers (22%) in Jun – Sep 2003. There was a dramatic decline of exclusive breastfeeding, to only 21% of infants aged 0-1 mo in Jun-Sep 03. The proportion of children that was completely immunized with an official record declined rapidly, from 81% in Apr-Jun 00 to 37% in Jun-Sep 03, but the proportion without an official record increased markedly. More than 88% of households used adequately iodized salt.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

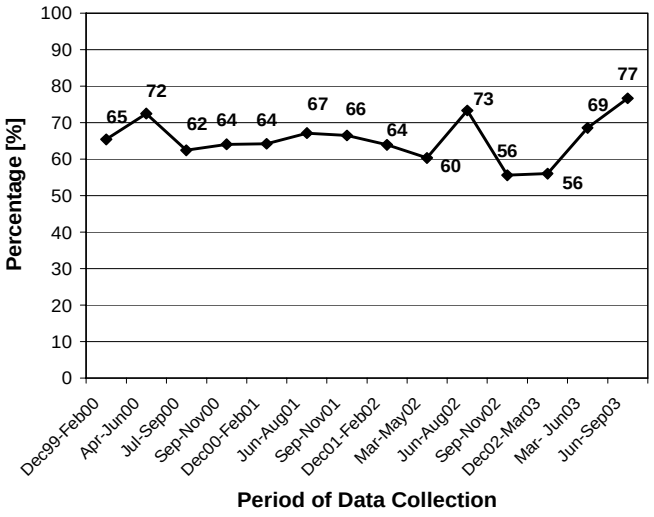
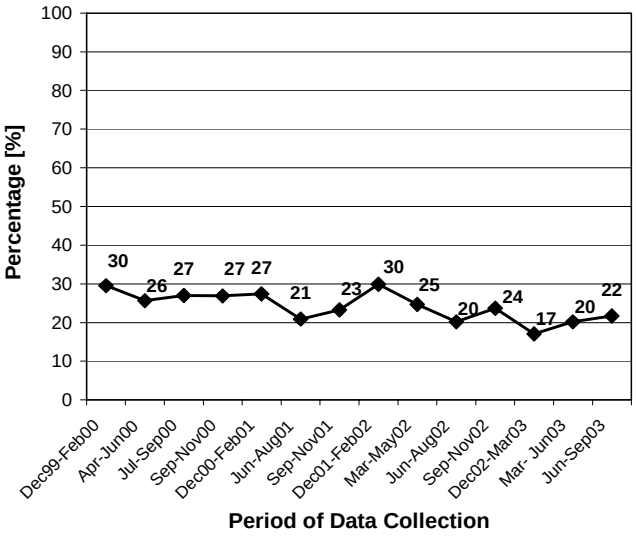


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation among the urban poor living in slums of the city of Surabaya.

Findings

Anemia among Children 12-23 Months of Age

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia have been consistently high over time (60-70%) and appear

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

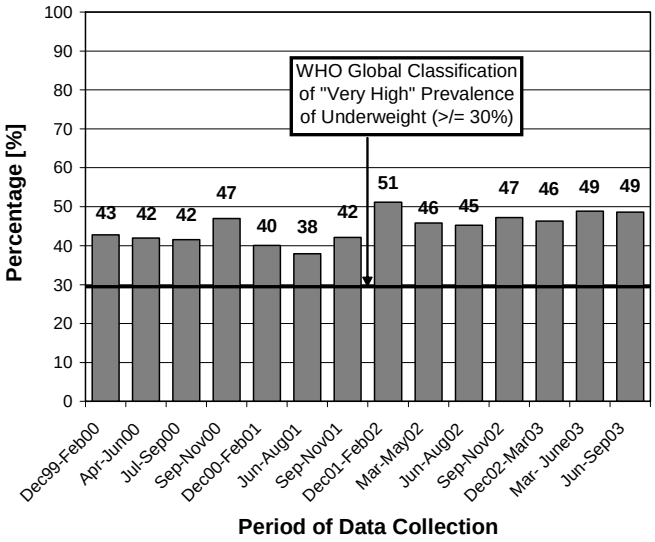
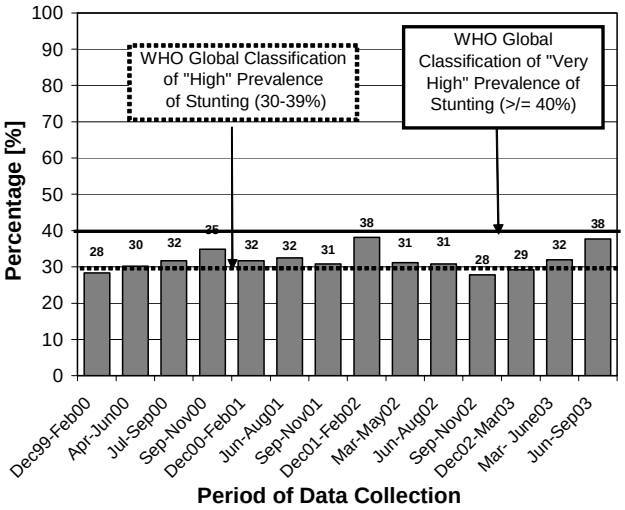


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



to be on the rise. *Surabaya* - The prevalence of anemia was 65% in December 1999-February 2000 and after a rise to 72% in the next round, it declined to 60% in Mar – May 2002. However, it increased again in Mar-Jun 03 and reached 77% in Jun-Sep 03.

Anemia among Non-Pregnant Mothers

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels ranged from 23-31% and showed little sign of improvement. *Surabaya* - Maternal anemia in urban slums of Surabaya decreased over time, from 30% in Dec 99-Feb 00 to 22% in Jun-Sep 03. Prevalence in the preceding two rounds of data collection was even lower at 17% and 20%.

Prevalence of Underweight Children 12-23 Months of Age

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - Prevalence of underweight was constant at 40-50%, which is above the cut-

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

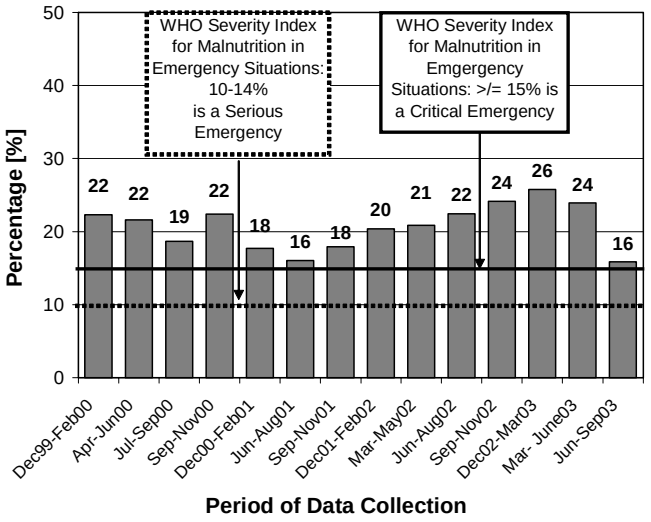
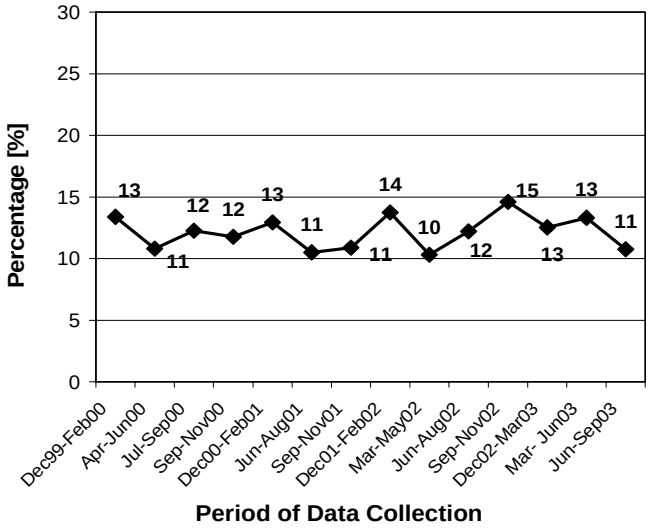


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



off for a "very high" prevalence by WHO standards for children 12-59 mo of age. *Surabaya* - The prevalence of underweight children varied between 38-51% and seemed to show a slight increase over time. By Jun-Sep 03 the prevalence was 49%.

Prevalence of Stunted Children 12-23 Months of Age

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Levels of stunting in urban slums were high at 30-40% and varied much among cities. *Surabaya* - The levels of stunting in the urban slums of Surabaya were lower than in other cities varying between 28-38%. Nevertheless, levels above 30% are classified as "high" by WHO standards .

Prevalence of Wasted Children 12-23 Months of Age

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - The levels of wasting among children in urban slums were extremely high at 15-22%, higher than WHOs cut off for a critical emergency situation among children 12-59 mo of age. *Surabaya* - The prevalence of wasting in the urban slums of Surabaya was very high during the past four years, varying between 16-26%. During 2000-2001, the prevalence decreased, then it

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

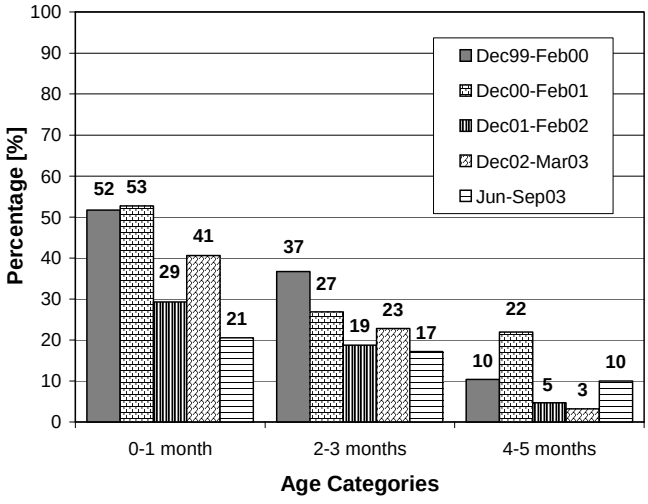
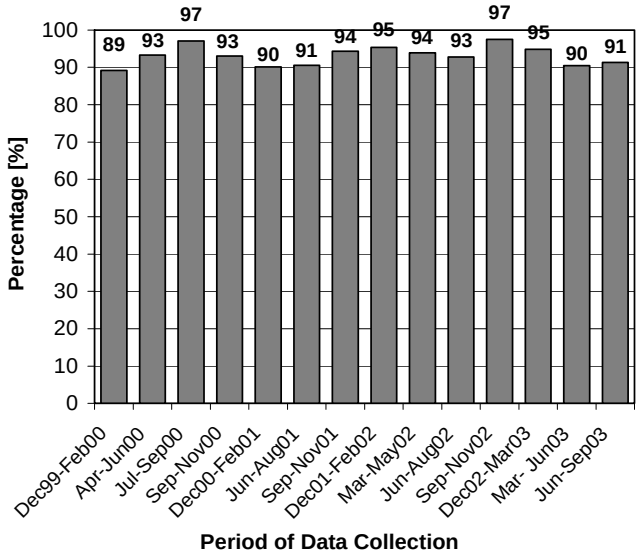


Fig 8. Household Use of Adequately Iodized Salt



increased again till early 2003, after which a fast decline was observed to 16% in Jun-Sep 03. However, that level is still above the WHO cut off for a critical emergency situation.

Percentage of Non-Pregnant Mothers with Low Body Mass Index

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared. .

Findings: *General* - The percentage of non-pregnant women with low Body Mass Index (BMI) varied between 11-13%. *Surabaya* - The percentage of non-pregnant women with a low BMI appeared constant between Dec 99 to Nov 02 at 10-15% and started to decline in 2003, from 15% in Sep-Nov 02 to 11% in Jun-Sep 03.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding among infants<6 mo old has dropped dramatically between December 1999 and September 2003. *Surabaya* - Also in Surabaya, rates of exclusive breastfeeding had decreased. In Jun-Sep 03, the proportion of infants exclusively breastfed was 21%, 17% and 10% among those aged 0-1, 2-3 and 4-5 mo, respectively. This had dropped from 52%, 37% and 10%, respectively, in Dec 99-Feb 00.

Fig 9. Vitamin A Intake of Children 12-59 months of age

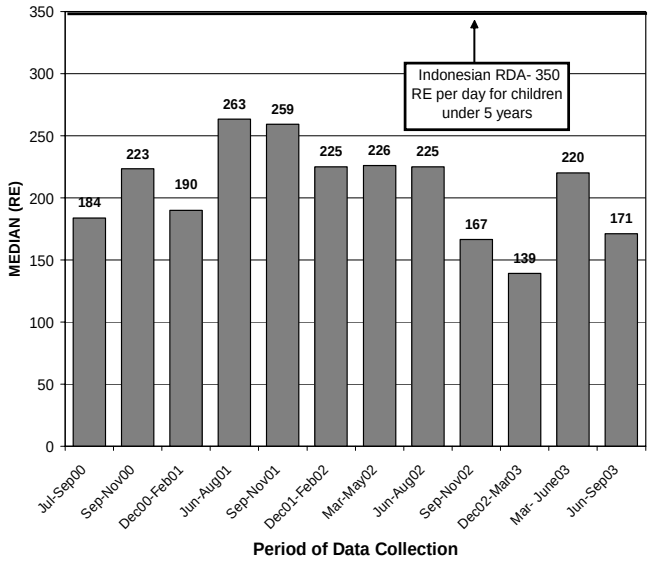
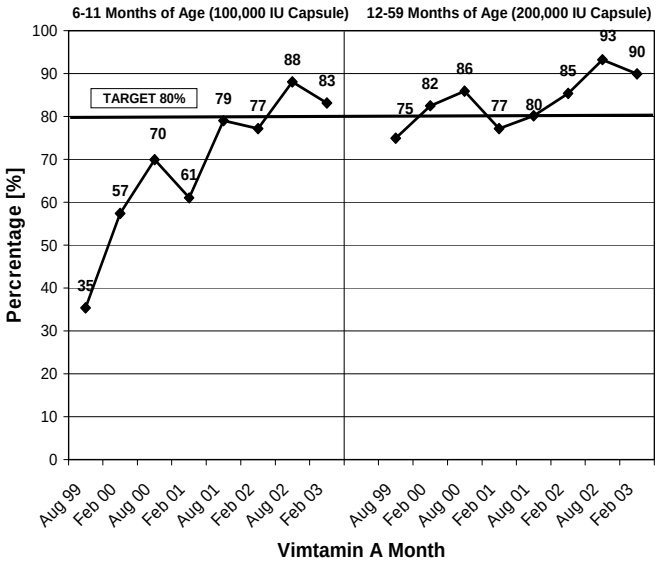


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Household Use of Adequately Iodized Salt

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Use of adequately iodized salt differed among urban areas, and decreased slightly in recent rounds of data collection to 77-78%. *Surabaya* - The level of adequately iodized salt was very high, varying between 89-97%.

Vitamin A Intake of Children 12-59 months of age

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among children in urban slums was approximately half of the Indonesian Recommended Daily Intake. *Surabaya* - Vitamin A intake was among the highest observed, but still well below the Recommended Daily Intake, and seems to have declined over the last two years.

Vitamin A Capsule Coverage among Children 6-59 Months of Age

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

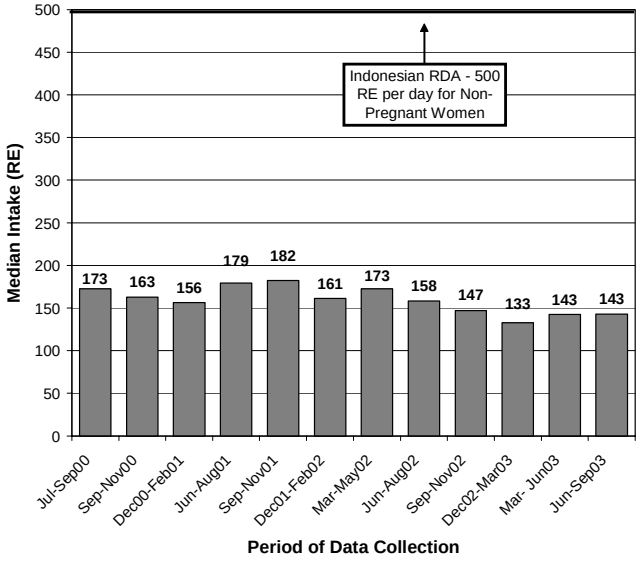
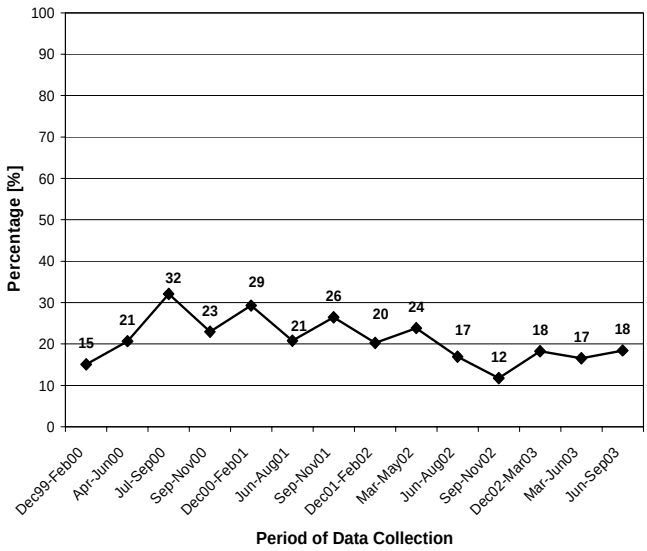


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.10 Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage levels increased steadily among children 6-59 months of age, and reached the target of 80% in August 2002 and February 2003. *Surabaya* - Vitamin A capsule coverage levels increased in both age categories and most dramatic among children 6-11 months of age. Since Aug 01, more than 77% of children have received a VAC.

Total Vitamin A Intake among Non- Pregnant Mothers

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - The total Vitamin A Intake for non-pregnant mothers was less than one half of the

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

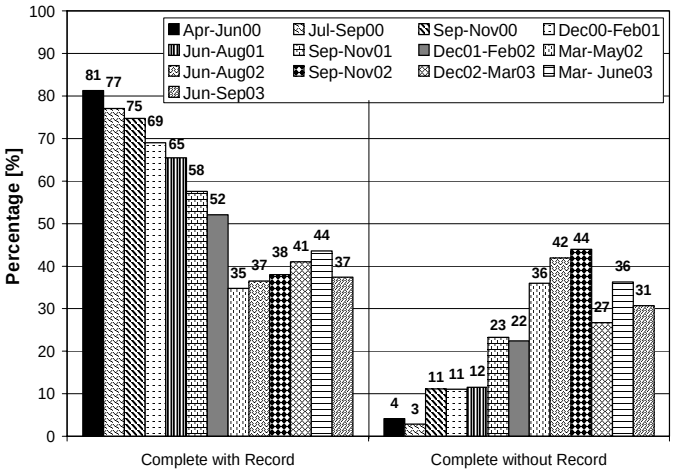
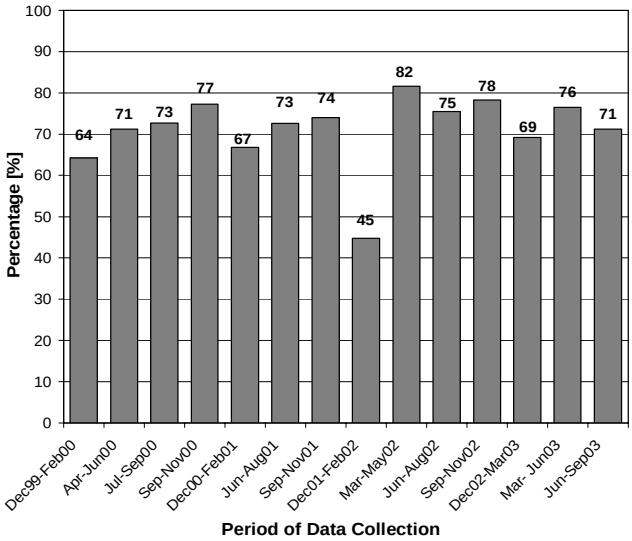


Fig 14. Posyandu Attendance in the Previous Month



Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for all urban slum areas in every round of data collection. *Surabaya* - Vitamin A intake among non-pregnant mothers was less than half of the Recommended Daily Intake for non-pregnant non-breastfeeding women and seems to have declined over the last two years.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Postpartum VAC coverage was very low at 17-24%. *Surabaya* - Vitamin A capsule coverage decreased overall, from a relatively high coverage in 1999-2000 (up to 32%) to less than 20% in 2002-2003.

Complete Immunization Status of Children 12-17 Months of Age

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

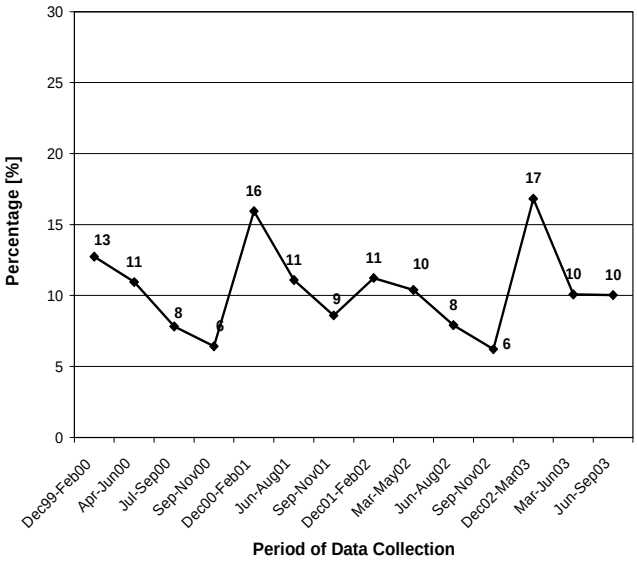
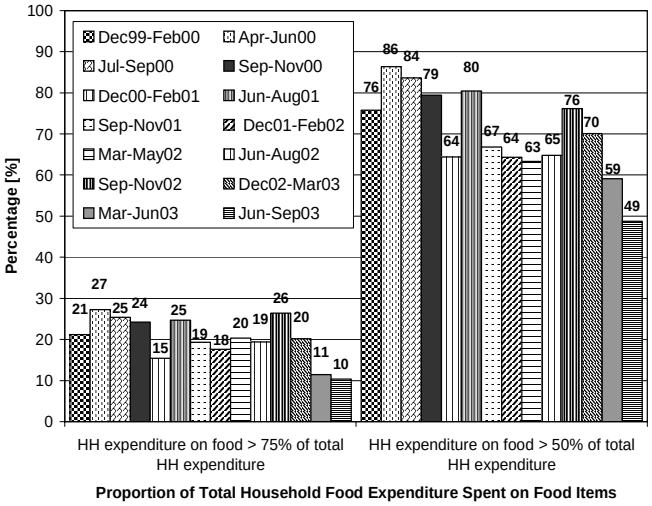


Fig 16. Household Expenditures on Food Items



Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization coverage rates range from 60-70% and the proportion with an official record declines. *Surabaya* - The percentage of children who had been completely immunized with an official record has declined dramatically, from 81% in Apr-Jun 00 to 37% in Jun-Sep 03. Complete immunization without an official record increased over this period from 4% to 31%. Incomplete immunization remained within the range of 15% and 32%.

Posyandu Attendance in the Previous Month

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General - Posyandu* attendance increased over time, but fell off considerably during certain times of the year. *Surabaya - Posyandu* attendance increased modestly over time, from 64% in Dec 99- Feb 00 to 71% in Jun-Sep 03. Most of the increase was in the first two years and attendance was lower in the December months. More than one quarter of all children are not attending the *Posyandu* regularly.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - The percentage of children suffering from diarrhea declined steadily, but seems to vary considerably among urban slums. *Surabaya* - The percentage of children suffering from diarrhea did not decline much. It varied between 6-11% with some high peaks around the December months of 16-17%.

Household Expenditures on Food Items

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - Proportion of household expenditures on food has decreased gradually to 56% spending >50% of expenditures on food. *Surabaya* - The trend in food expenditures in Surabaya followed the general trend in urban slums. The percentage of households spending more than 50% of their total expenditures on food items was 76% in December 1999-February 2000 and 49% in June-September 2003. The percentage of households spending more than 75% of their total expenditures on food items was 21% in the first round and 10% in the last.

Conclusions

General - Findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. *Surabaya* - Prevalence of anemia among young children was very high and appeared to be increasing (77%), as it also did among mothers (22%) in Jun – Sep 2003. There was a dramatic decline of exclusive breastfeeding, to only 21% of

infants aged 0-1 mo in Jun-Sep 03. The proportion of children that was completely immunized with an official record declined rapidly, from 81% in Apr-Jun 00 to 37% in Jun-Sep 03, but the proportion without an official record increased markedly. More than 88% of households used adequately iodized salt.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 4
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in urban poor Semarang

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. The main findings for Semarang are that – ***Anemia rates in children age 12-23 months oscillated from round to round, but still increased overall to 77% in Jun-Sep 03. Maternal anemia was relatively high between 25-41%. Level of underweight, stunting and wasting was the lowest among the other urban slums sites. The percentage of children suffering from diarrhea was also the lowest among all urban poor sites (6%). The coverage of adequately iodized salt use is the highest among urban slums areas (74-97%).***

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

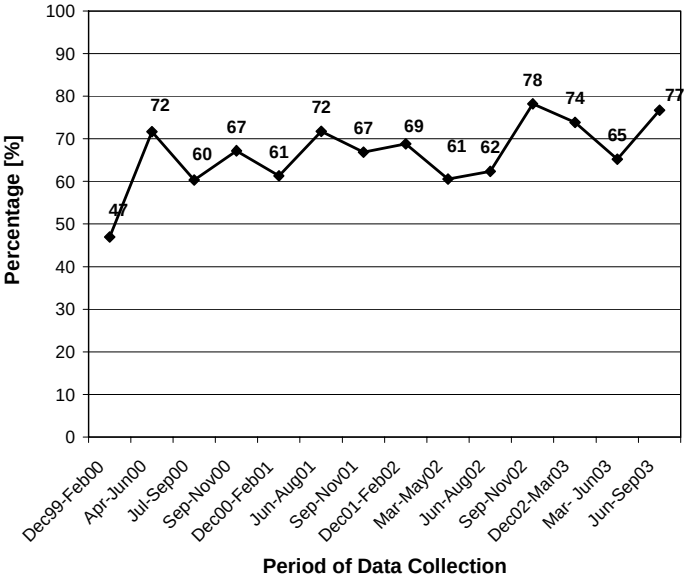
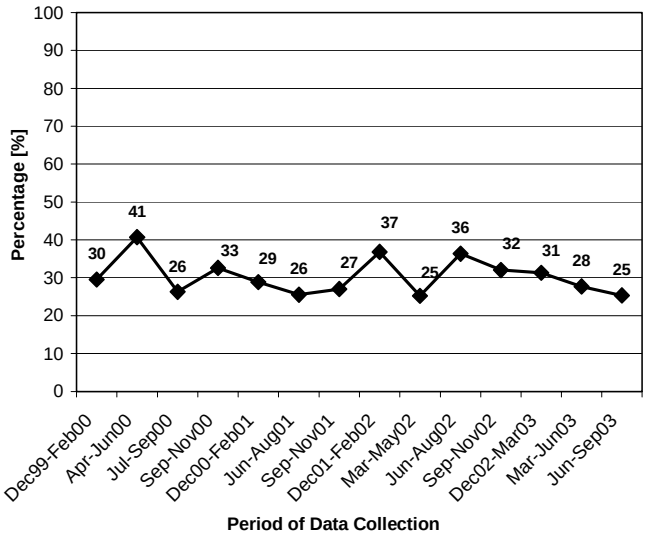


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation among the urban poor living in slums of the city of Semarang.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

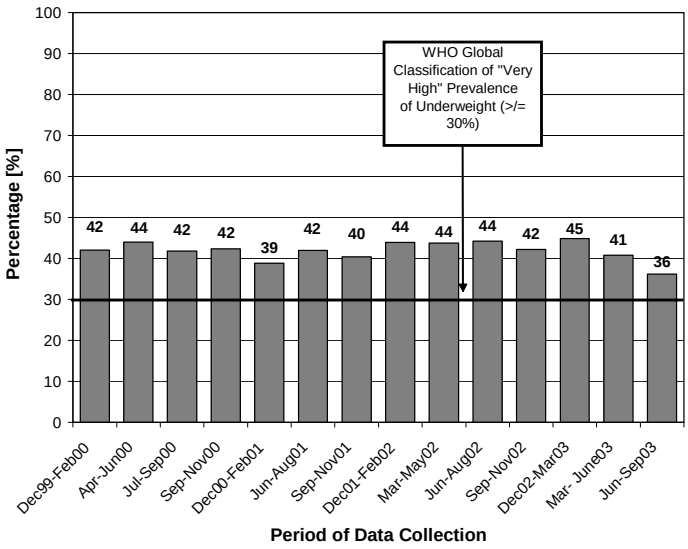
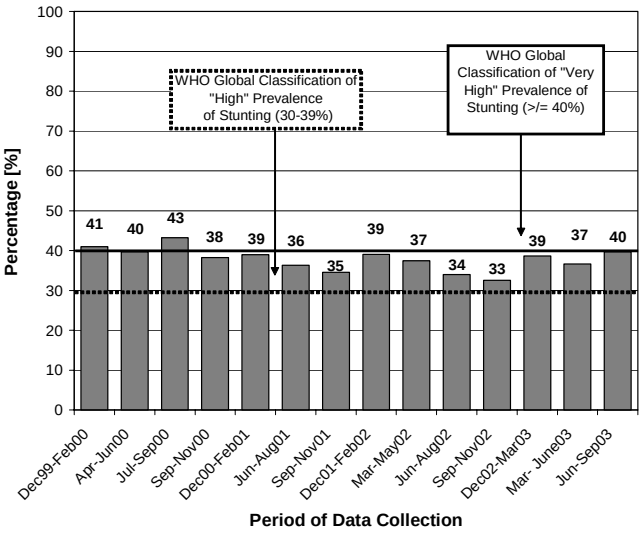


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



Findings: *General* - Levels of anemia have been consistently high over time (60-70%) and appear to be on the rise. *Semarang* - The level of anemia oscillated from round to round in Semarang's urban slums, but still increased overall. The prevalence was 47% in Dec 99 - Feb 00 and 77% in Jun-Sep 03.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels ranged from 23-31% and showed little sign of improvement. *Semarang* - Prevalence of maternal anemia in urban slums of Semarang was relatively high between 25-41% and recently showed a gradual decline from 36% in Jun-Aug 02 to 25% in Jun-Sep 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

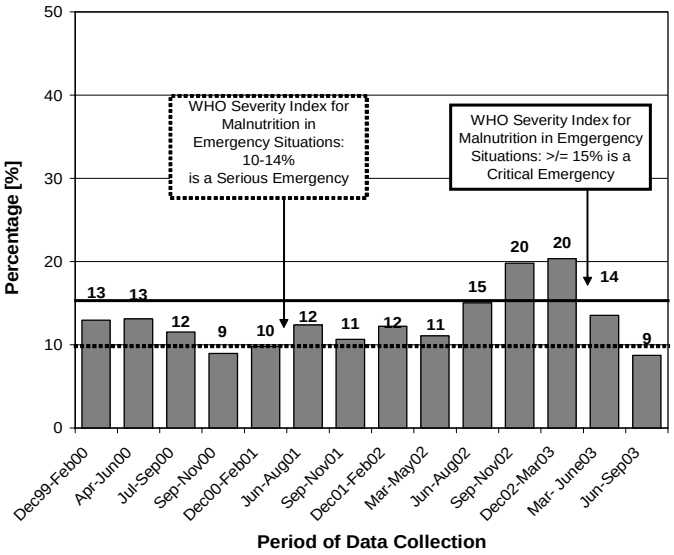
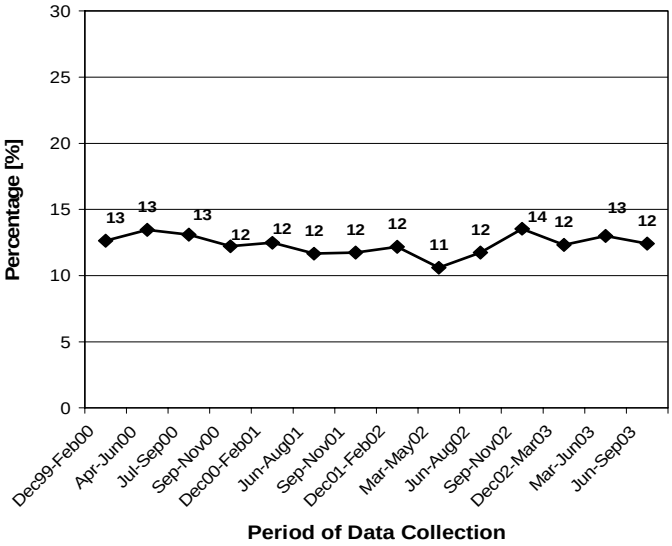


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



enumerator, age was determined using a local calendar.

Findings: *General* - Prevalence of underweight was constant at 40-50%, which is above the cut-off for a "very high" prevalence by WHO standards for children 12-59 mo of age. *Semarang* - The prevalence of underweight children was high in the urban slums of Semarang, at 39-45% and then declined from 45% in Dec 02 - Mar 03 to 36% in Jun-Sep 03. The latter is still in the WHO category of very high for children 12-59 months of age.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult[7].

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Levels of stunting in urban slums were high at 30-40% and varied much among cities. *Semarang* - The levels of stunting in the urban slums of Semarang are classified as at least "high" for every round of data collection by WHO standards for children 12-59 months of age. While prevalence declined gradually from 43% in Jul-Sep 00 to 33% in Sep-Nov 02, it increased again to 37-40% in 2003.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

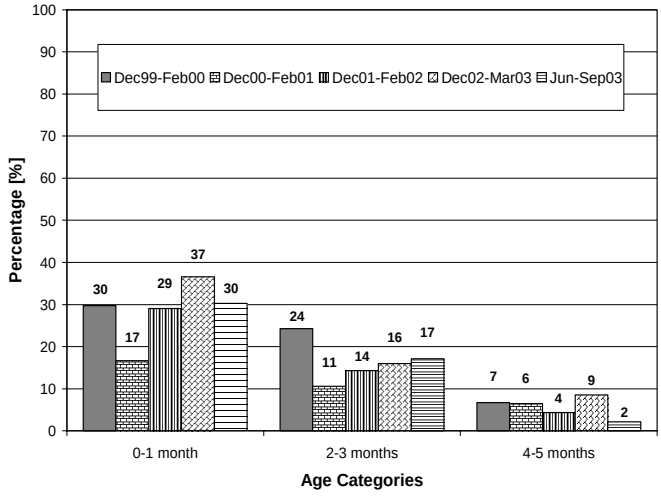
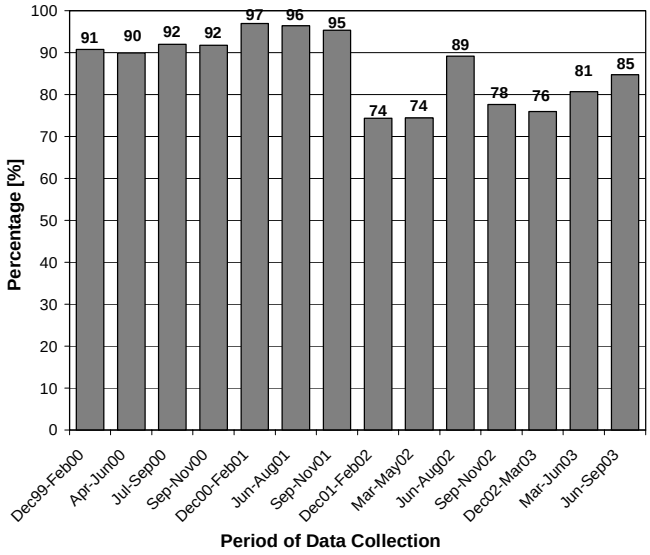


Fig 8. Household Use of Adequately Iodized Salt



Findings: *General* - The levels of wasting among children in urban slums were extremely high at 15-22%, higher than WHOs cut off for a critical emergency situation among children 12-59 mo of age. *Semarang* - While the level of wasting in the urban slums of Semarang tended to be much lower than that of other cities, it increased considerably from 9% in Sep-Nov 00 to 20% in Sep 02 - Mar 03. However, in Jun-Sep 03 it was back at 9% again.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - The percentage of non-pregnant women with low Body Mass Index (BMI) varied between 11-13%. *Semarang* - The percentage of non-pregnant women with a low BMI in Semarang was constant between 11-14%.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding among infants<6 mo old has dropped dramatically between December 1999 and September 2003. *Semarang* - Exclusive breastfeeding rates were very low and did not decrease much more during the last four years. In

Fig 9. Vitamin A Intake of Children 12-59 months of age

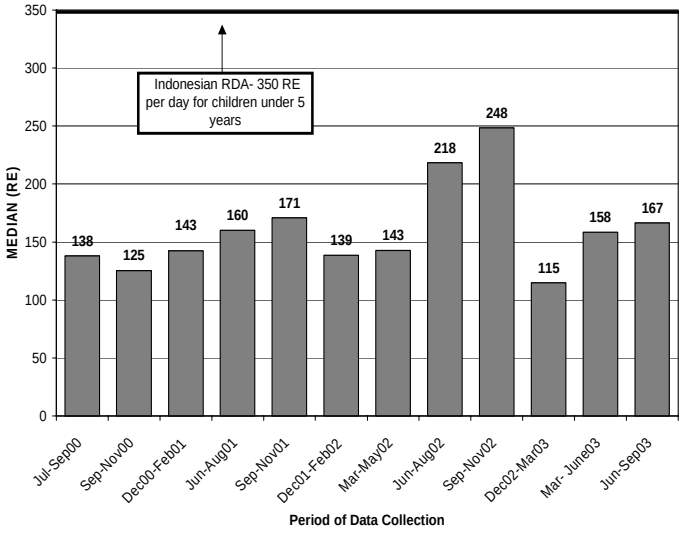
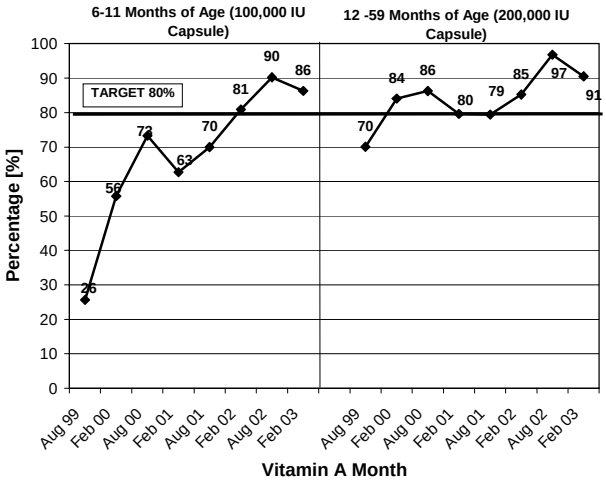


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Jun-Sep 03, the proportion of infants exclusively breastfed was 30%, 17% and 2% among those aged 0-1, 2-3 and 4-5 mo, respectively.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Use of adequately iodized salt differed among urban areas, and decreased slightly in recent rounds of data collection to 77-78%.

Semarang -

The level of adequately iodized salt in the urban slums of Semarang was very high. It was above 90% from December 1999 to November 2001, but then fell to 74% in Dec 01 - Feb 02. Since then, it gradually increased again to 85% in Jun-Sep 03. The levels observed are still the highest among urban slum areas.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among children in urban slums was approximately half of the Indonesian Recommended Daily Intake.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

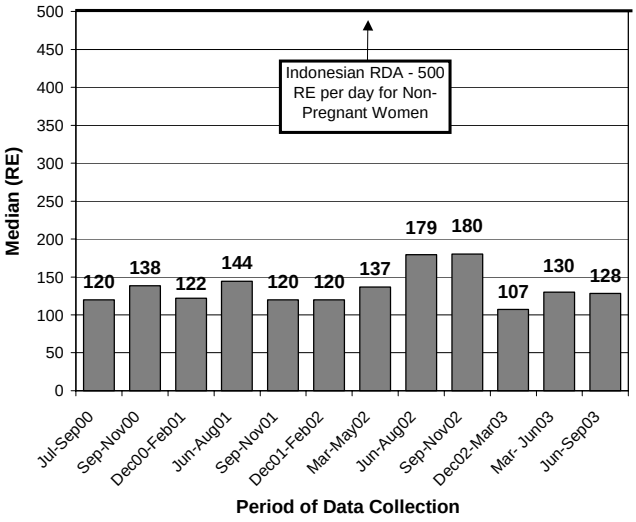
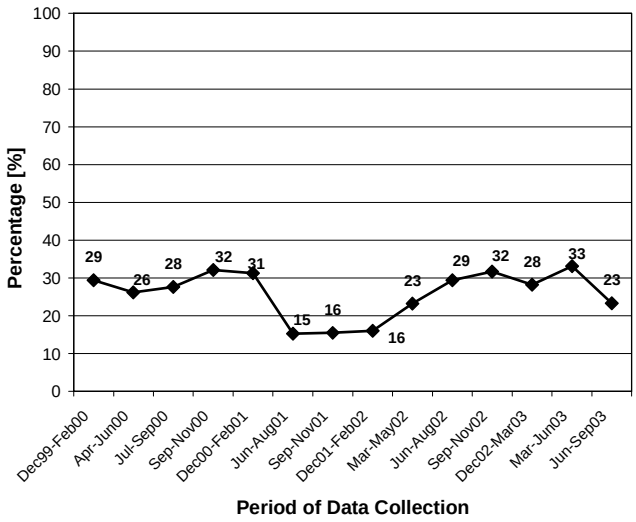


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Semarang - Vitamin A intake had increased steadily to 70% of the Recommended Daily Intake by Sep-Nov 02 but then declined again to less than 50% in 2003.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage levels increased steadily among children 6-59 months of age, and reached the target of 80% in August 2002 and February 2003. *Semarang* - Vitamin A capsule coverage levels increased in both age categories, but was most dramatic among children 6-11 months of age for whom coverage was only 26% in August 1999. Since February 2002 coverage has been above the target of 80%.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

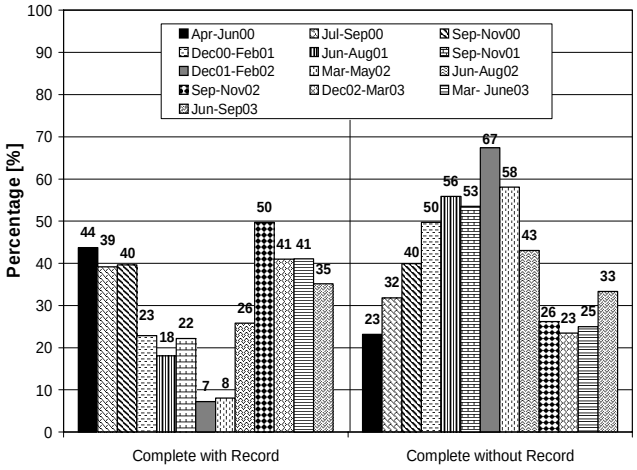
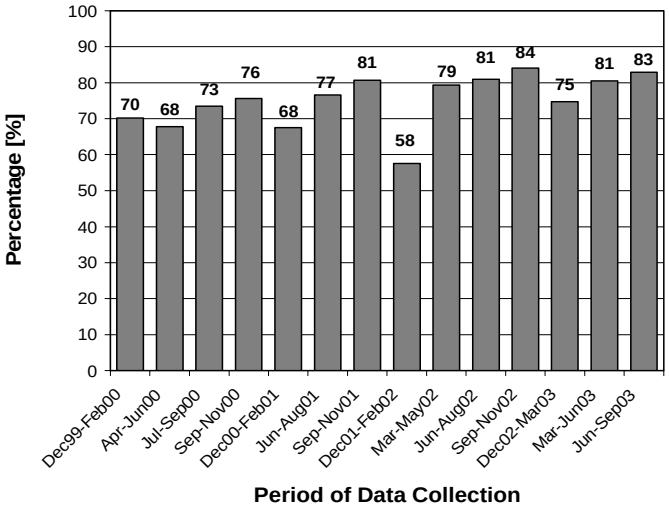


Fig 14. Posyandu Attendance in the Previous Month



assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - The total Vitamin A Intake for non-pregnant mothers was less than one half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for all urban slum areas in every round of data collection. *Semarang* - The total Vitamin A intake among non-pregnant mothers was less than one-third of the Recommended Daily Intake for non-pregnant non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Postpartum VAC coverage was very low at 17-24%. *Semarang* - Postpartum VAC coverage was relatively high between 15-33%. After a drop in 2001 it increased again till 23-33%.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

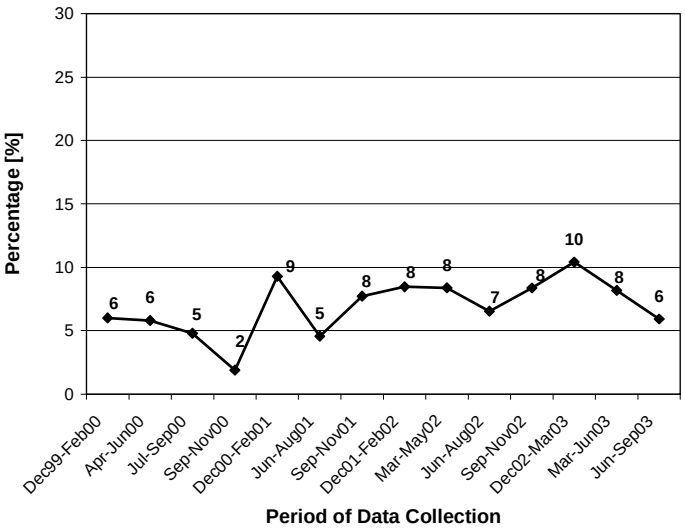
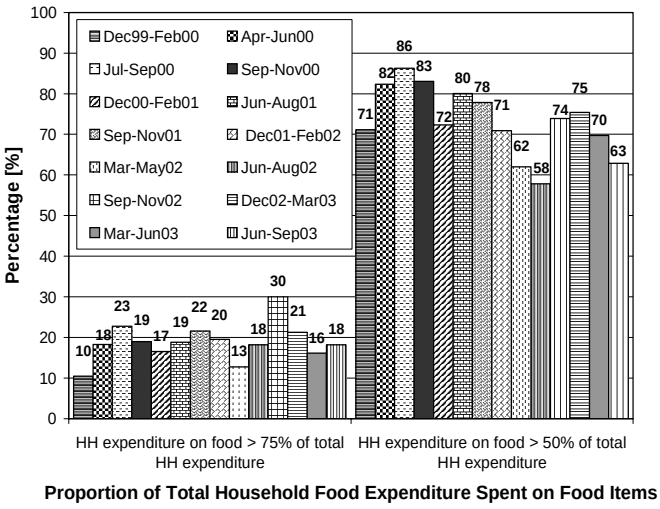


Fig 16. Household Expenditures on Food Items



government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization coverage rates range from 60-70% and the proportion with an official record declines. *Semarang* - Percentage of children who had been completely immunized with official record declined from 44% in Apr-Jun 00 to 7% in early 2002, but then it increased to 50% in Sep-Nov 02. However, that level was not maintained, in Jun-Sep 03 35% of children had been completely immunized with a record and 33% without a record. Thus, around one-third of the children had not received all of the standard childhood immunizations.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance increased over time, but fell off considerably during certain times of the year. *Semarang* - *Posyandu*

attendance increased over time, from 70% in Dec 99 - Feb 00 to 83% in Jun-Sep 03, but decreased noticeably in the months December to February. The visiting rate in Jun-Sep 03 was the highest among urban slum areas.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - The percentage of children suffering from diarrhea declined steadily, but seems to vary considerably among urban slums. *Semarang* - The percentage of children suffering from diarrhea was lowest among all urban poor sites, but increased gradually from 2% in Sep-Nov 00 to 10% in Dec 02 - Mar 03. After that, it declined to 6% in Jun-Sep 03.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - Proportion of household expenditures on food has decreased gradually to 56% spending >50% of expenditures on food. *Semarang* - The trend in food expenditures in Semarang followed the general trend in urban slums. The percentage of households spending more than 50% of their total expenditures on food items was 71% in Dec 99 - Feb 00 and 63% in Jun-Sep 03. The percentage of households spending more than 75% of their total expenditures on food items was 10% in the first round and 18% in the last and were highest at 30% in Sep-Nov 02.

Conclusions

General - Findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule

coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. *Semarang* – Anemia rates in children age 12-23 months oscillated from round to round, but still increased overall to 77% in Jun-Sep 03. Maternal anemia was relatively high between 25-41%. Level of underweight, stunting and wasting was the lowest among the other urban slums sites. The percentage of children suffering from diarrhea was also the lowest among all urban poor sites (6%). The coverage of adequately iodized salt use is the highest among urban slums areas (74-97%).

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 5
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in urban poor Makassar

Key results for the period: Apr 2000 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~60%. The main findings for Makassar are that - *Vitamin A capsule coverage did not reach the target rate of 80% of all eligible children, with rates of 75% in Feb 2003 distribution month. Prevalence of anemia among children aged 12-23 mo was extremely high and had increased to 83% in Jun-Sep 03. Also among non-pregnant mothers, prevalence of anemia had increased. Prevalence of both underweight and stunting was in the very high category as classified by WHO and wasting in the category of a critical emergency.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

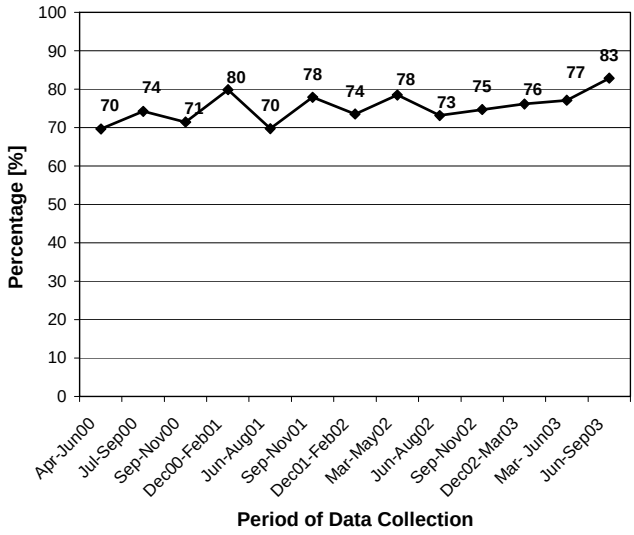
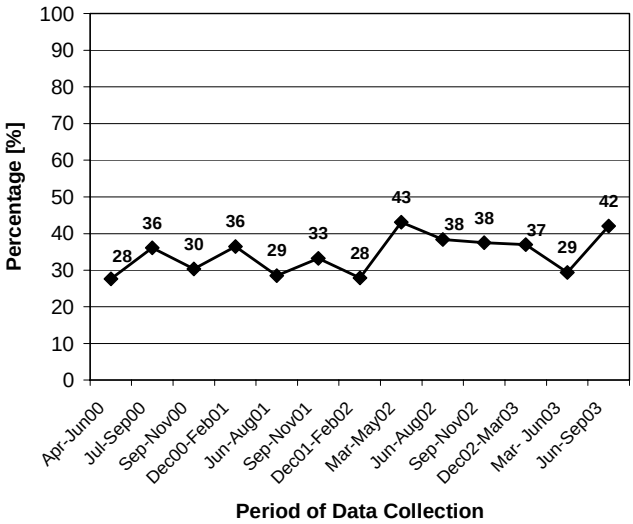


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation among the urban poor living in slums of the city of Makassar.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

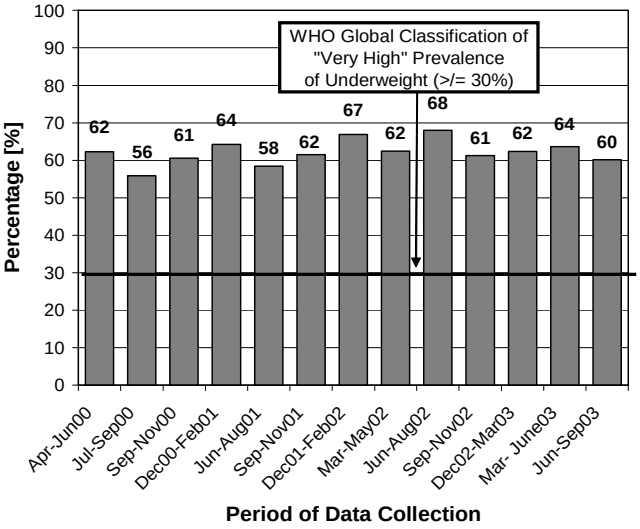
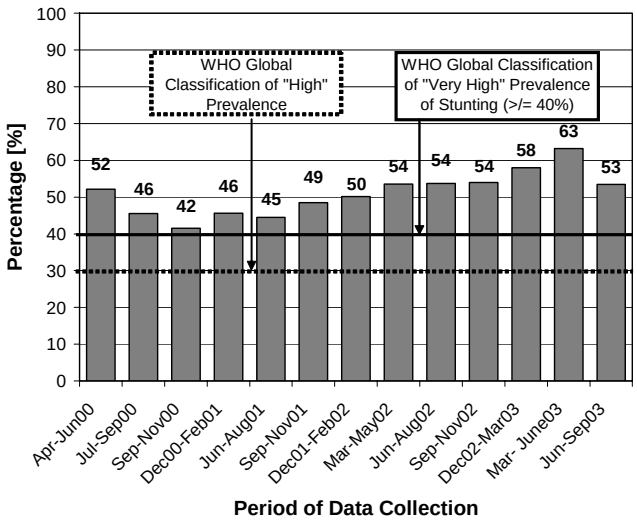


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



Findings: *General* - Levels of anemia have been consistently high over time (60-70%) and appear to be on the rise. *Makassar* - Overall, the level of anemia in Makassar increased over time, from 70% in Apr 99 - Jun 00 to 83% in Jun-Sept 03.

Anemia among Non-Pregnant Mothers

(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels ranged from 23-31% and showed little sign of improvement. *Makassar* - Maternal anemia in urban slums of Makassar was among the highest observed and increased between the first and the last round of data collection, from 28-42%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - Prevalence of underweight was constant at 40-50%, which is above the cut-off for

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

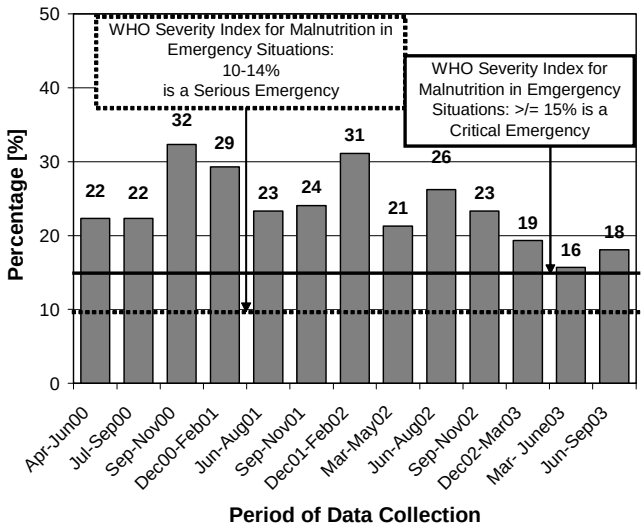
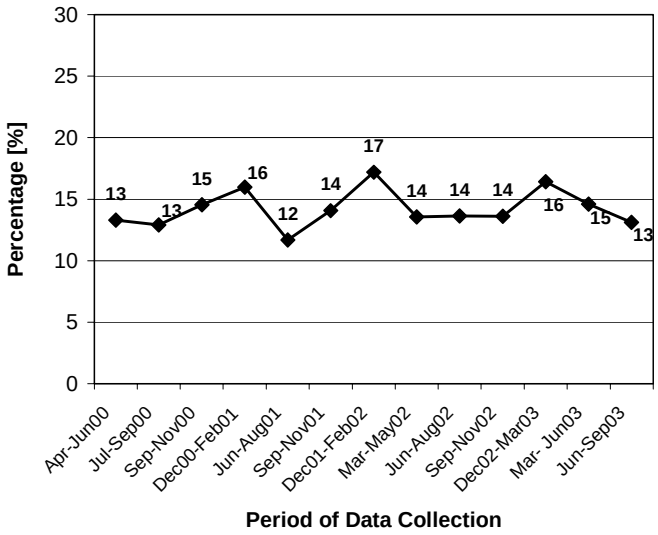


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



a "very high" prevalence by WHO standards for children 12-59 mo of age. *Makassar* - The prevalence of underweight children was extremely high in the urban slums of Makassar, ranging from 56-68%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Levels of stunting in urban slums were high at 30-40% and varied much among cities. *Makassar* - The levels of stunting in the urban slum of Makassar are classified as "very high" for every round of data collection by WHO standards for children 12-59 months of age. There was an increase from 42% in Sep-Nov 00 to 63% in Mar-Jun 03 and then a decline to 53% in Jun-Sep 03.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - The levels of wasting among children in urban slums were extremely high at 15-22%, higher than WHOs cut off for a critical emergency situation among children 12-59 mo of age. *Makassar* - The prevalence of wasting reached extremely high levels of 31-32% but has been below

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

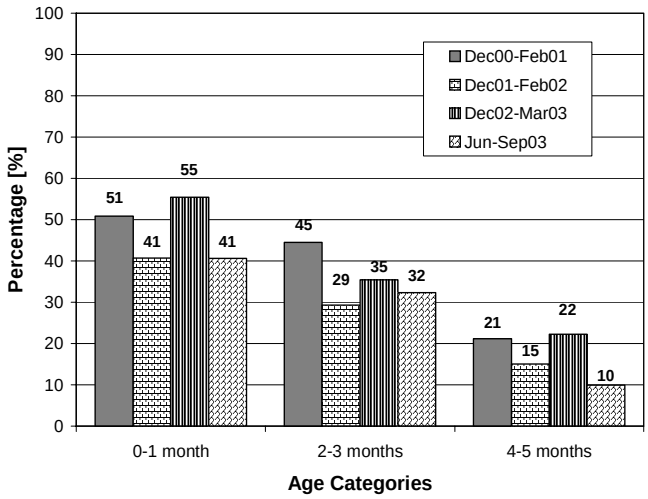
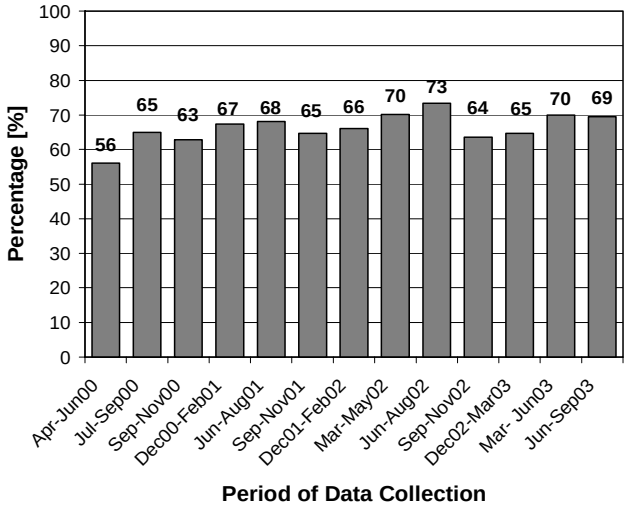


Fig 8. Household Use of Adequately Iodized Salt



20% in 2003. However, that level is still well above the cut-off for a critical emergency situation.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - The percentage of non-pregnant women with low Body Mass Index (BMI) varied between 11-13%. *Makassar* - The percentage of non-pregnant women with a low BMI changed little over time and varied between 12-17%.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

(SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding among infants<6 mo old has dropped dramatically between December 99 and September 03. *Makassar* - In Makassar, exclusive breastfeeding was not as low as in other urban slums, but it did decline to some extent, from 51%, 45% and 21% among infants aged 0-1, 2-3 and 4-5 mo,

Fig 9. Vitamin A Intake of Children 12-59 months of age

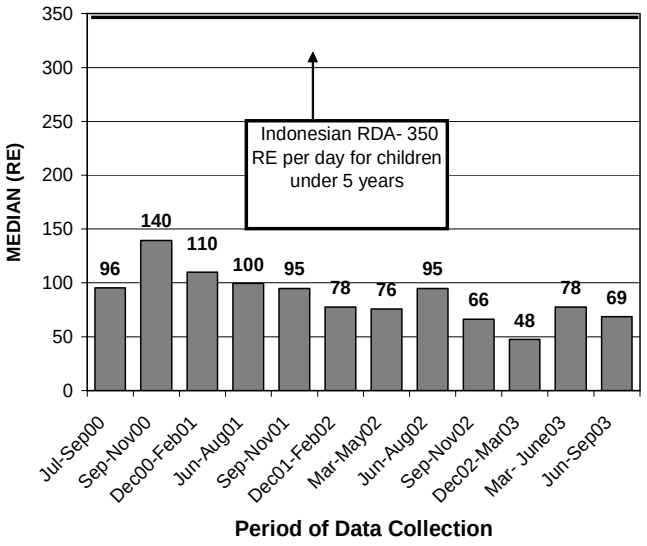
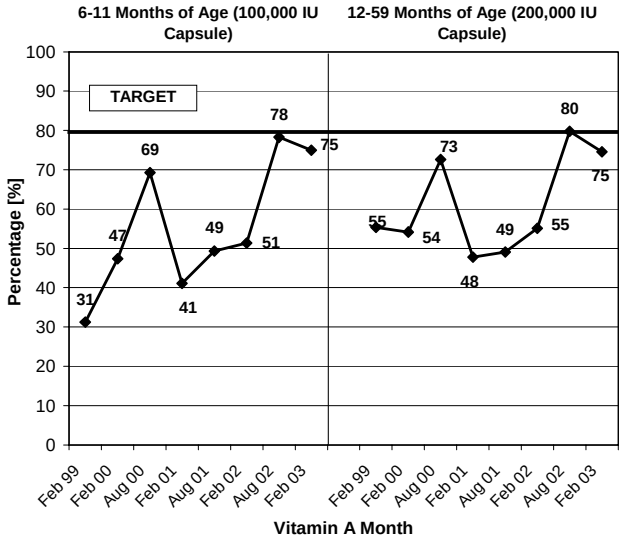


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



respectively, in Dec 00 - Feb 01 to 41%, 32% and 10%, respectively, in Jun-Sep 03.

Household Use of Adequately Iodized Salt

(SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Use of adequately iodized salt differed among urban areas, and decreased slightly in recent rounds of data collection to 77-78%. *Makassar* - The level of adequately iodized salt increased slightly in Makassar, from 56% in Apr-Jun 00 to 69% in Jun-Sep 03.

Vitamin A Intake of Children 12-59 months of age

(SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among children in urban slums was approximately half of the Indonesian Recommended Daily Intake. *Makassar* - Vitamin A intake is extremely low and declined from more than one-third in Sep-Nov 00 to less than one-fourth of the Recommended Daily Intake in Jun-Sep 03.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

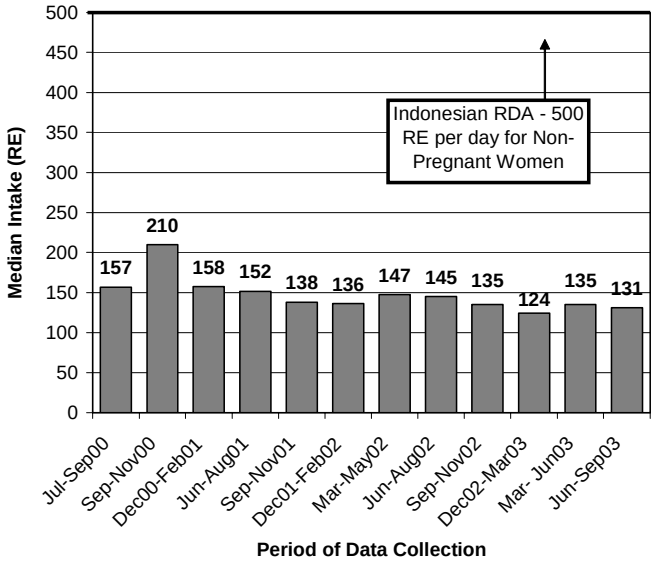
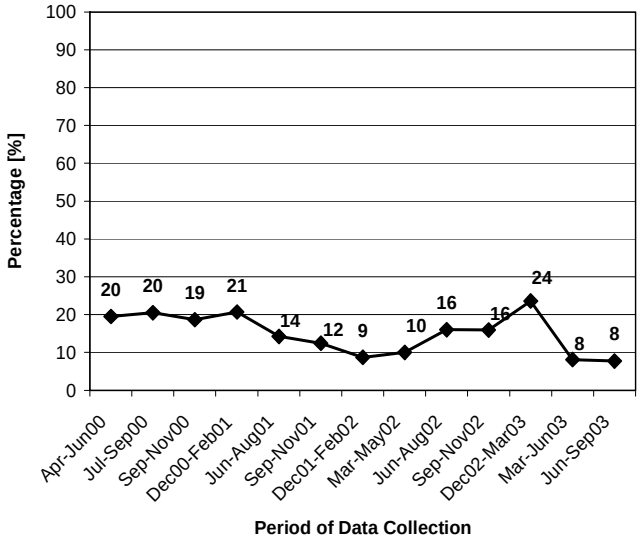


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage levels increased steadily among children 6-59 months of age, and reached the target of 80% in August 2002 and February 2003. *Makassar* - Vitamin A capsule coverage levels in Makassar reached high levels in August 2000 (69-73%) but then dropped deeply (41-55%) and only reached high levels again two years later in August 2002 and February 2003 (78-80%), almost reaching the Government of Indonesia's target of 80% coverage.

Total Vitamin A Intake among Non-Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

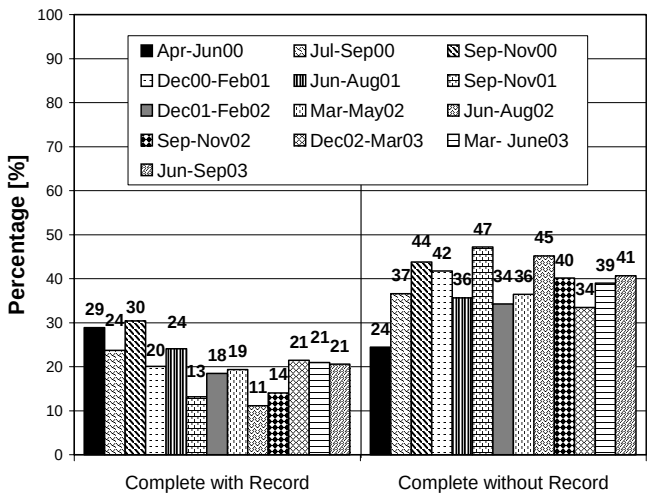
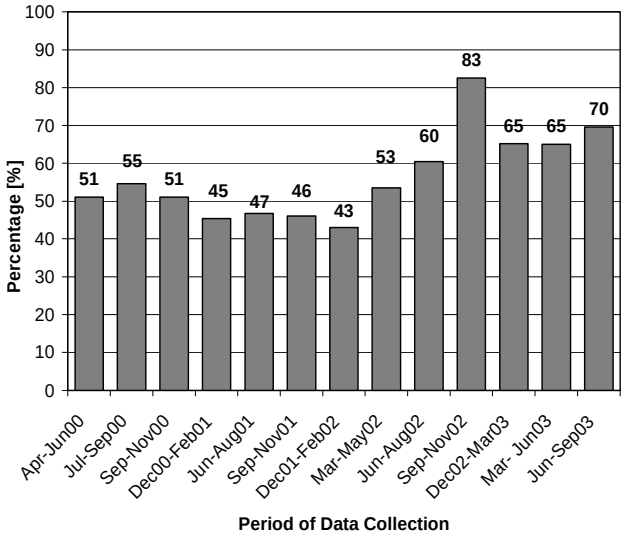


Fig 14. Posyandu Attendance in the Previous Month



everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - The total Vitamin A Intake for non-pregnant mothers was less than one half of the Indonesian Recommended Daily Intake (even less for mothers that are lactating since their RDI is higher) for all urban slum areas in every round of data collection. *Makassar* - Total Vitamin A intake was less than one-third of the Recommended Daily Intake for non-pregnant non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Postpartum VAC coverage was very low at 17-24%. *Makassar* - Postpartum VAC coverage had been at its highest in Dec 02 – Mar 03 (24%) and then decreased to 8% in the subsequent years.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG. 13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

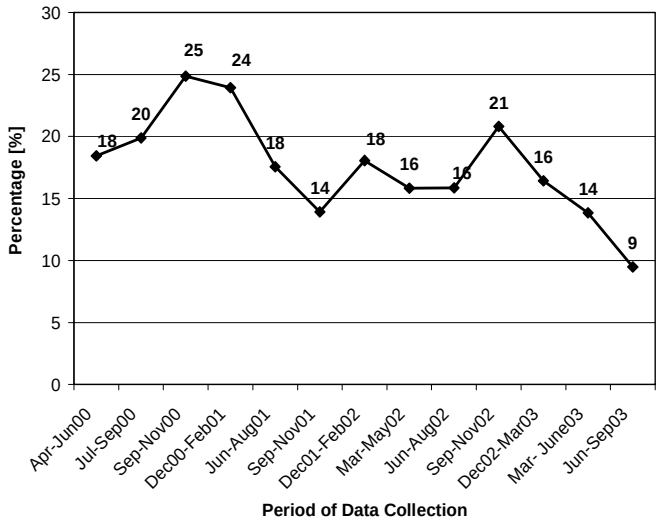
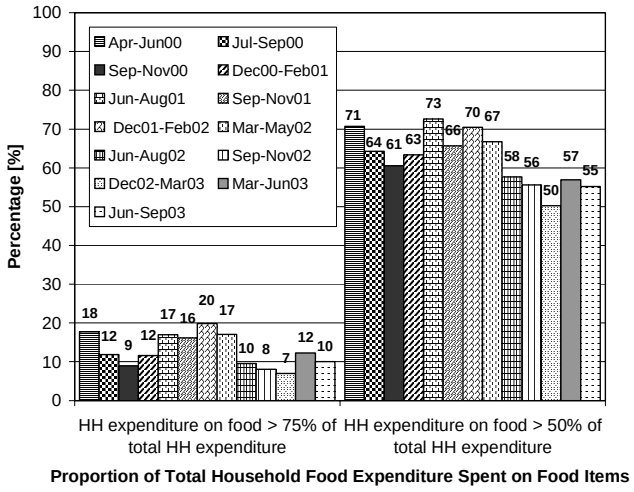


Fig 16. Household Expenditures on Food Items



Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.
Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.
Findings: *General* - Complete immunization coverage rates range from 60-70% and the proportion with an official record declines. *Makassar* - In Makassar, the percentage of children who had been completely immunized with an official record has declined slightly, till 21% in Jun-Sep 03, while those without an official record remained stable since Jul-Sep 00 at 40-50%. In Jun-Sep 03, at least 38% of children had not received all of the standard childhood immunizations.

Posyandu Attendance in the Previous Month

(SEE FIG. 14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.
Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.
Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.
Findings: *General* - *Posyandu* attendance increased over time, but fell off considerably during certain times of the year. *Makassar* - After a gradual decrease of P*osyandu* visiting rates from 55% in Jul-Sep 00 to 43% in Dec 01 – Feb 02,

they increased to 83% in Sep-Nov 02. After that, levels were maintained at 65-70%.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG. 15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - The percentage of children suffering from diarrhea declined steadily, but seems to vary considerably among urban slums. *Makassar* - The percentage of children suffering from diarrhea declined overall from 18% in Apr-Jun 00 to 9% in Jun-Sep 03, but showed high peaks in Sep-Nov 00 (25%) and Sep-Nov 02 (21%).

Household Expenditures on Food Items

(SEE FIG. 16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - Proportion of household expenditures on food has decreased gradually to 56% spending >50% of expenditures on food. *Makassar* - The trend in food expenditures in Makassar followed the general trend in urban slums with a decline after Dec 01 - Feb 02. The percentage of households spending more than 50% of their total expenditures on food items was 71% in April-June 00 and 55% in Jun-Sep 03. The percentage of households spending more than 75% of their total expenditures on food items was 18% and 10%, respectively.

Conclusions

General - Findings in urban slums of Indonesia's population reveal that prevalence of underweight and wasting among children aged 12-23 mo old is very high and stunting high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased

dramatically and diarrhea prevalence has declined by ~60%. *Makassar* - Vitamin A capsule coverage did not reach the target rate of 80% of all eligible children, with rates of 75% in Feb 2003 distribution month. Prevalence of anemia among children aged 12-23 mo was extremely high and had increased to 83% in Jun-Sep 03. Also among non-pregnant mothers, prevalence of anemia had increased. Prevalence of both underweight and stunting was in the very high category as classified by WHO and wasting in the category of a critical emergency.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

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I N D O N E S I A

Year 5, Issue 6
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural West Sumatra

Key results for the period: Dec 1999 – Aug 2002

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for West Sumatra are that - *There was a dramatic decline in the level of exclusive breastfeeding from 83%, 51% and 25% among infants aged 0-1, 2-3 and 4-5 mo, respectively, in Dec 99-Feb 00, to 28%, 24% and 2% respectively, in Jun-Aug 02. Vitamin A capsule coverage in children was <60% in Feb 2002. Nearly half of children aged 12-17 mo had not received all standard childhood immunizations and Posyandu attendance was low, between 35%-51%. However, more than 89% of households used iodized salt, the highest proportion observed.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

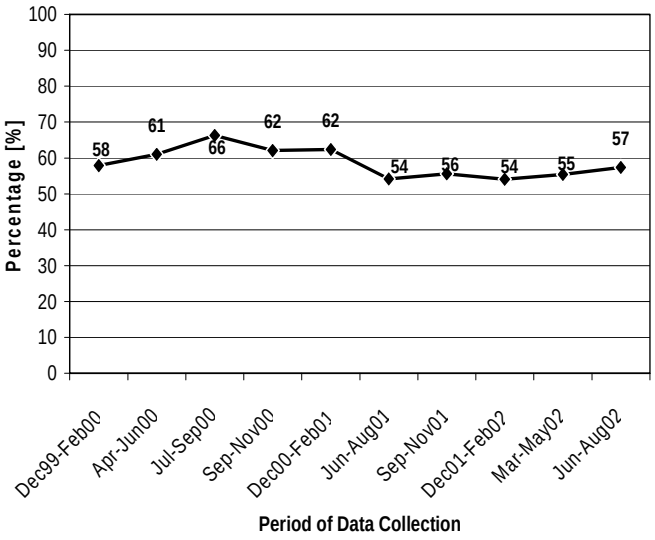
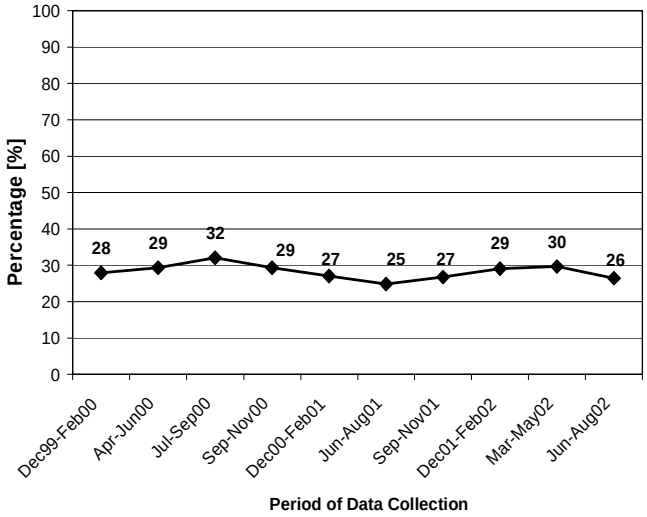


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators[1].

Data presented in this Bulletin highlight the health and nutrition situation in West Sumatra Province.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%[2].

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold[3].

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

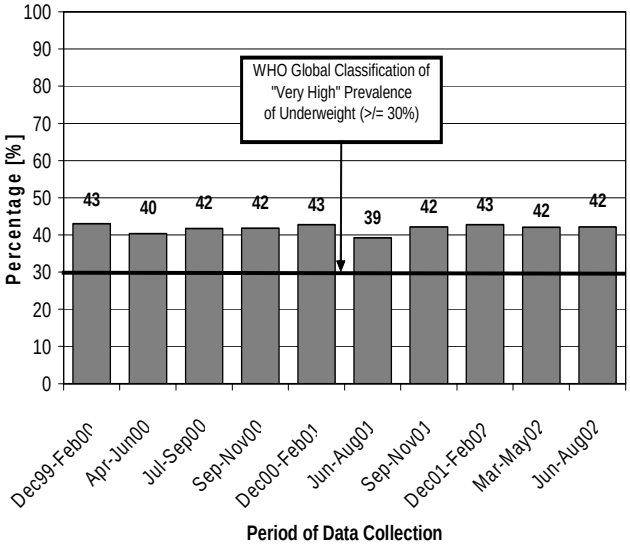
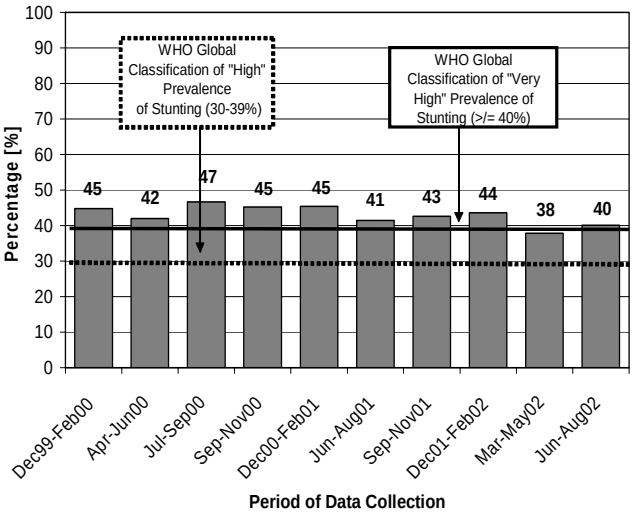


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



signs of improvement. *West Sumatra* - Prevalence of anemia in West Sumatra declined from 66% in Jul-Sep 00 to 57% in Jun-Aug 02. However, that level is still very high.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%[2].

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *West Sumatra* - Anemia levels in West Sumatra were consistent over time, ranging from 25% to 32%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

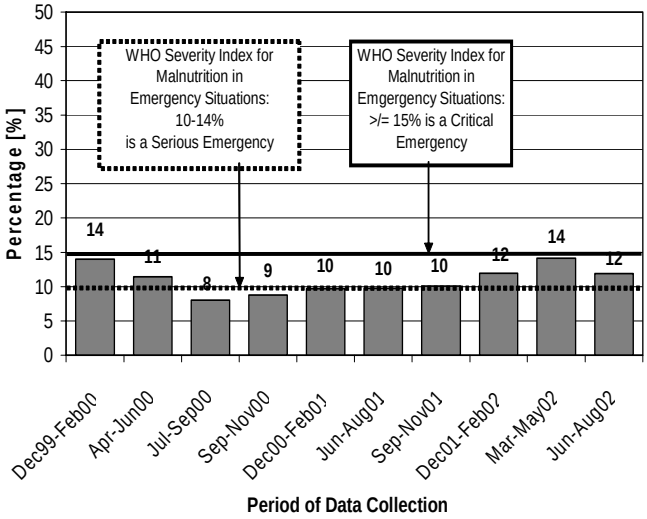
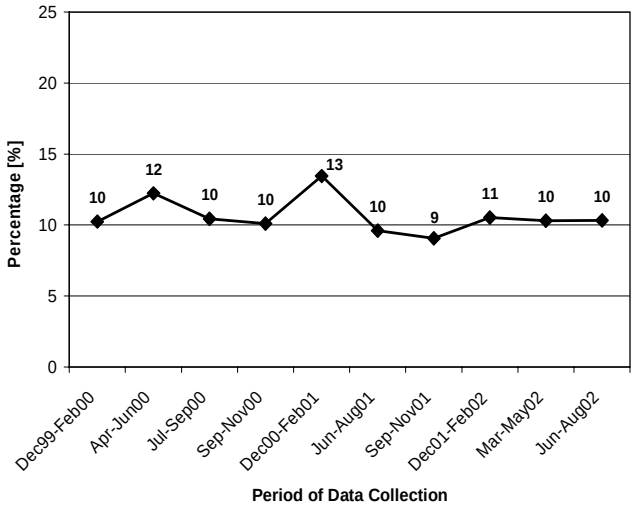


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



for 12-59 month old children. *West Sumatra* - The level of underweight remained stable at 39-43%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high"[4].

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult[7].

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *West Sumatra* - The prevalence of stunting appears to have declined slightly from 47% in Jul-Sep 00 to 40% in Jun-Aug 02. A prevalence of stunting above 40% is classified as "very high" for children 12-59 months of age. Data collection was stopped in August 2002.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation"[4].

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality[8].

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12-23 months of age varied between 9-13%. *West Sumatra* - The prevalence of wasting was 14% in Dec 99 - Feb 00, then declined to 8% by Jul-Sep 00, but then gradually increased again to 14% in Mar-May02. In the subsequent and last

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

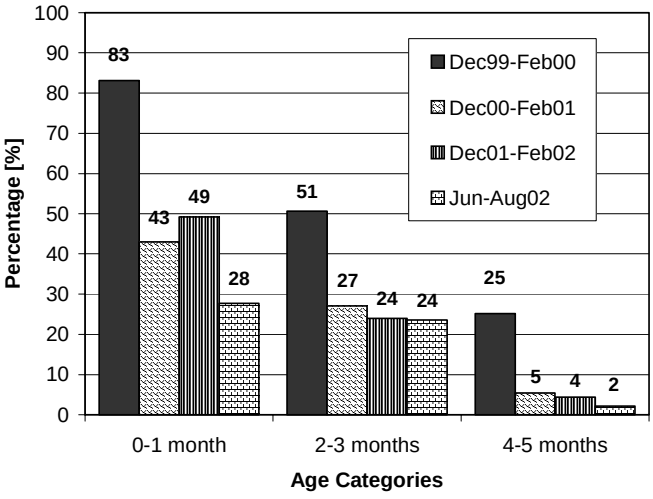
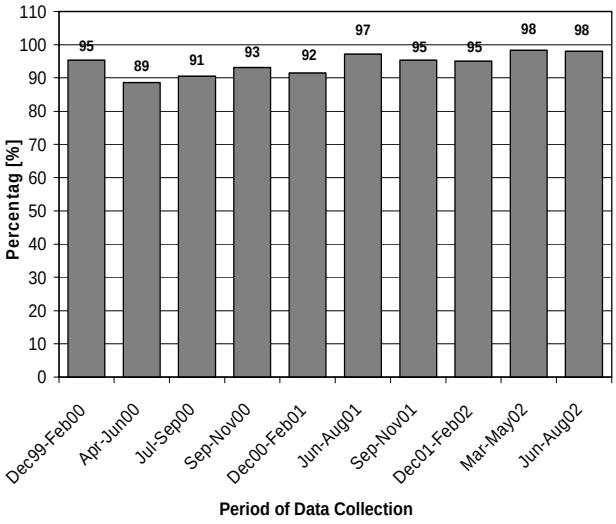


Fig 8. Household Use of Adequately Iodized Salt



round of data collection in West Sumatra, Jun-Aug 02 the prevalence was 12%. This is classified as a "serious" emergency by WHO standards for children 12-59 months old.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *West Sumatra* - In West Sumatra, the level of maternal thinness peaked minimally in the Dec 00 - Feb 01 round of data collection to 13%. Overall, prevalence remained stable between 9-13%.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *West Sumatra* - There was a dramatic decline in the level of exclusive breastfeeding from 83%, 51% and 25% among infants aged 0-1, 2-3 and 4-5 mo, respectively, in Dec 99 - Feb 00, to 28%, 24% and 2% respectively, in Jun-Aug 02, which was only 2.5 years later.

Fig 9. Vitamin A Intake of Children 12-59 months of age

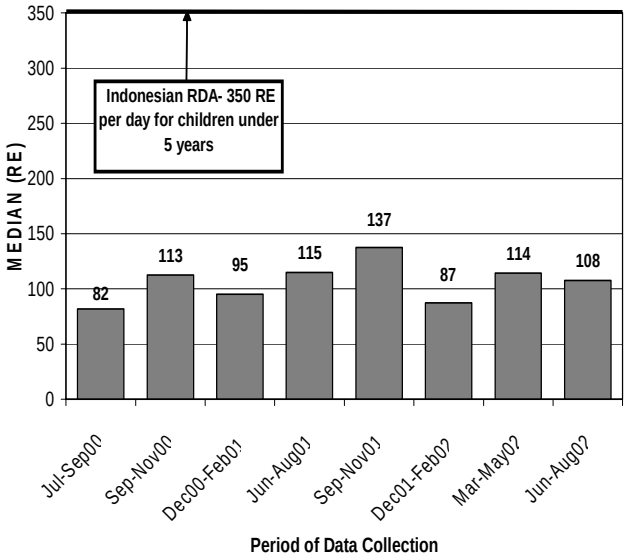
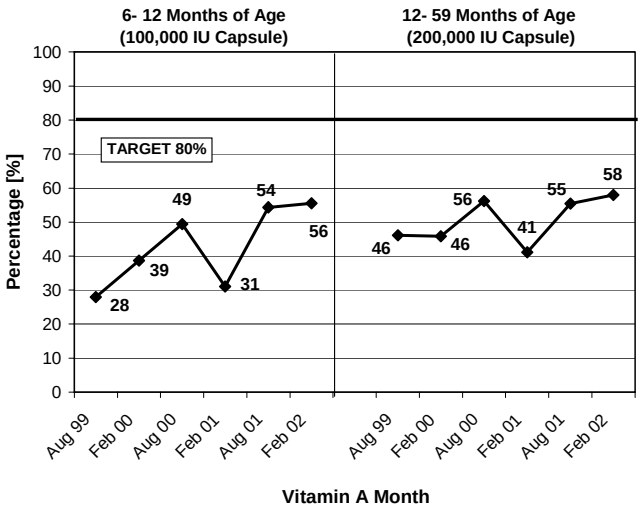


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development[9].

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas, reaching 60-70% during the last rounds. *West Sumatra* - The use of adequately iodized was consistently highest in West Sumatra, between 89-98%.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease[10]. However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. *West Sumatra* - Vitamin A intake in West Sumatra was no more than one-third of the Recommended Daily Intake for children.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

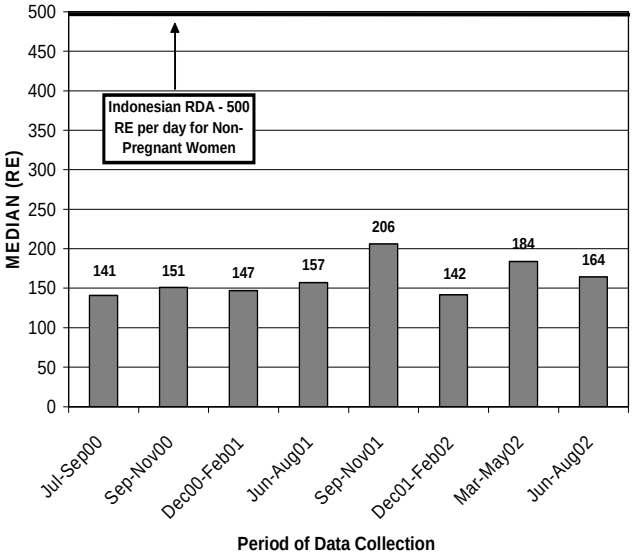
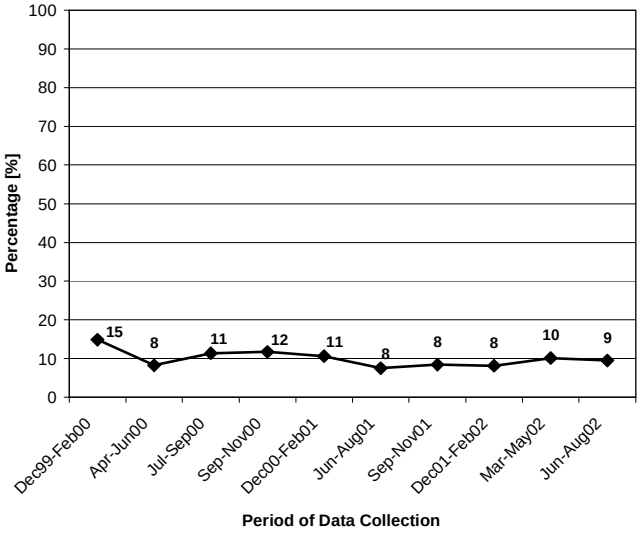


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age[12]. All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%[13].

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 02 and February 2003. *West Sumatra* - VAC coverage increased from August 1999 to February 2002, but modestly. Highest coverage was still below 60% in both age groups, which is much below the target of 80%. No information is available for after February 2002.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women[14]. Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

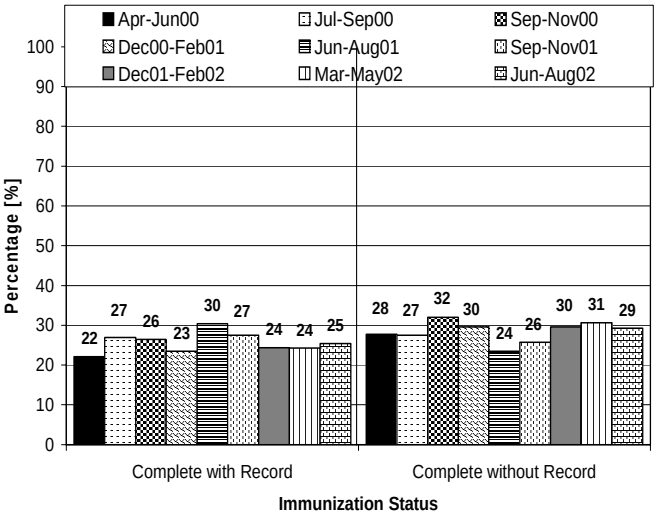
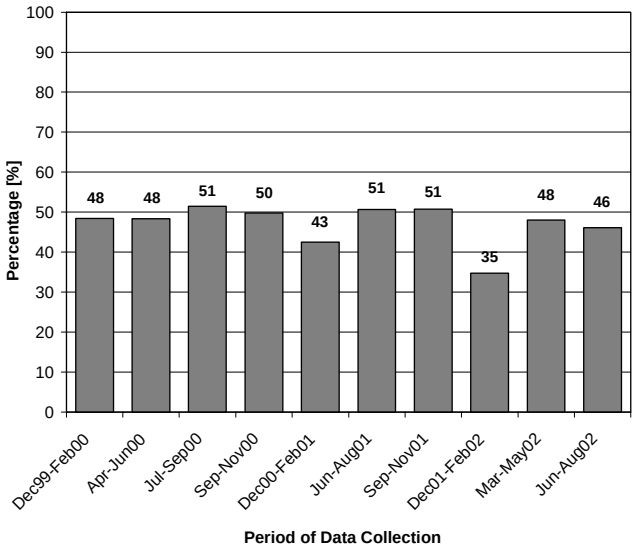


Fig 14. Posyandu Attendance in the Previous Month



everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food

Findings: *General*: Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *West Sumatra* – Vitamin A intake in West Sumatra was no more than 40% of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *West Sumatra* - Post partum VA supplementation coverage in West Sumatra were very low, ranging from 8%-15%.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

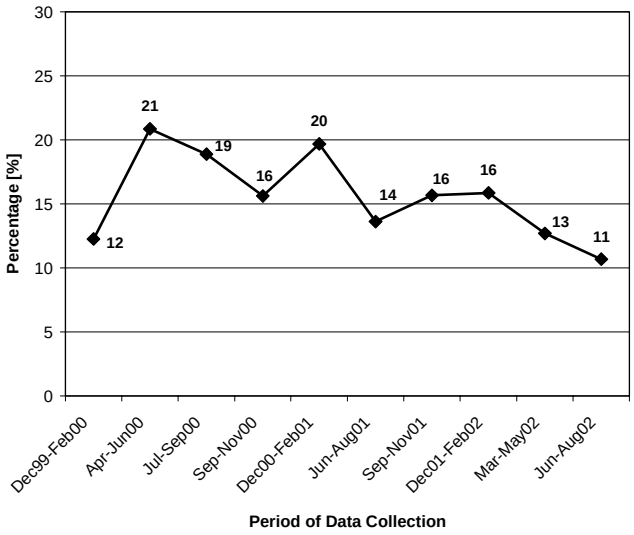
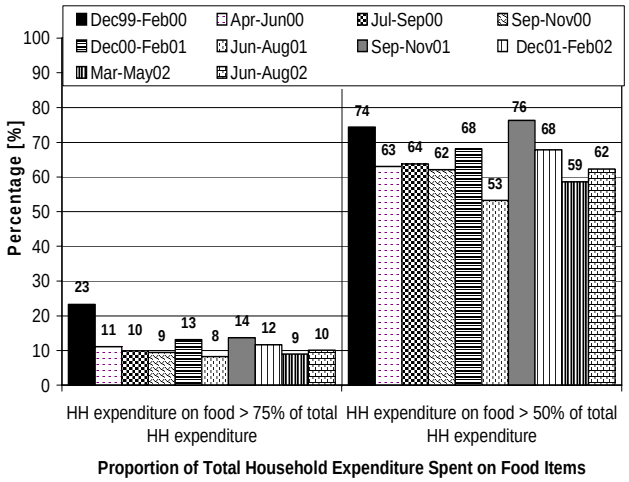


Fig 16. Household Expenditures on Food Items



Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.
Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.
Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *West Sumatra* - Completed immunization was very low. Completed immunization with an official record varied between 22-30%, and without record between 24-32%. By Jun-Aug 02, less than half (46%) of the children aged 12-17 mo in West Sumatra had not received all standard childhood vaccinations.

***Posyandu* Attendance in the Previous Month**
(SEE FIG.14)
The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.
Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.
Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.
Findings: *General - Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *West Sumatra - Posyandu* attendance in West Sumatra was lower than in other rural provinces, ranging from 35% to 51%, with lowest levels in Dec 00 - Feb 01 and Dec 01 - Feb 02.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea[15].

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *West Sumatra* - The prevalence of diarrhea among children fluctuated considerably and was high compared to other rural provinces. Prevalence was highest in Apr-Jun 00 at 21% and then declined to 11% in Jun-Aug 02.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability[16].

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *West Sumatra* - The percentage of families spending more than 75% of their total expenditure on food was 23% in Dec 99 - Feb 00 and declined to 10% in Jun-Aug 02. The percentage of families spending more than 50% of their income on food declined from 74% to 62% over the same period.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *West Sumatra* - There was a dramatic decline in the level of exclusive breastfeeding from 83%, 51% and 25% among infants aged 0-1, 2-3 and 4-5 mo, respectively, in Dec 99-Feb 00, to 28%, 24% and 2% respectively, in Jun-Aug 02. Vitamin A capsule coverage in children was <60% in Feb 2002. Nearly half of children aged 12-17 mo had not received all standard childhood

immunizations and *Posyandu* attendance was low, between 35%-51%. However, more than 89% of households used iodized salt, the highest proportion observed.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 7
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural Lampung

Key results for the period: Apr 2000 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for Lampung are that – ***The Vitamin A capsule coverage target of 80% for children 6-59 mo was not met and most recent coverage was below 70%. The proportion of exclusively breastfed infants was extremely low, only 11%, 8% and 1% among infants aged 0-1, 2-3 and 4-5 mo, respectively. And, in contrast to other rural provinces, Posyandu attendance in Lampung decreased. Since December 2002, less than half of the families had attended the Posyandu in the previous month***.

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Data Collection Methods

The NSS collected cross-sectional data four times a

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Fig 1. Anemia among Children 12-23 Months of Age

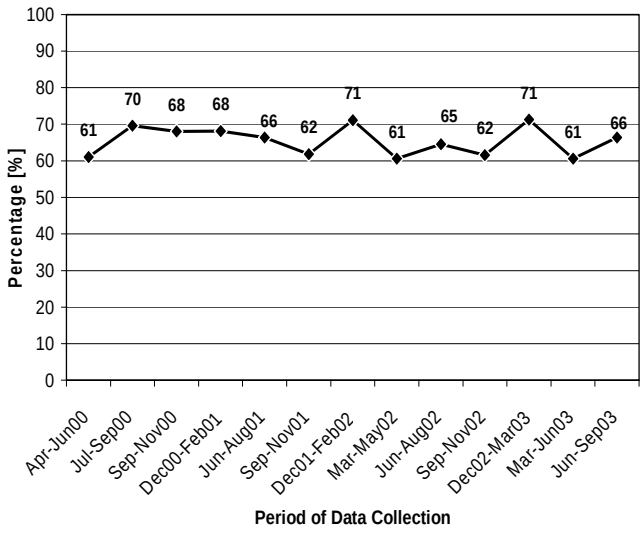
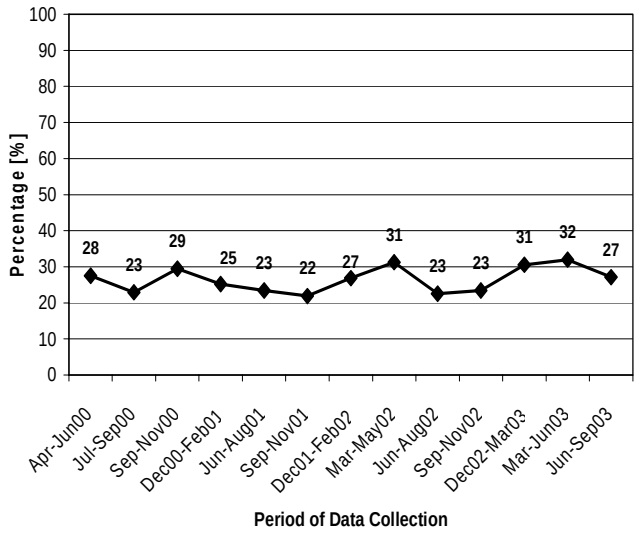


Fig 2. Anemia among Non-Pregnant Mothers



year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in Lampung Province.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

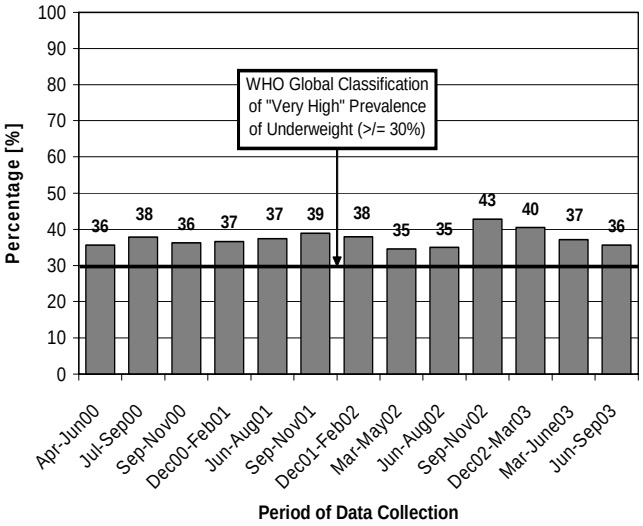
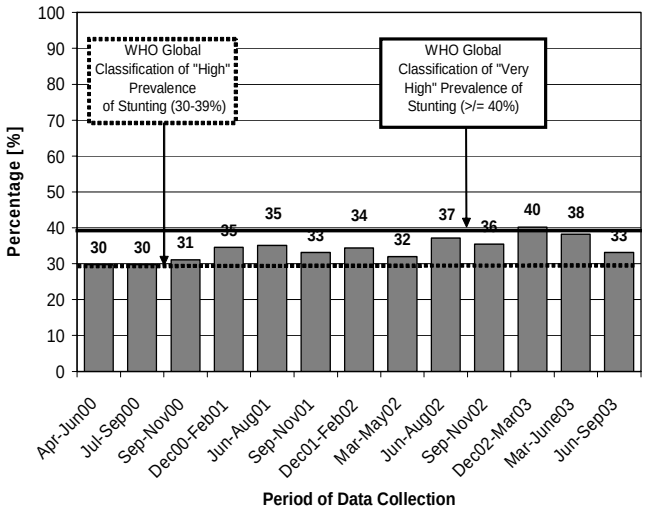


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



Findings: *General* - Levels of anemia were universally high in rural provinces and showed few signs of improvement. *Lampung* - The prevalence of anemia remained high throughout the four year period at 61-71%.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *Lampung* - Anemia levels fluctuated between 22-32% and peaked in Sep-Nov 00, Mar-May 02 and Dec 02–Jun 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

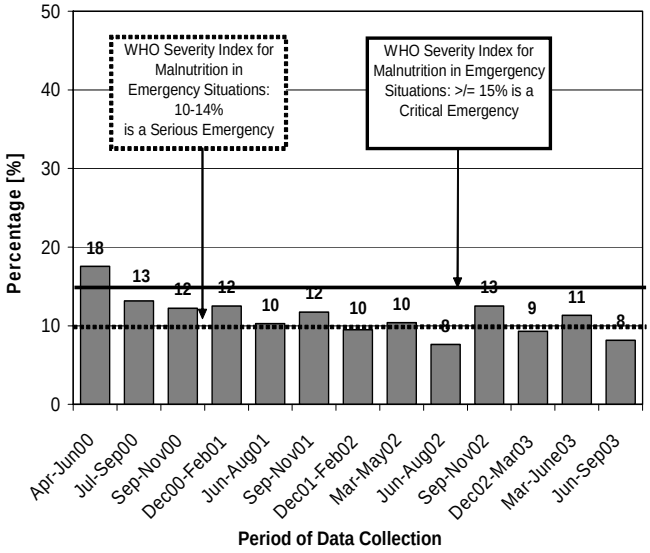
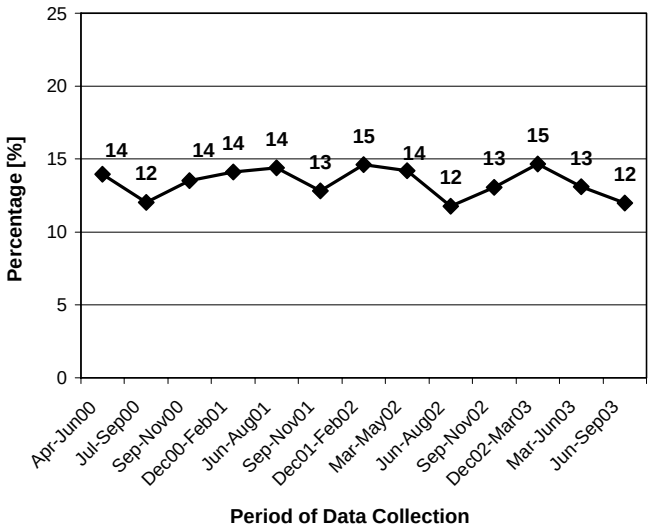


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *Lampung* - Lampung was no exception. In Jun-Sep 03, prevalence was 36%, the same as in the first round of data collection from Apr-Jun 00 and reached its height in Sep-Nov 02 at 43%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high". [4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *Lampung* - The prevalence of stunting in Lampung was lower than in other rural areas, but did not decline. In Jun-Sep 03, prevalence was 33%, almost the same as in the first round of data collection from Apr-Jun 00 (30%).

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation". [4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

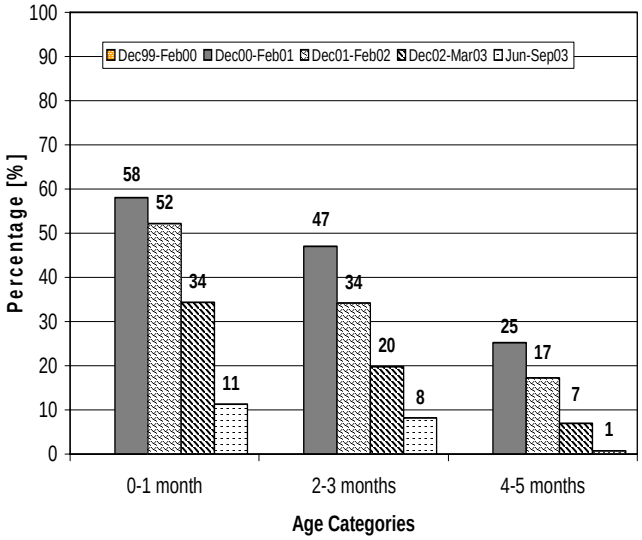
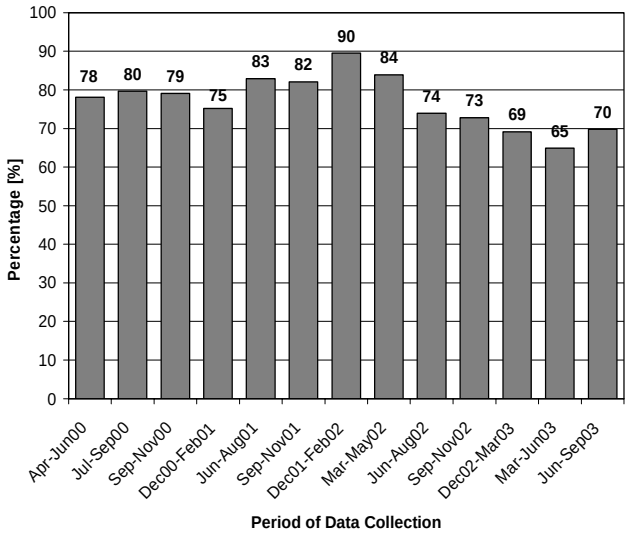


Fig 8. Household Use of Adequately Iodized Salt



(NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12-23 months decreased in the most recent rounds of data collection. *Lampung* - Wasting declined from 18% in the first round of data collection from Apr-Jun 00 to 8% in Jun-Sep 03, which was below the WHO classification of a "serious emergency" for children 12-59 months of age.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *Lampung* - Maternal thinness did not show a clear decline and remained within a range of 12-15%.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Fig 9. Vitamin A Intake of Children 12-59 months of age

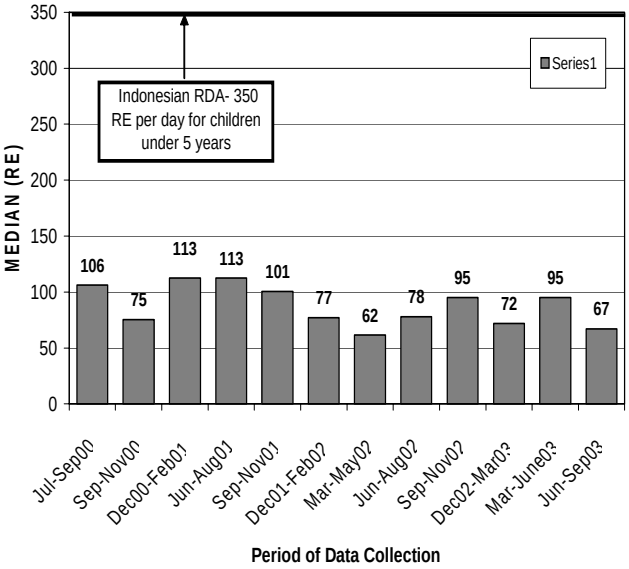
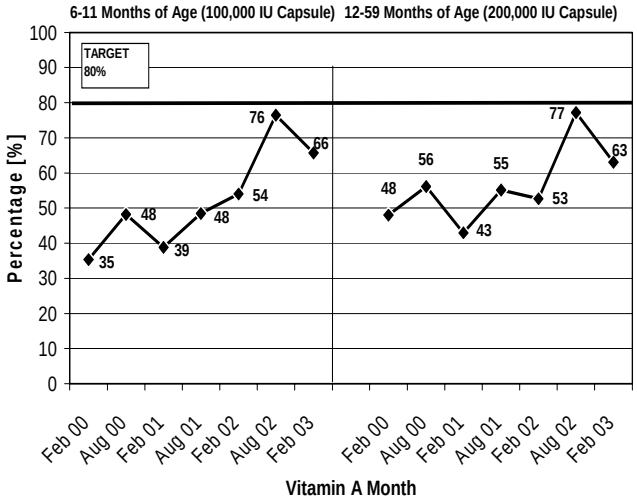


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *Lampung* - The prevalence of exclusive breastfeeding declined dramatically. By Jun-Sep 03, the proportion of infants that was exclusively breastfed was only 11% for those aged 0-1 mo, 8% for those 2-3 mo old and 1% for those 4-5 mo of age.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly, reaching 60-70% during the last rounds. *Lampung* - The use of adequately iodized salt increased from 78% in Apr 00 to 90% by Feb 02 but then decreased again to 65% in Mar-Jun 03. By Jun-Sep 03 it had increased slightly again, to 70%.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

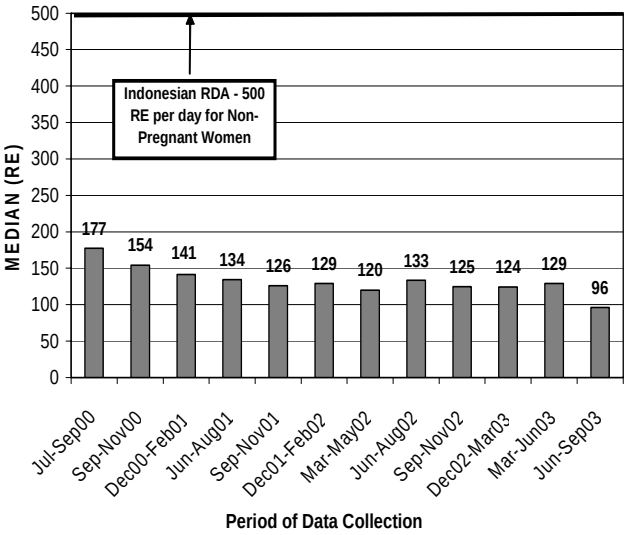
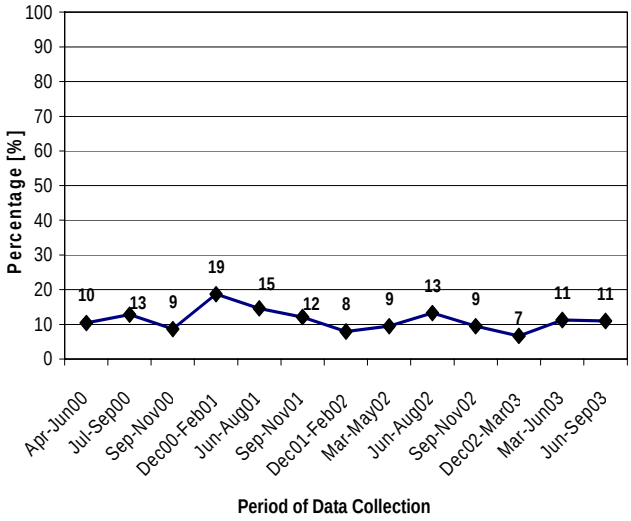


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Indonesian Recommended Daily Intake and has improved little over time. *Lampung* - Vitamin A intake of children was around one-fourth of their Recommended Daily Intake and appeared to have declined over time.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in Aug 02 and Feb 03. *Lampung* - Till February 2002, VAC coverage had not been higher than 56% for both age groups. After that it increased to 76-77% in August 2002, but then declined again by more than 10% in February 2003.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore,

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

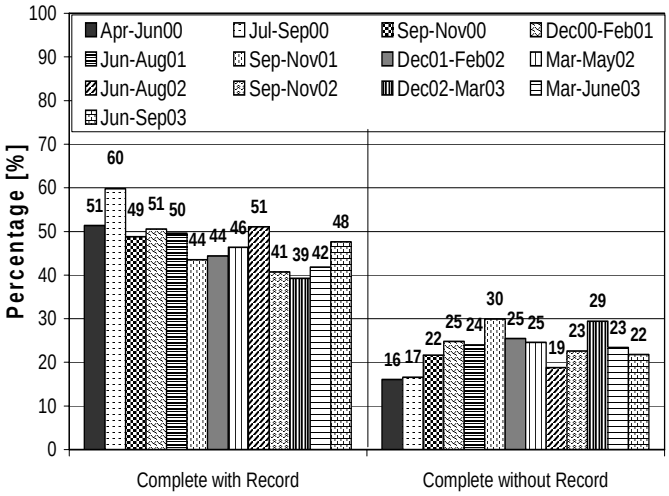
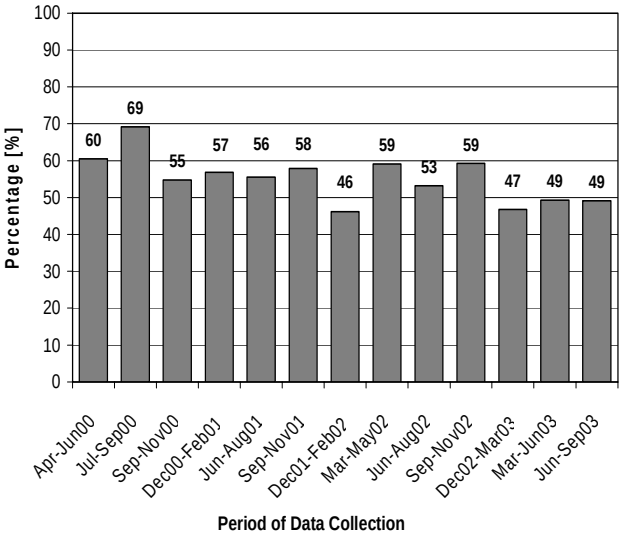


Fig 14. Posyandu Attendance in the Previous Month



VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *Lampung* - Vitamin A intake decreased over time from about one-third to one-fourth of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *Lampung* - Post partum VA supplementation coverage declined from 19-12% over the past years.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

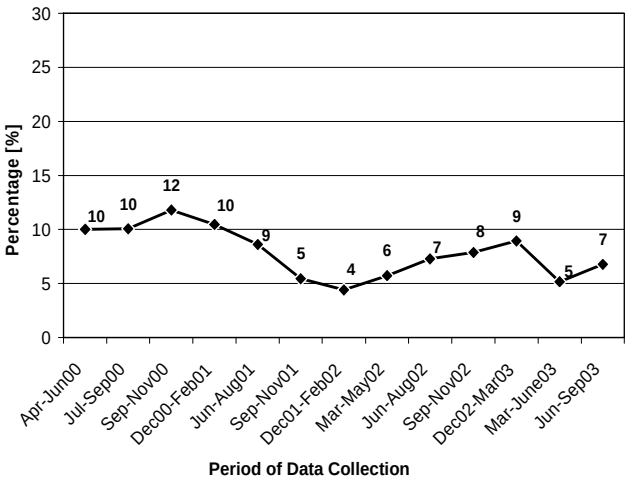
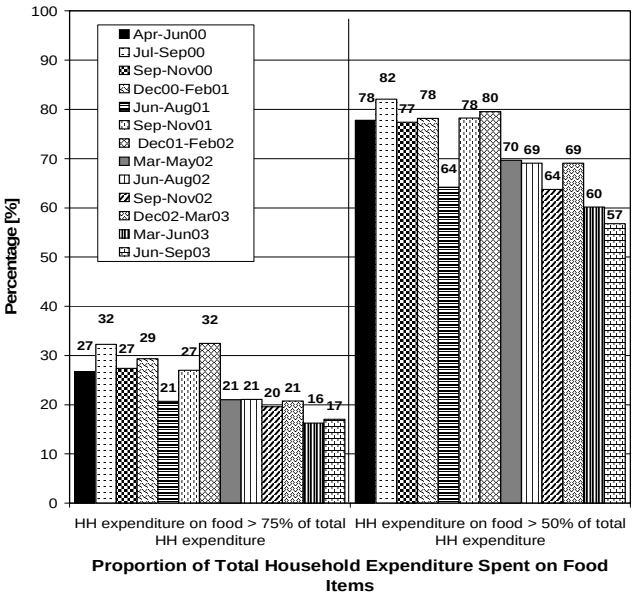


Fig 16. Household Expenditures on Food Items



from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *Lampung* - Completed immunization status with an official record declined over time, but increased in the last round of data collection. By Jun-Sep 03 complete immunization status with an official record was at 48% and without an official record was 22%.

***Posyandu* Attendance in the Previous Month**
(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-73%). *Lampung* - In contrast to other rural provinces, *Posyandu* attendance in Lampung decreased. Since December 2002, less than half of the families had attended the *Posyandu* in the previous month. Highest attendance was observed in Jul-Sep 00 at 69%.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *Lampung* - Prevalence of diarrhea among children tended to be low and fluctuated over time with peaks later in the calendar year. Overall, there was a decrease to 7% in Jun-Sep 03.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *Lampung* - The proportion of expenditures spent on food declined from December 2001 till 17% spending more than 75% on food and 57% spending more than 50% in Jun-Sep 03.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *Lampung* – The Vitamin A capsule coverage

target of 80% for children 6-59 mo was not met and most recent coverage was below 70%. The proportion of exclusively breastfed infants was extremely low, only 11%, 8% and 1% among infants aged 0-1, 2-3 and 4-5 mo, respectively. And, in contrast to other rural provinces, *Posyandu* attendance in Lampung decreased. Since December 2002, less than half of the families had attended the *Posyandu* in the previous month.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 8
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural Banten

Key results for the period: Jun 2001 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for Banten are that - ***anemia rates in children aged 12-23 months are higher than in other rural areas, reaching up to 75%. Exclusive breastfeeding among infants 0-5 mo of age was higher than in other areas, but still no more than one-half of infants 0-1 mo of age was exclusively breastfed. In Jun-Sep 03, less than 40% of children had received all standard childhood immunizations. Child anthropometry is also worse than in many other rural areas with stunting in the WHO category of "very high" (although a decline over time was seen) and wasting in the WHO designated "critical emergency" category.***

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

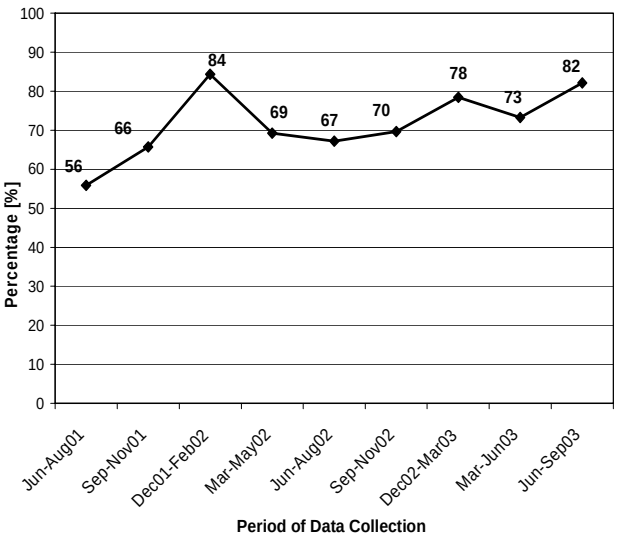
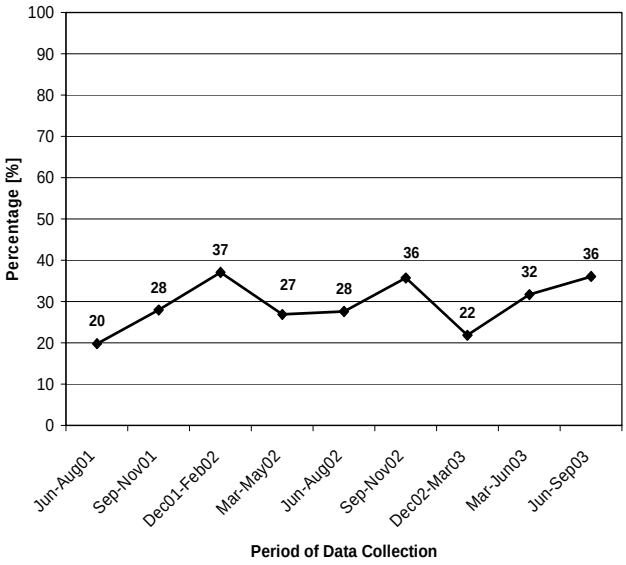


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in Banten Province.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

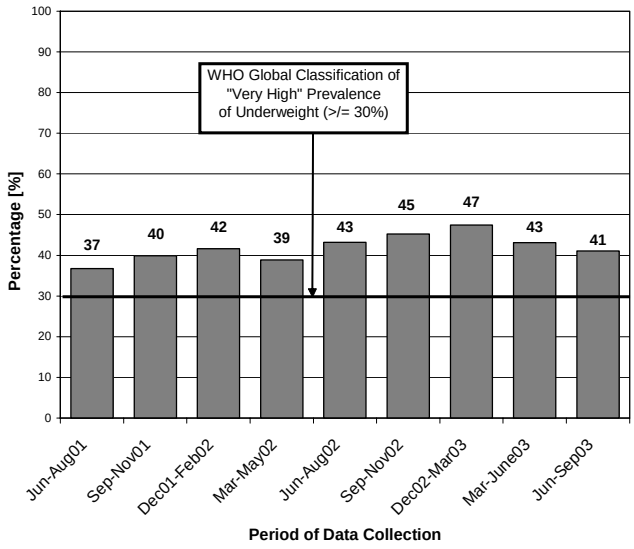
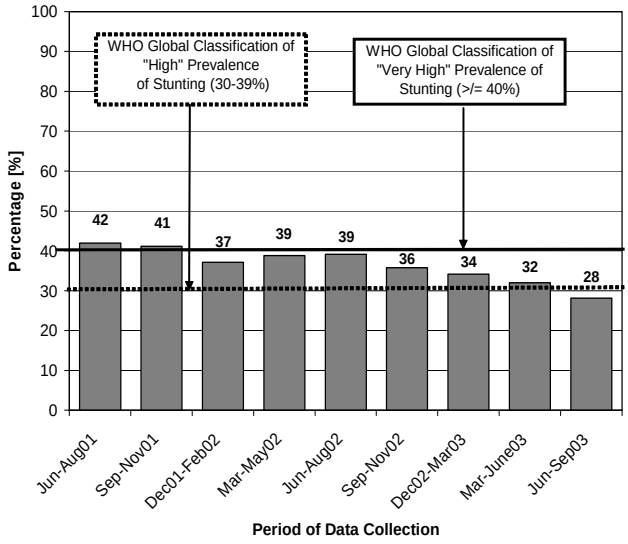


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



signs of improvement. *Banten* - The prevalence of anemia in Banten was worse than the rural trend and varied between 56-84% from Jun 01-Sep 03.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *Banten* - The prevalence of anemia among non-pregnant women fluctuated between 20-37%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *Banten* - The underweight prevalence was 37% in the first round of data collection from Jun-Aug 01, and was 41%

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

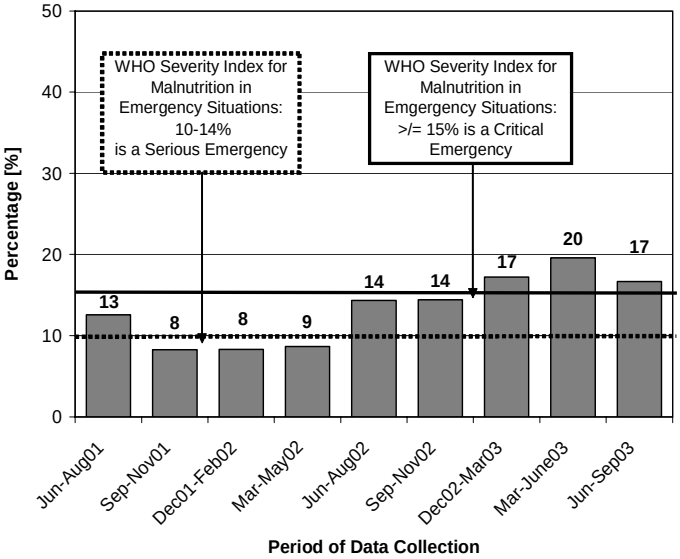
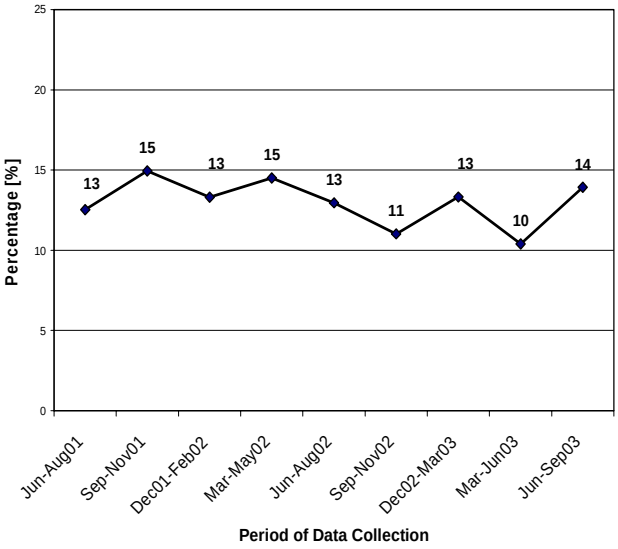


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



in the last round of data collection from Jun-Sep 03. Prevalence of underweight reached its height in the Dec 02 - Mar 03 period of data collection at 47%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *Banten* - In contrast to other rural provinces, stunting declined. The prevalence of stunting was 42% in the Jun-Aug 01 period of data collection, and was therefore classified as a "very high" prevalence by the WHO. Subsequently, the prevalence declined 12 percentage points to 28% by the last round of data collection from Jun-Sep 03, placing it just below the cutoff for "high" prevalence as determined by the WHO.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation". [4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12-23 months of age varied between 9-

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

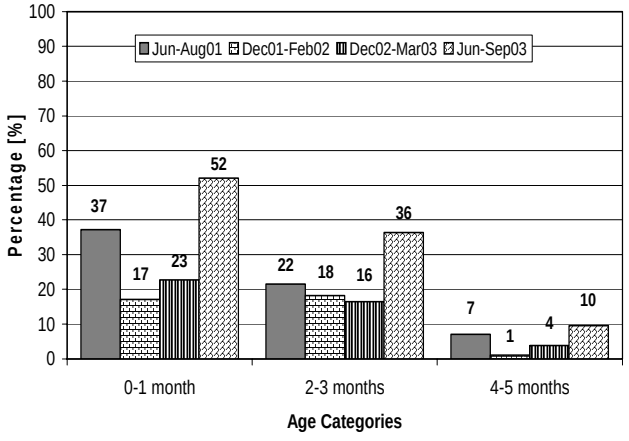
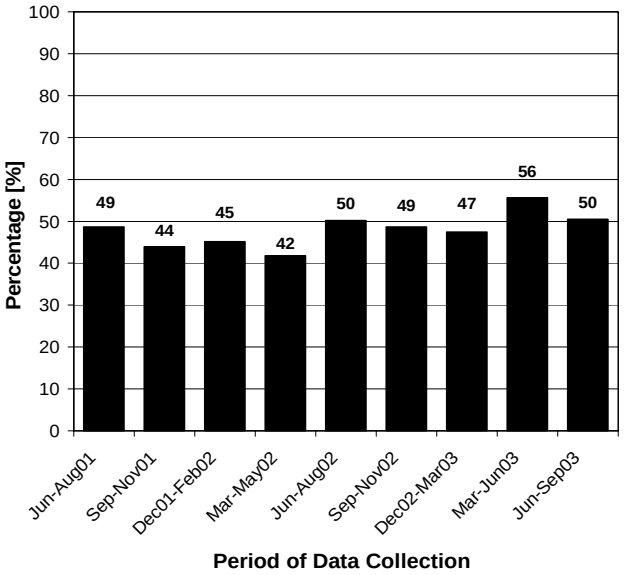


Fig 8. Household Use of Adequately Iodized Salt



13%. *Banten* - Wasting increased in later rounds of data collection. The level of wasting was 13% in the first round of data collection from Jun-Aug 01. The prevalence declined in subsequent rounds, but beginning in the Jun-Aug 02 round an alarming rise in the prevalence of wasting was observed. The prevalence of wasting reached 17% in the last round of data collection from Jun-Sep 03. This is well above the WHO classification of a "critical emergency" situation for children 12-59 months of age.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *Banten* - Maternal thinness followed the rural trend with small fluctuations over time.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *Banten* - In contrast to

Fig 9. Vitamin A Intake of Children 12-59 months of age

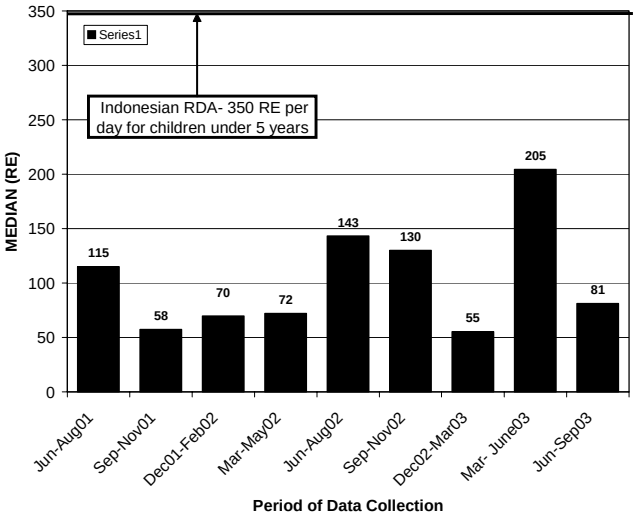
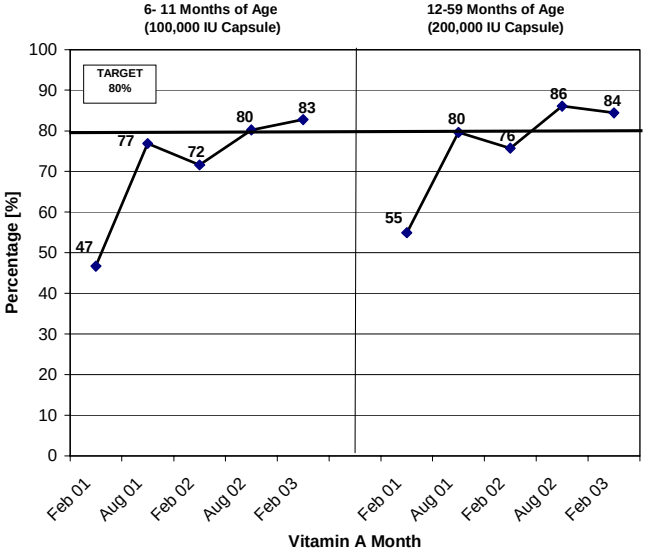


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



other rural provinces, in Banten, exclusive breastfeeding declined between Jun-Aug 01 and Dec 01 – Feb 02, but then was much higher again in Jun-Sep 03. At the last round, 52% of infants 0-1 mo old and 36% of infants aged 2-3 mo old were exclusively breastfed. However, there is considerable variation around these numbers, because the number of children of this age about whom data were collected, particularly in Banten, was low. Among children aged 4-5 mo old, the proportion that was exclusively breastfed was very low, both in the beginning and end of data collection (varying between 1-10%).

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas, reaching 60-70% during the last rounds. *Banten* - The use of adequately iodized salt increased slightly, but at ~50% is still very low compared to other rural provinces.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

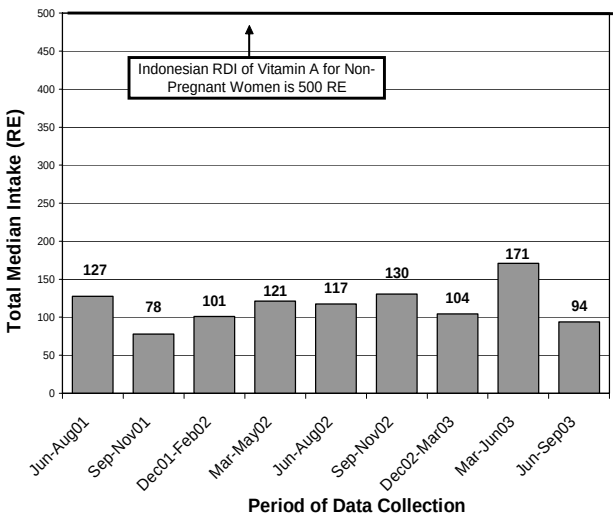
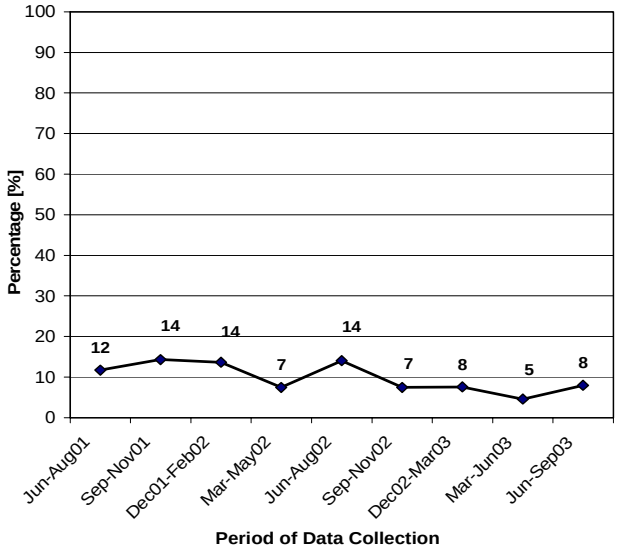


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. *Banten* - Vitamin A intake was also well below the requirements.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *Banten* - The percentage of children who received vitamin A capsules increased in both age categories and reached the target of 80% in the last two distribution months (August 2002 and February 2003).

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

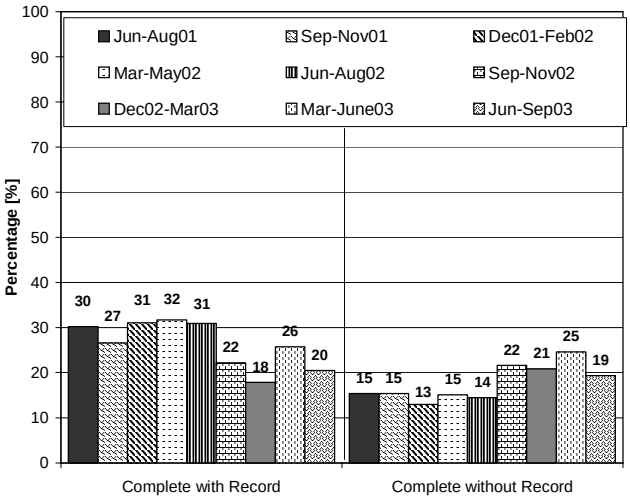
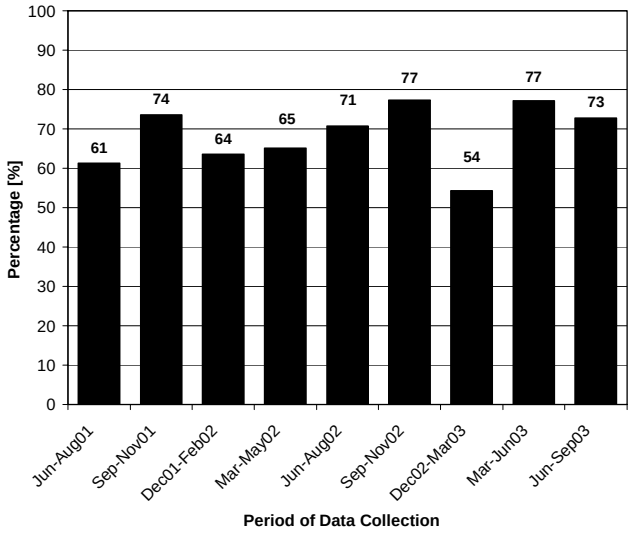


Fig 14. Posyandu Attendance in the Previous Month



Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *Banten* – Banten was no exception to the general trend with an intake below approximately one-quarter of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *Banten* - Post partum VA supplementation coverage was lower than other rural provinces (~10%).

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

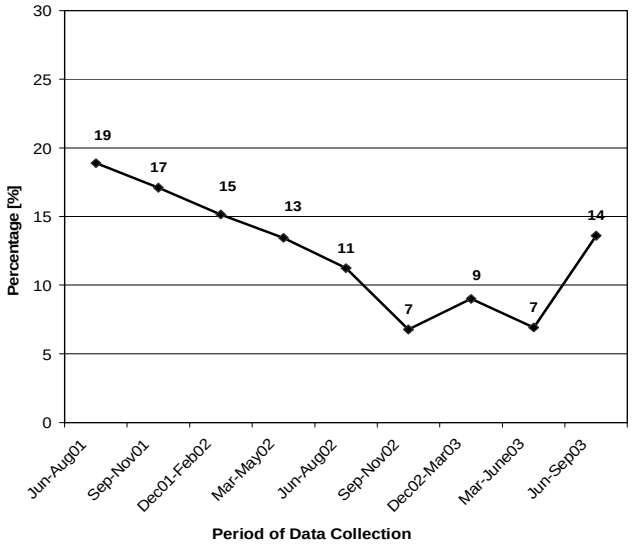
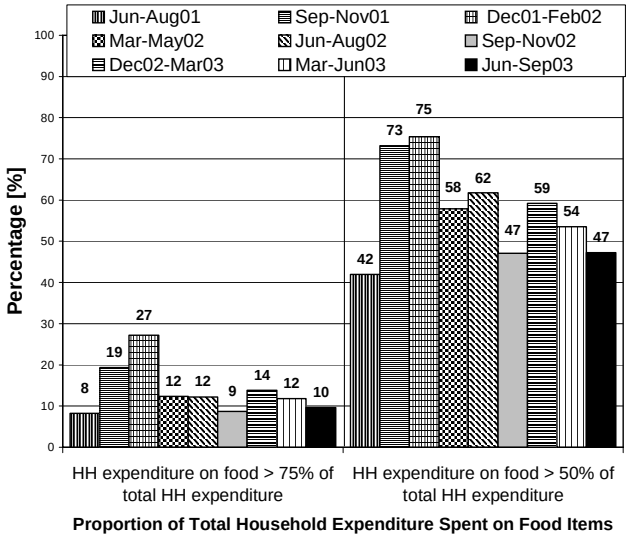


Fig 16. Household Expenditures on Food Items



immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *Banten* - Completed immunization was very low. Completed immunization with an official record varied between 18-32%, and without record between 13-25%. By Jun-Sep 03, more than half (61%) of the children aged 12-17 mo in Banten had not received all standard childhood vaccinations.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu* records. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *Banten* - Household *Posyandu* attendance increased slightly over time, indicating a sustainable and active health system. Attendance in the last round of data collection from Jun-Sep 03 was 73%. Nevertheless, attendance did fall off at times, as most strongly observed during Dec 02 - Mar 03.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *Banten* - Diarrhea among children declined rapidly in the last 2 years, from 19% to 7%. However, in the last round of data collection, from Jun-Sep 03, prevalence of diarrhea rose from 7% to 14%.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *Banten* - The percentage of families spending more than 75% of their total income on food was highest in Dec 01 - Feb 02 (27%) and declined to 10% in Jun-Sep 03. A similar trend was observed for households spending >50% on food. Proportions were lower than in rural areas overall.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately

50%. *Banten* - Anemia rates in children aged 12-23 months are higher than in other rural areas, reaching up to 75%. Exclusive breastfeeding among infants 0-5 mo of age was higher than in other areas, but still no more than one-half of infants 0-1 mo of age was exclusively breastfed. In Jun-Sep 03, less than 40% of children had received all standard childhood immunizations. Child anthropometry is also worse than in many other rural areas with stunting in the WHO category of "very high" (although a decline over time was seen) and wasting in the WHO designated "critical emergency" category.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 9
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural West Java

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for West Java are that ***– There was a worrying increase of the prevalence of anemia between Sep-Nov 02 and Jun-Sep 03. Among children aged 12-23 mo prevalence increased from 52% to 69%, and among non-pregnant mothers it increased from 18% to 30%. Prevalence of underweight and stunting as well as thinness among mothers declined slowly. The proportion of young infants that were exclusively breastfed increased recently to 52% of those aged 0-1 mo, 36% aged 2-3 mo and 5% 4-5 mo.***

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller
INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

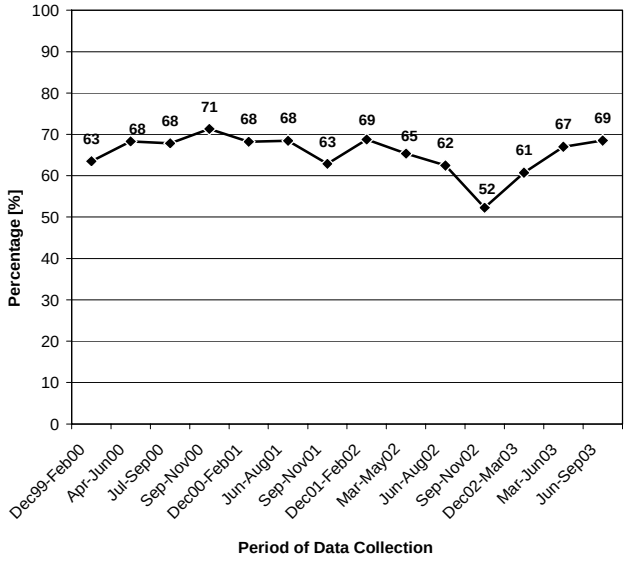
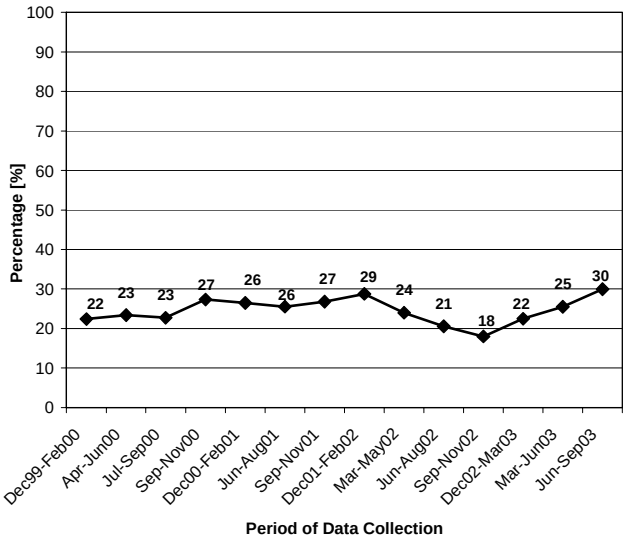


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in West Java Province.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

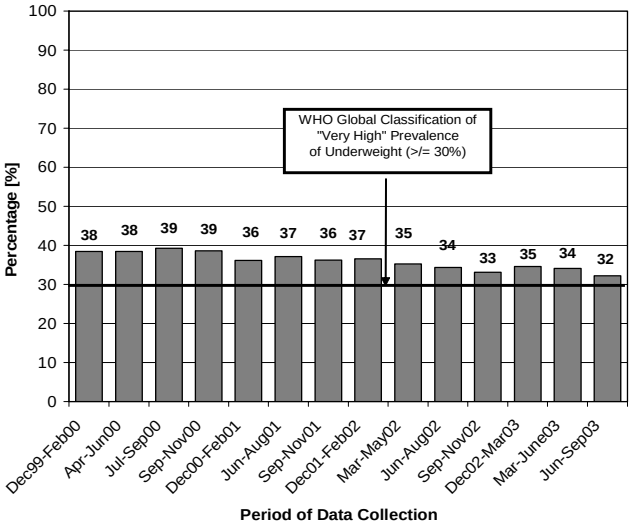
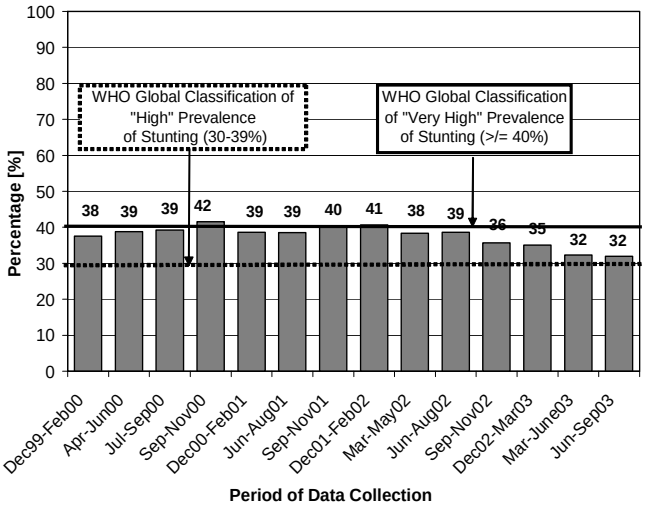


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



signs of improvement. *West Java* - Levels of anemia did not differ from other rural provinces, but were characterized by several sudden drops in prevalence, the largest of which began in Jun-Aug 02. The prevalence of anemia in this round was 62%, and decreased to 52% in Sep-Nov 02. In the very next round from Dec 02 - Mar 03 the prevalence increased to 61% and then gradually increased to 69% in Jun-Sep 03.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *West Java* - Anemia levels in West Java also experienced fluctuations in prevalence with an increase occurring in the last year. The prevalence was 22% in Dec 99 - Feb 00. Rates were the lowest from Sep-Nov 02 at 18% and increased to 30% in Jun-Sep 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

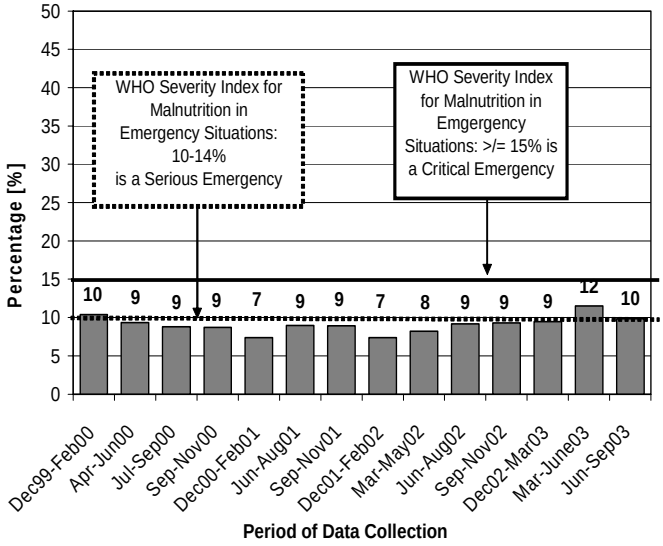
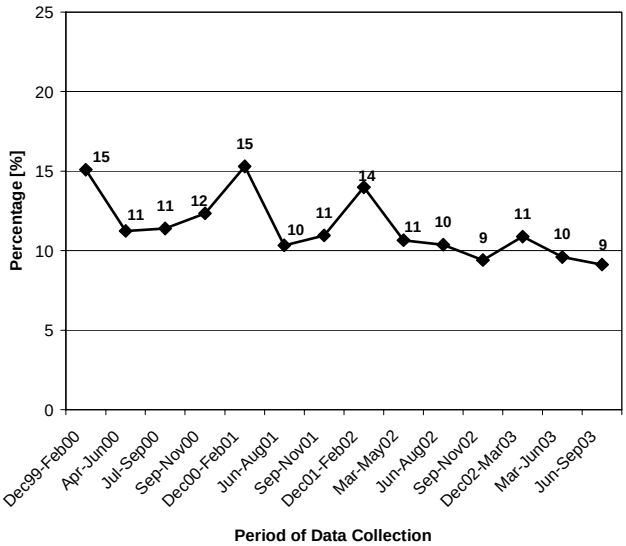


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



(NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *West Java* - The underweight prevalence gradually declined from 39% to 32% over the past four years.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high". [4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *West Java* - The prevalence of stunting gradually declined from 42% in Sep-Nov 00 to 32% in Jun-Sep 03, moving it from the "very high" to the "high" category for stunting prevalence for children 12-59 months old.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

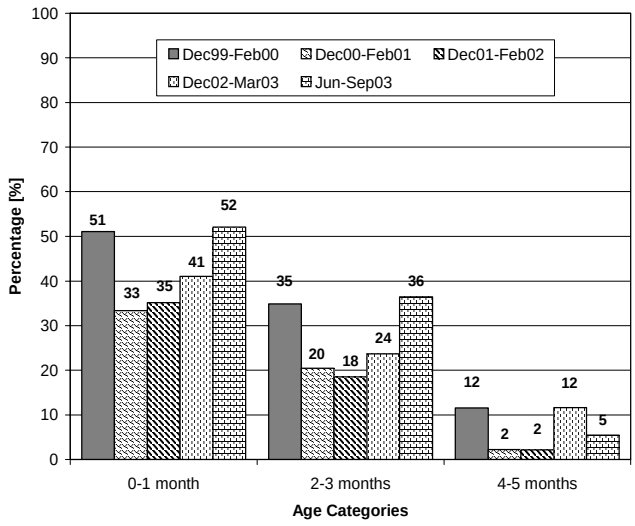
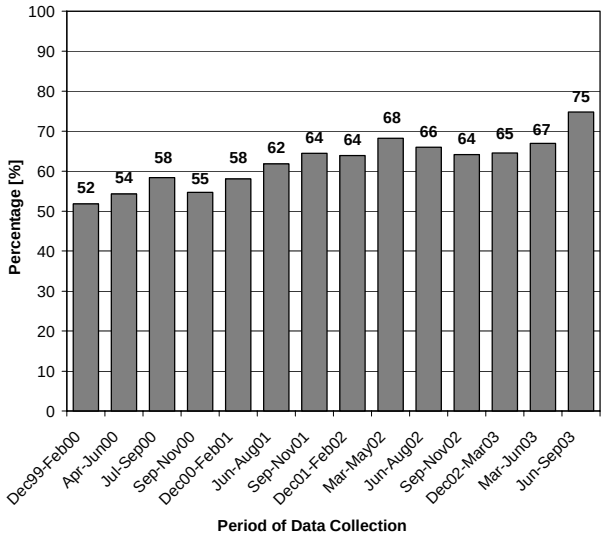


Fig 8. Household Use of Adequately Iodized Salt



Findings: *General* - Wasting among rural Indonesia children 12-23 months of age varied between 9-13%. *West Java* - The level of wasting remained relatively stable between 7-10% with an exception in Mar-Jun 03 when it reached 12%, just above the level of a "serious emergency" as defined by WHO for children 12-59 months old.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *West Java* - Levels of maternal thinness followed the rural trend, declining over time with peaks occurring in the December-February rounds of data collection. The prevalence of low BMI was 15% in Dec 99 - Feb 00 and 9% in Jun-Sep 03.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to

Fig 9. Vitamin A Intake of Children 12-59 months of age

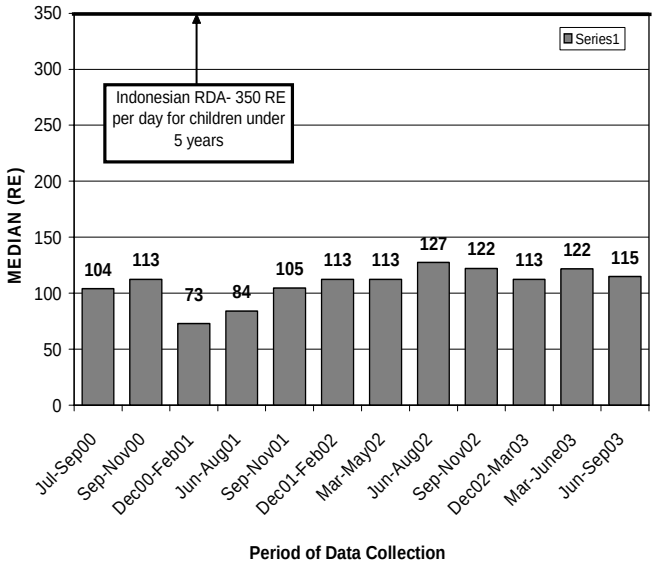
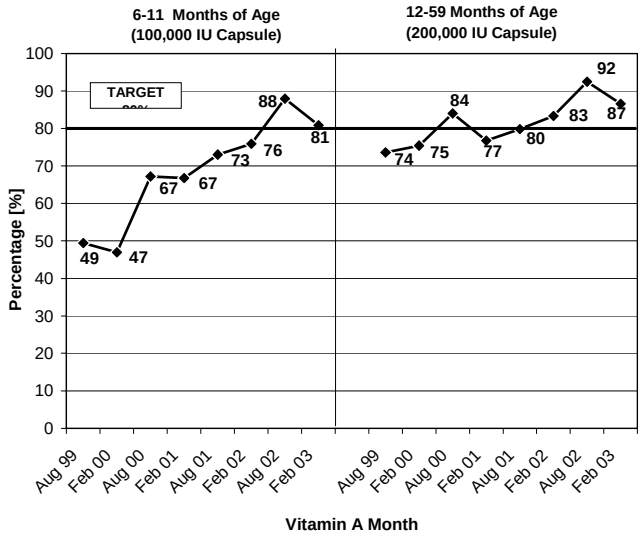


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



decline in rural provinces. *West Java* - Exclusive breastfeeding levels increased from early 2001. By Jun-Sep 03, levels were 52% among 0-1 month old children, 36% among 2-3 month old children, and 5% among 4-5 month old children.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas, reaching 60-70% during the last rounds. *West Java* - The use of adequately iodized salt increased modestly, but steadily in the past few years. Use of adequately iodized salt increased from 52% in Dec 99 - Feb 00 to 75% in Jun-Sep 03.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

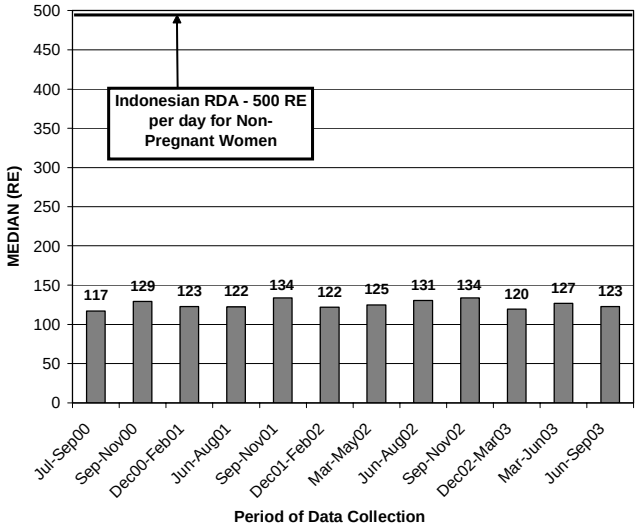
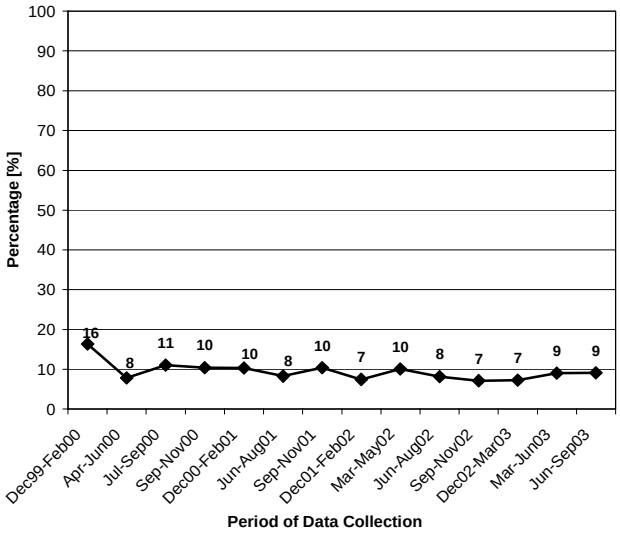


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



and has improved little over time. *West Java* - Vitamin A intake was around one third of the Recommended Daily Intake for children.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *West Java* - Vitamin A supplementation among children 6-59 months of age increased in West Java, particularly for children 6-11 months of age as coverage was very low for this group in August 1999 and February 2000. Coverage increased to 81% for children 6-11 months and to 87% among 12-59 month old children by the February 2003 distribution month.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

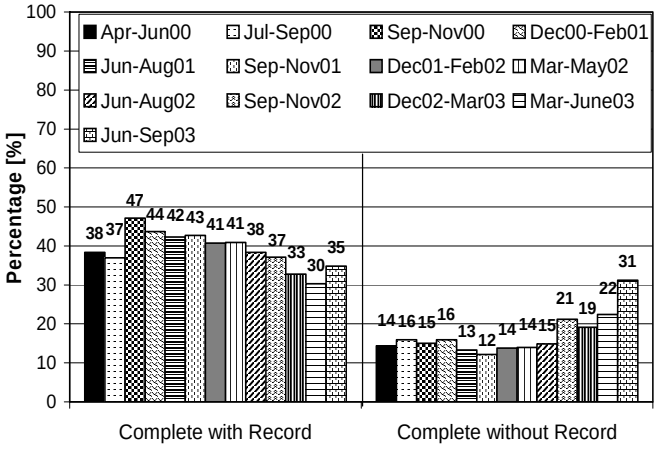
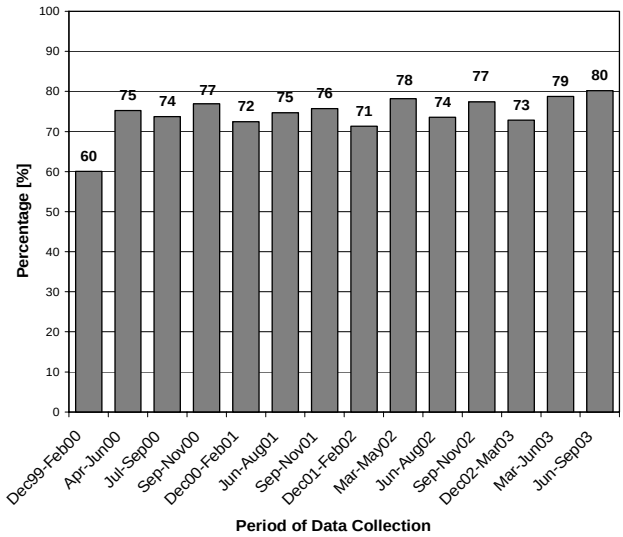


Fig 14. Posyandu Attendance in the Previous Month



concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *West Java* – Vitamin A intake in West Java was around one-fourth of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *West Java* - Post partum VA supplementation coverage was among the lowest observed ranging from 7-16%.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

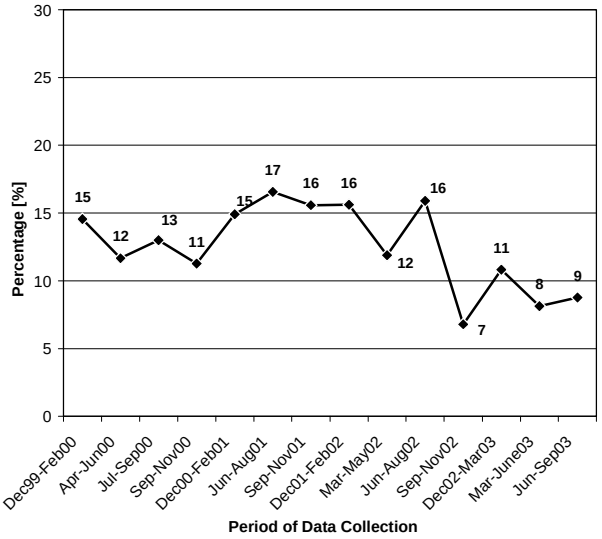
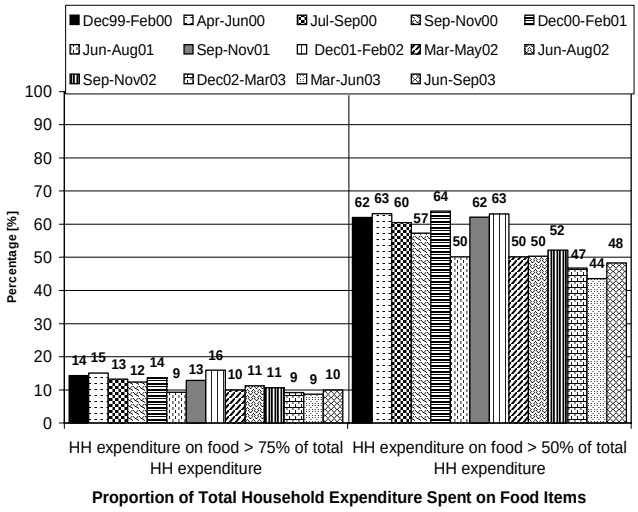


Fig 16. Household Expenditures on Food Items



official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *West Java* - Total completed immunization status, with or without an official record, remained at 60-70% over time. However, the proportion with an official record declined considerably to a low of 30% and without an official record increased to 31% by Jun-Sep 03.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General - Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *West Java - Posyandu*

attendance remained fairly stable from Apr-Jun 00 at 75-80%, while it had been only 60% in Dec 99 - Feb 00.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *West Java* - Diarrhea among children in West Java only really started to decline after August 2002. Before then the prevalence was 11-17%, after that it declined to 9% in Jun-Sep 03.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *West Java* - The percentage of families spending more than 75% of their total expenditure on food was lower than in most other provinces. Rates were 14% in Dec 99 - Feb 00 and declined to 10% in Jun-Sep 03. The percentage of families spending more than 50% of their income on food was 62% in Dec 99 - Feb 00 and declined to 48% in Jun-Sep 03.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *West Java* – There was a worrying increase of the prevalence of anemia between Sep-Nov 02 and Jun-Sep 03. Among children aged 12-23 mo

prevalence increased from 52% to 69%, and among non-pregnant mothers it increased from 18% to 30%. Prevalence of underweight and stunting as well as thinness among mothers declined slowly. The proportion of young infants that were exclusively breastfed increased recently to 52% of those aged 0-1 mo, 36% aged 2-3 mo and 5% 4-5 mo.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 10
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural Central Java

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings from Central Java are that – *Exclusive breastfeeding experienced a decline over time. Although levels of diarrhea were generally lower than in other areas, rates increased over time. Levels of stunting decreased over time. Furthermore, regular Posyandu attendance was amongst the highest of rural areas with rates of 77% among families with children under 5 years of age.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling

Helen Keller INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

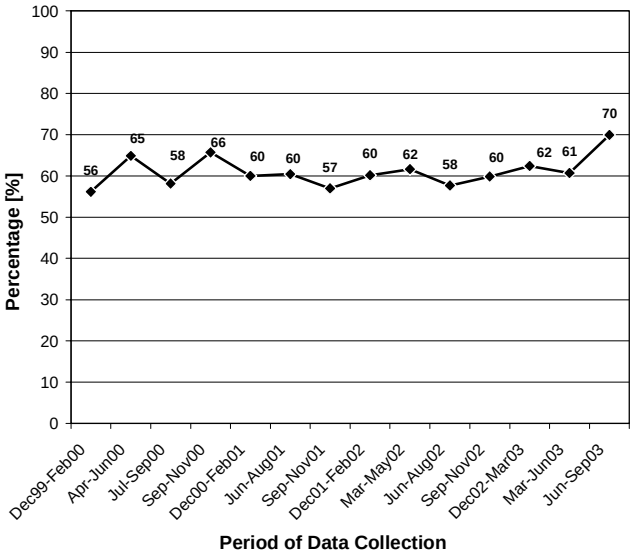
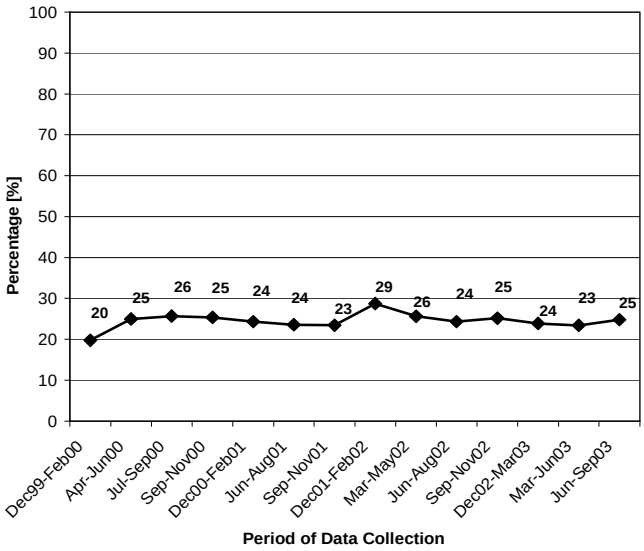


Fig 2. Anemia among Non-Pregnant Mothers



frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in Central Java province.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few signs of improvement. *Central Java* - Although the levels of anemia were not the highest among rural provinces, they are still very high at 56-70%

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

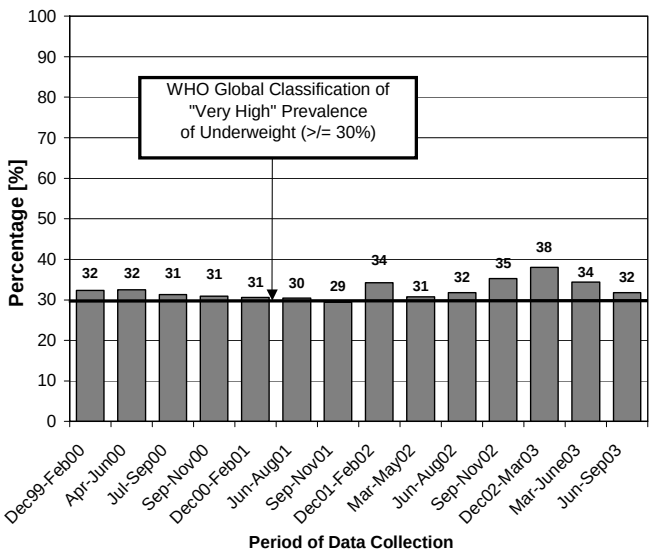
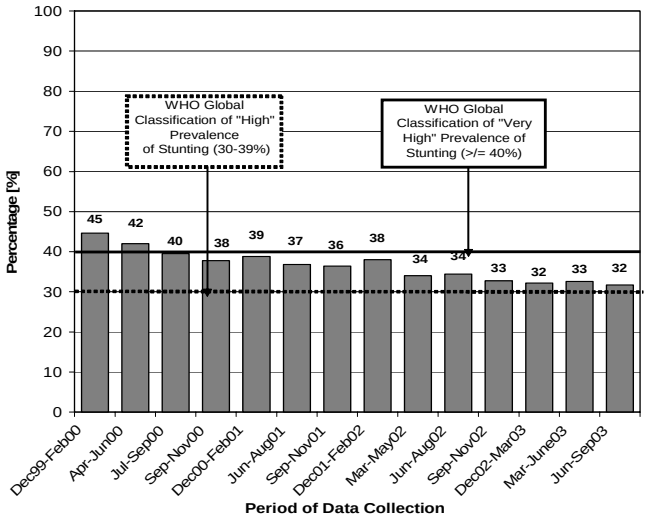


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



and did not improve over the course of data collection. Instead, the last round of data-collection found an increase.

Anemia among Non-Pregnant Mothers (SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *Central Java* - Anemia levels did not change greatly over time and ranged from 20-29%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *Central Java* - The underweight prevalence was lower than the rural

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

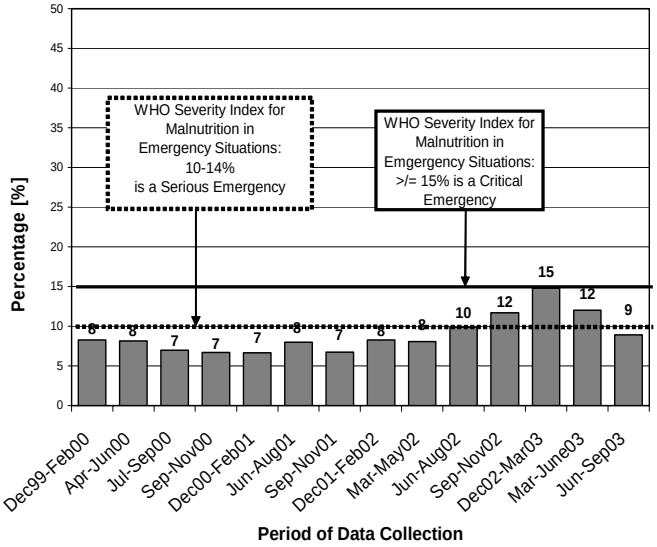
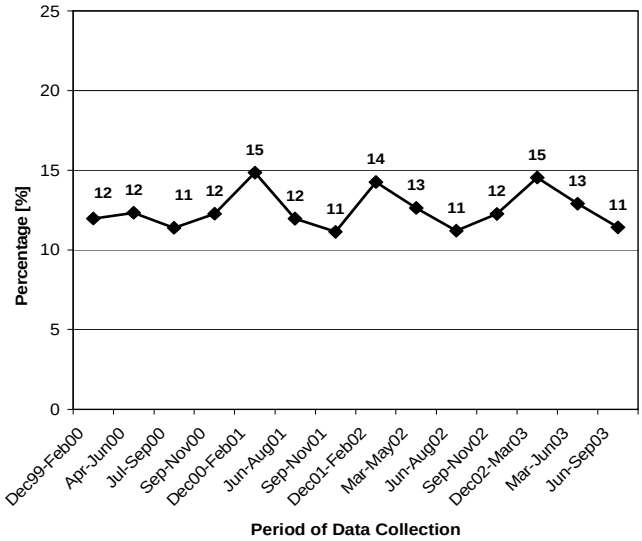


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



average. Prevalence was highest in the last year of data collection, ranging from 32-38%.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *Central Java* - Stunting declined over the four-year period of data collection in Central Java, from 45% to 32%.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12- 23 months decreased in the most recent rounds of data collection. *Central Java* - The level of wasting was stable at 7-8% until Jun-Aug 02 when it increased to 10% and then to 15% in Dec 02-Mar 03. After that it declined again to reach 9% in the most recent round of data collection from Jun-Sep 03.

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

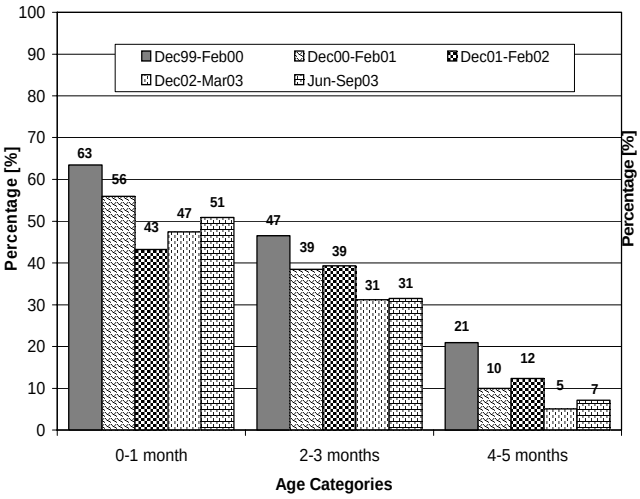
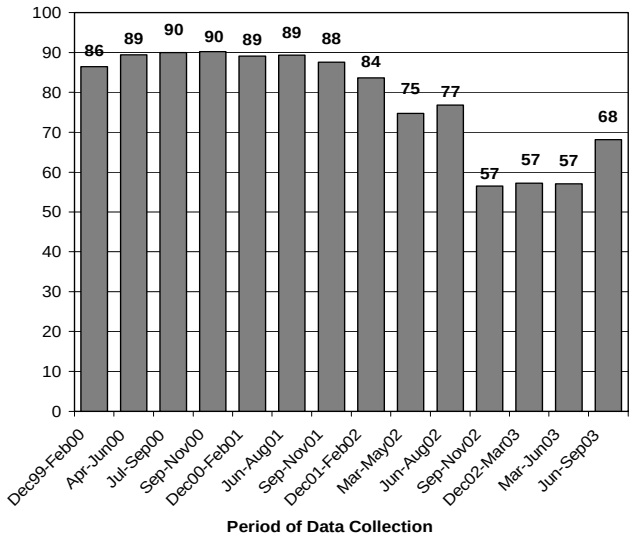


Fig 8. Household Use of Adequately Iodized Salt



Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *Central Java* - Maternal thinness followed the rural trend; it declined slightly, and peaked at 15% in the December - February rounds of data collection.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *Central Java* - Overall, exclusive breastfeeding declined in Central Java. Like East and West Java, the lowest levels were found in the round of data collection from Dec 00 - Feb 01. In the last round, Jun-Sep 03, the prevalence of exclusive breastfeeding was 51% for children 0-1 month of age, 31% among children 2-3 months old and 7% among children 4-5 months of age.

Fig 9. Vitamin A Intake of Children 12-59 months of age

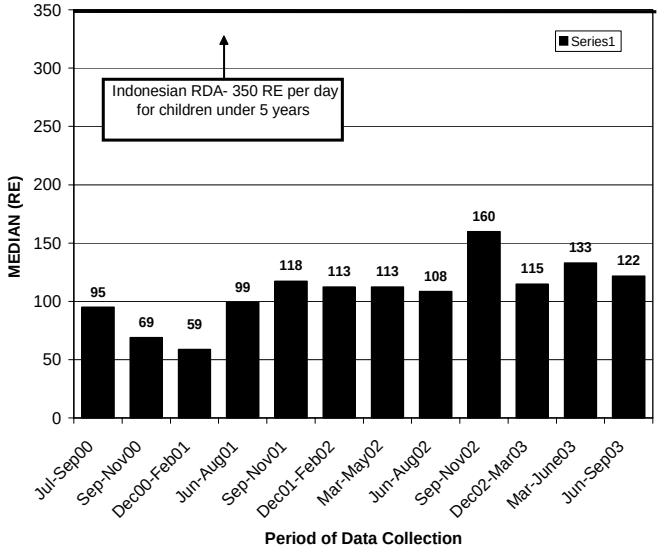
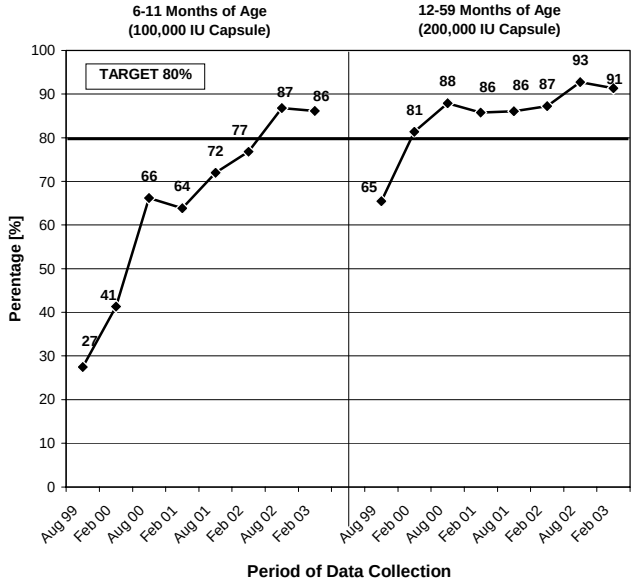


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly, reaching 60-70% during the last rounds. *Central Java* - The use of adequately iodized salt decreased from 89% in Jun-Aug 01 till 57% during the period Sep 02 – Jun 03. In the last round of data collection from Jun-Sep 03 the use of adequately iodized had increased again to 68%.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. *Central Java* - Vitamin A intake has improved somewhat over time, but is still below 50% of the Recommended Daily Intake for children.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

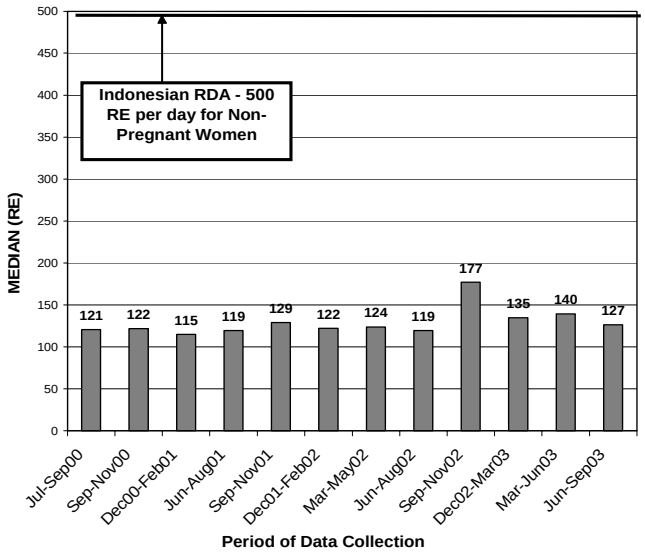
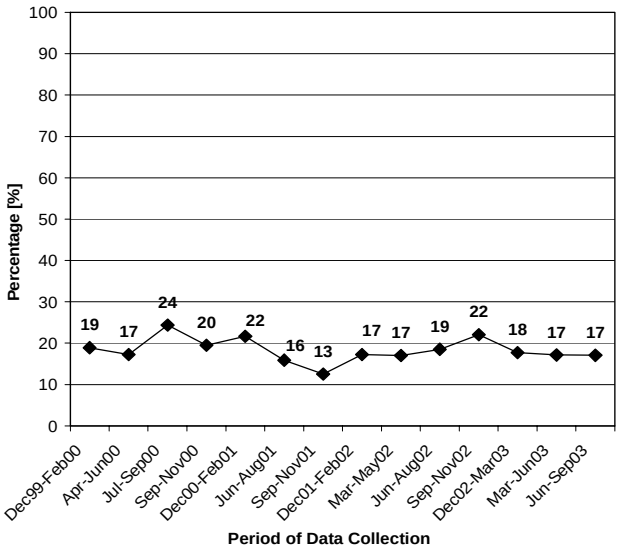


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *Central Java* - The percentage of children who received vitamin A supplementation increased, particularly in the 6-11 month old age category. In August 1999, 27% of children 6-11 months received a Vitamin A capsule, by August 2002 this was 87%. VAC coverage among children 12-59 months old has been above the target of 80% since February 2000 and still increased further to 91% in February 2003.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

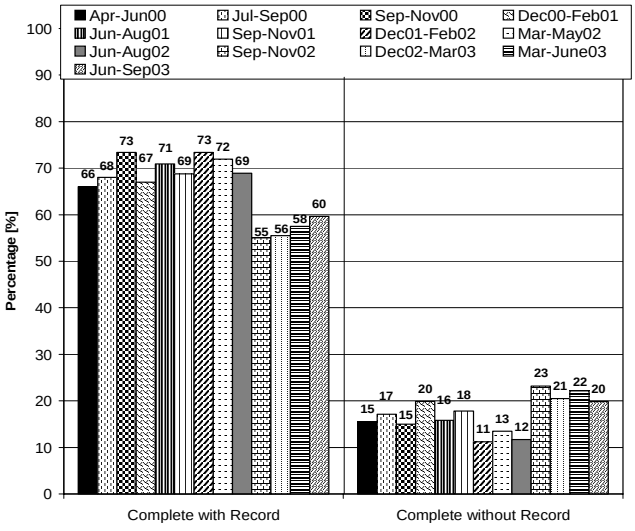
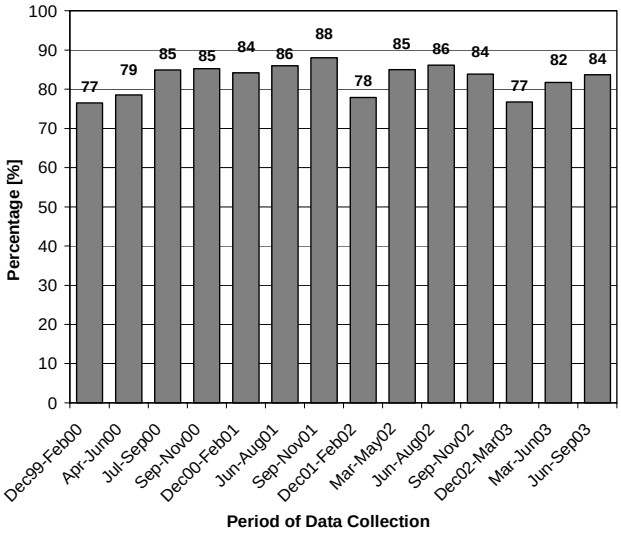


Fig 14. Posyandu Attendance in the Previous Month



assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *Central Java* - Median Vitamin A intake was low in Central Java. While it increased slightly in the last few rounds of data collection, it was still only one-third of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *Central Java* - Post partum VA supplementation coverage was stable over most rounds of data collection and slightly higher than the rural average (<23%).

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

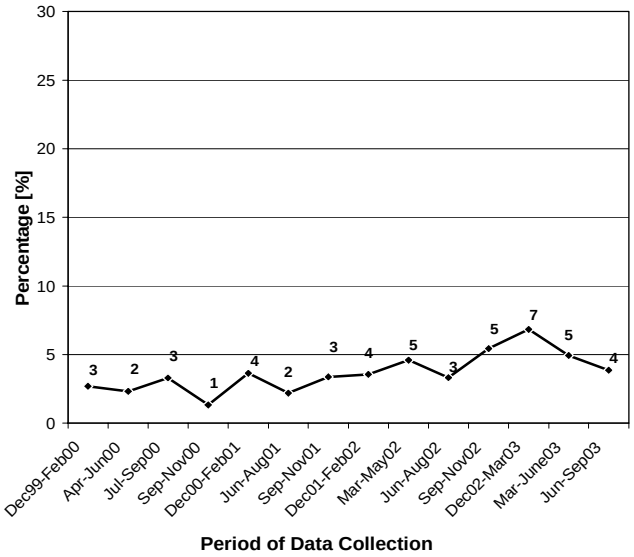
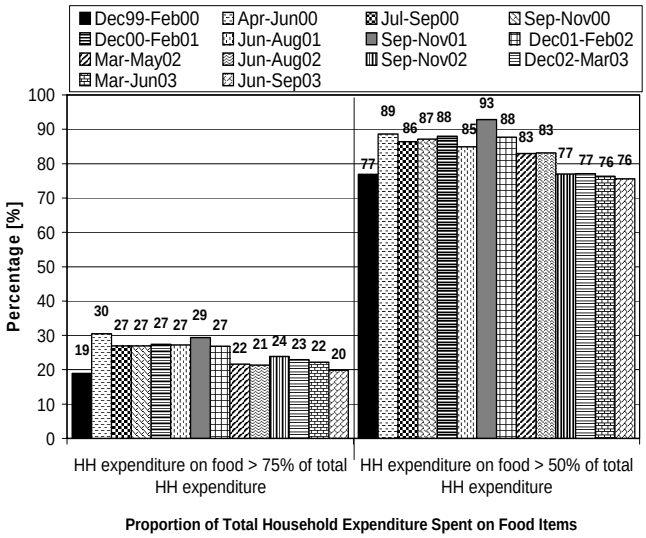


Fig 16. Household Expenditures on Food Items



official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *Central Java* - Central Java followed the rural trend as the level of completed immunization documented decreased. By Jun-Sep 03 complete immunization status with an official record was 60%, while immunization without official record was 20%.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-73%). *Central Java* - Household

Posyandu attendance remained high, indicating a sustainable and active health system. From Dec 99 - Feb 00, 77% of women attended the *Posyandu* with their youngest child. The highest level of attendance was from Sep-Nov 01 with 88% attendance in the previous month. In the last round of data collection from Jun-Sep 03 attendance was 84%.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *Central Java* - Diarrhea among children was much lower than in other rural provinces, but showed a small increase in the last year of data collection with a peak of 7% in Dec 02 – Mar 03.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *Central Java* - Also in Central Java, the proportion of expenditures on food decreased, but only since Mar-May 02. But, they were still relatively high with 70-80% of households spending more than 50% and 20-25% spending more than 75% of all expenditures on food.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *Central Java*- Exclusive breastfeeding

experienced a decline over time. Although levels of diarrhea were generally lower than in other areas, rates increased over time. Levels of stunting decreased over time. Furthermore, regular *Posyandu* attendance was amongst the highest of rural areas with rates of 77% among families with children under 5 years of age.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 11
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural East Java

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings from the analysis in East Java are that – *Anemia among children dropped over time by 13% to 56% in Jun-Sep 03. Vitamin A capsule coverage targets have not yet been met, as the most recent coverage rates were 75% for 12-59 month and 69% for 6-11 month old children. Only 29-30% of infants aged 0-3 months was exclusively breastfed.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The

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Fig 1. Anemia among Children 12-23 Months of Age

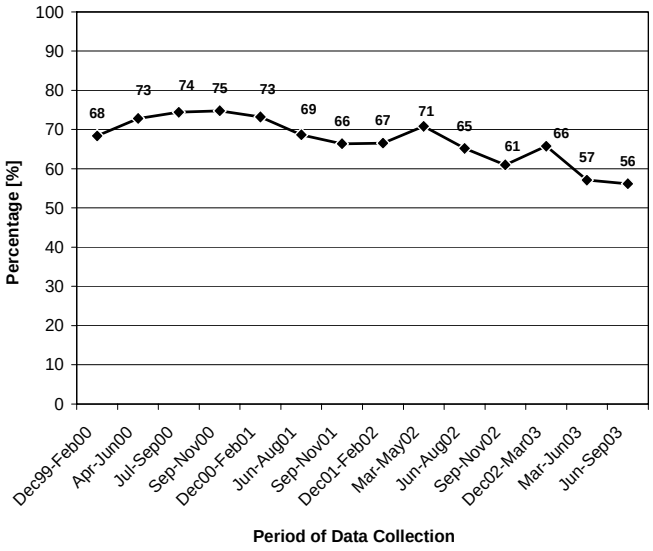
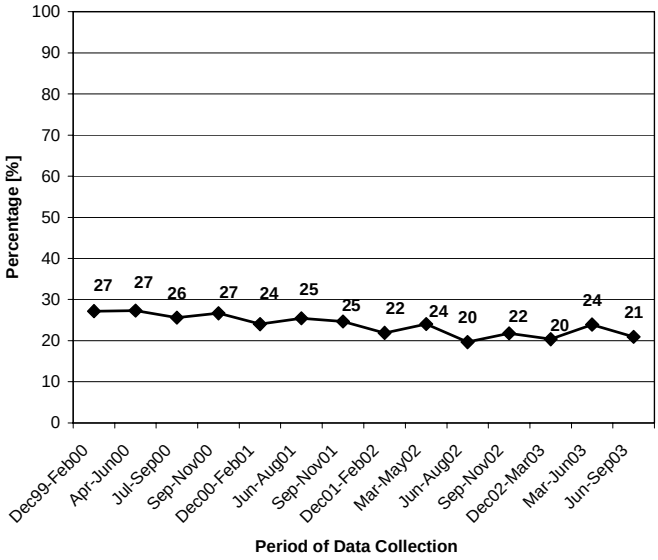


Fig 2. Anemia among Non-Pregnant Mothers



sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in East Java Province.

Findings

Anemia among Children 12-23 Months of Age (SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few signs of improvement. *East Java* - In contrast to other rural provinces, the prevalence of anemia

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

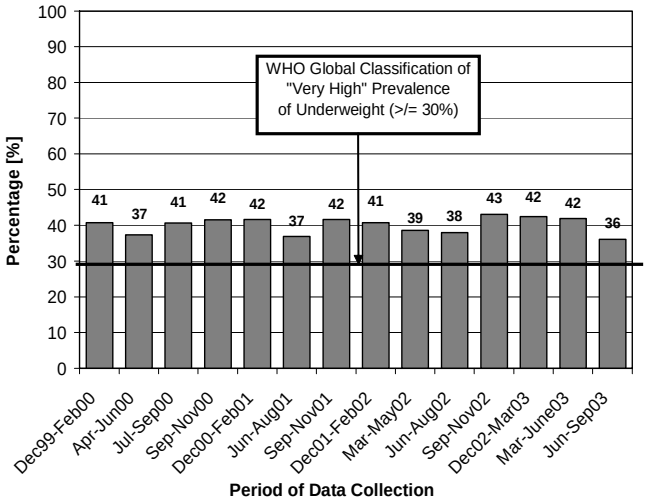
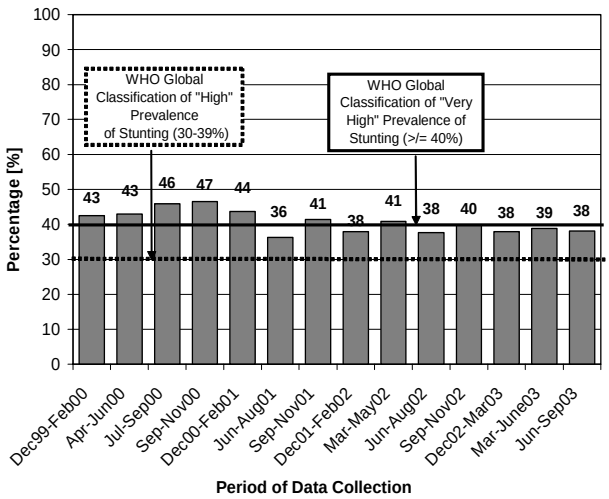


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



declined over time. The lowest level of anemia was documented in the last round of data collection from Jun-Sep 03 at 56%, and this was a 9% reduction from prevalence levels at the same time in the previous year.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *East Java* - There appears to be a very slight decline of anemia prevalence in East Java. In Jun-Sep 03 it was 21%.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

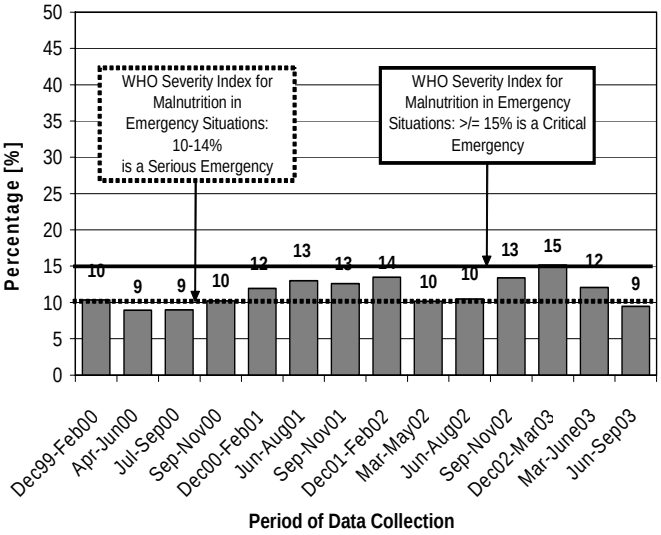
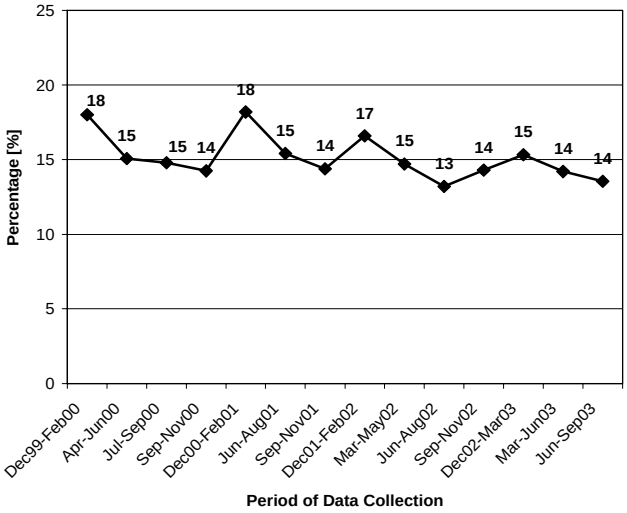


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *East Java* - The underweight prevalence was 41% in Dec 99 - Feb 00, and was 36% in the last round from Jun-Sep 03. On average the prevalence of underweight children in East Java is more than 10% higher than the WHO definition of a "very high" prevalence for children aged 12-59 months.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *East Java* - The prevalence of stunting was 43% in Dec 99 - Feb 00 and 38% in Jun-Sep 03. The highest level was found in the Sep-Nov 00 round at 47%. This decrease in prevalence meant that the rate of stunting in East Java has moved from "very high" to "high" as classified by the WHO.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

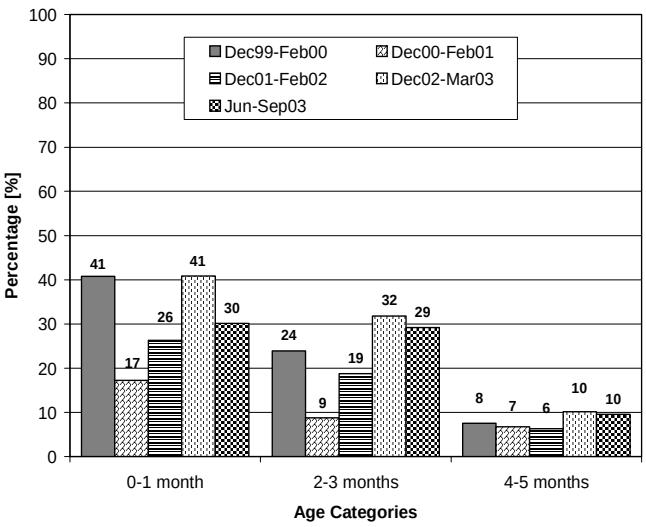
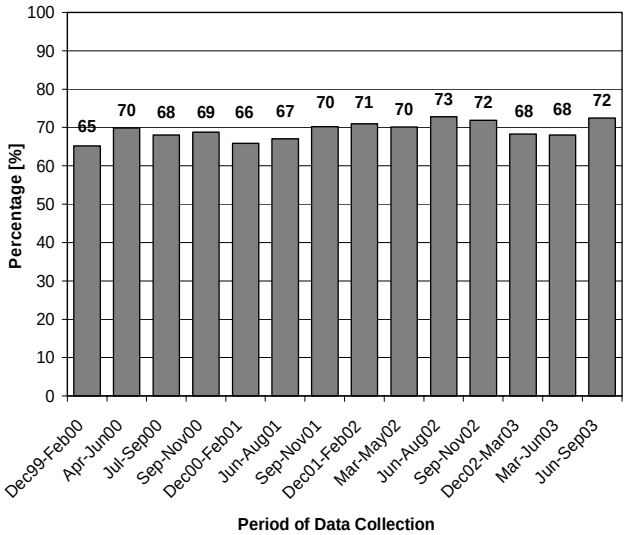


Fig 8. Household Use of Adequately Iodized Salt



SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12- 23 months decreased in the most recent rounds of data collection. *East Java* - The level of wasting did not decline, but fluctuated over time and reached its highest levels around periods of data collection that included December, up to 15% in the Dec 02 - Mar 03 round. Lowest prevalence recorded was 9%, just below the "critical emergency" category designated by the WHO.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *East Java* - Maternal thinness followed the rural tend; a general decline, from 18% to 14%, with peaks of up to 18% in Dec 00 - Feb 01.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The

Fig 9. Vitamin A Intake of Children 12-59 months of age

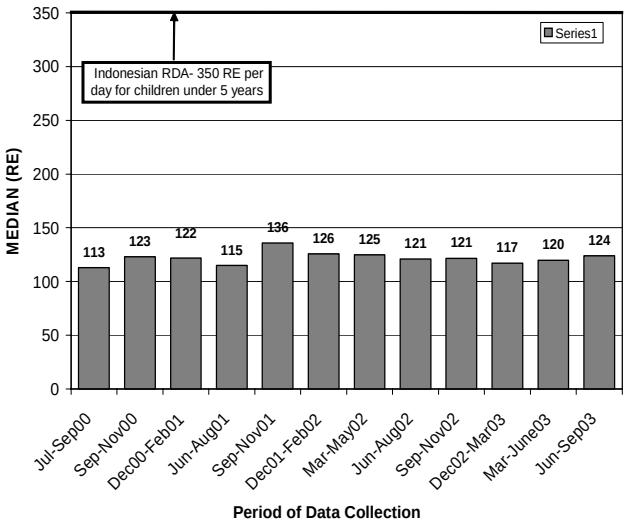
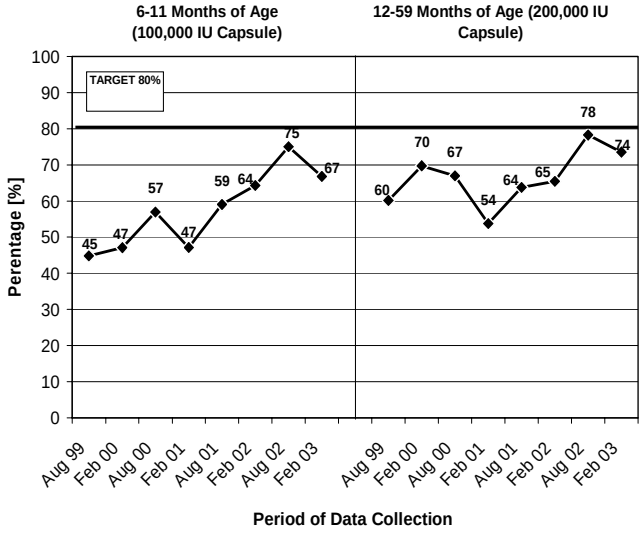


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *East Java* - Exclusive breastfeeding declined in East Java, but like Central and West Java provinces prevalence reached its lowest point in Dec 00 - Feb 01 and then increased again. In Jun–Sep 03 exclusive breastfeeding levels were at 30% for 0-1 mo old infants, 29% for 2-3 mo old and 10% for 4-5 mo old infants. However, despite the recent increase, levels are still very low.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly, reaching 60-70% during the last rounds. *East Java* - The use of adequately iodized salt was more or less static over time at 68-73%.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

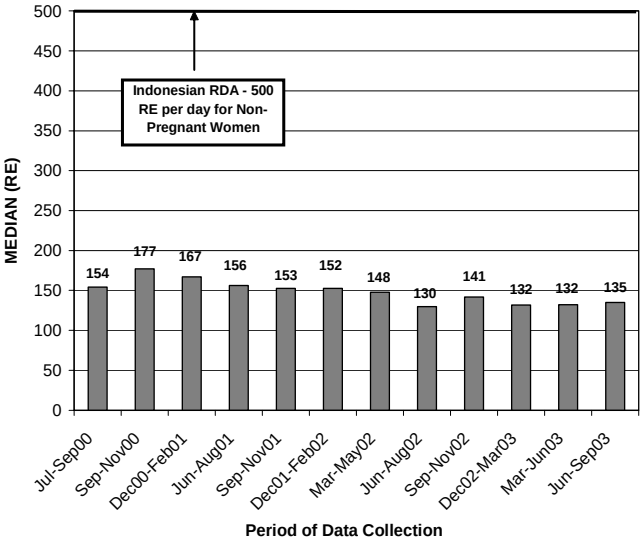
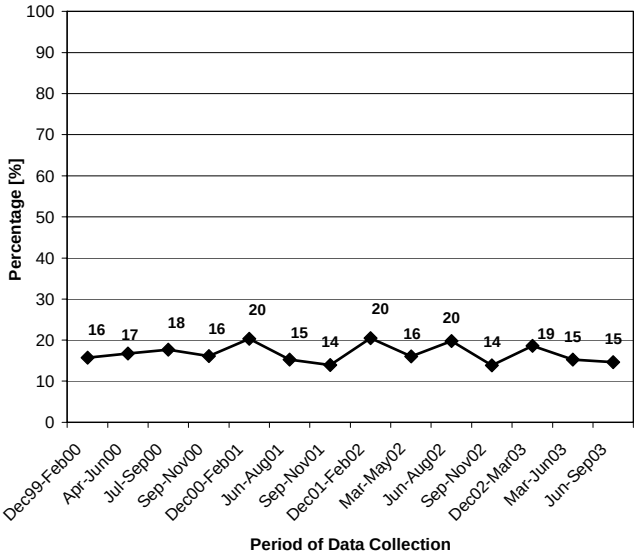


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Indonesian Recommended Daily Intake and has improved little over time. *East Java* - Vitamin A intake has been very consistent at just one-third of the Recommended Daily Intake for children.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta-analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *East Java* - There was a steady increase in the vitamin A capsule (VAC) coverage level among all children, but it also included some dips and the target level of 80% has not yet been met. Furthermore, the drop in coverage rates found for February 2003 is worrisome.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

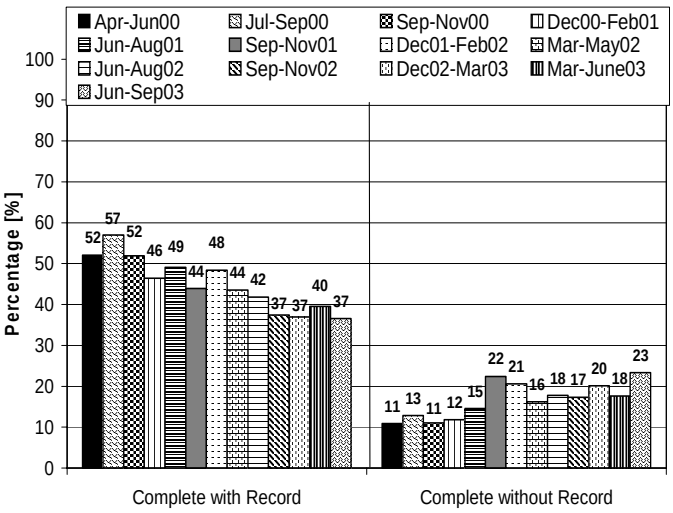
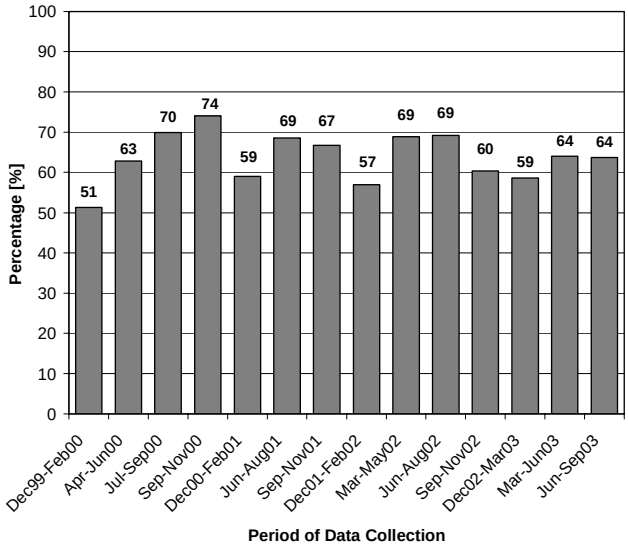


Fig 14. Posyandu Attendance in the Previous Month



health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *East Java* - Vitamin A intake was consistently less than one-third of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *East Java* - Post partum VA supplementation coverage is between 14-20%, very low.

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

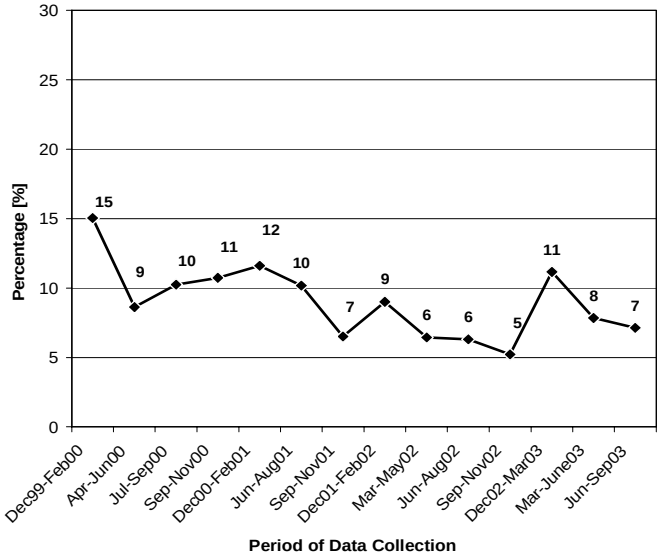
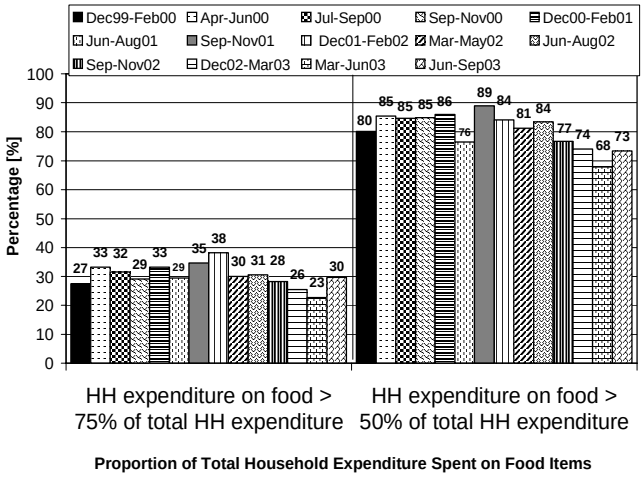


Fig 16. Household Expenditures on Food Items



Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *East Java* - East Java followed the rural trend as the level of completed immunization with an official record declined. By Jun-Sep 03 complete immunization status with an official record was only 37%, while without record was 23%. Thus, no more than 60% of children were completely immunized.

***Posyandu* Attendance in the Previous Month** (SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly

attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-73%). *East Java* - Household *Posyandu* attendance fluctuated considerably over time. The lowest levels of attendance were found in December - February months, and the highest level of attendance was in the Sep-Nov 00 round at 74%. Overall, a third of families were not attending the *Posyandu* regularly.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days (SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *East Java* - Diarrhea prevalence among children declined from 15% to ~7%, but spiked around December.

Household Expenditures on Food Items (SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *East Java* - The proportion of expenditure spent on food started to decline from late 2001. However, declines reversed by mid 2003. In Jun-Sep 03, 73% of families spent more than 50% of expenditures on food and 30% spent more than 75% on food.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially

for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *East Java*- Anemia among children dropped over time by 13% to 56% in Jun-Sep 03. Vitamin A capsule coverage targets have not yet been met, as the most recent coverage rates were 75% for 12-59 month and 69% for 6-11 month old children. Only 29-30% of infants aged 0-3 months was exclusively breastfed.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 12
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural Lombok

Key results for the period: Dec 1999 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings from the analysis in Lombok are that – ***Prevalence of anemia among children 12-23 mo of age was among the highest observed (81% in Jun-Sep 03), and prevalence of underweight and stunting in this age group was also extremely high. While prevalence of maternal thinness declined, it was relatively high. And no more than 27% of households used adequately iodized salt. However, positive findings included that exclusive breastfeeding was practiced relatively widely and declined more slowly, VAC coverage reached over 90% in Feb 03, Posyandu attendance had increased considerably to nearly 80%, completed immunization rate was high (>90%) and the prevalence of diarrhea had declined dramatically from 27% to 5%.***

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Helen Keller INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

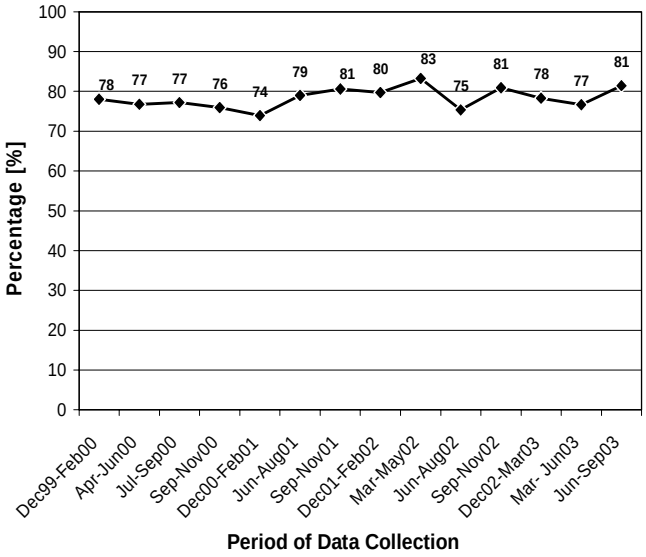
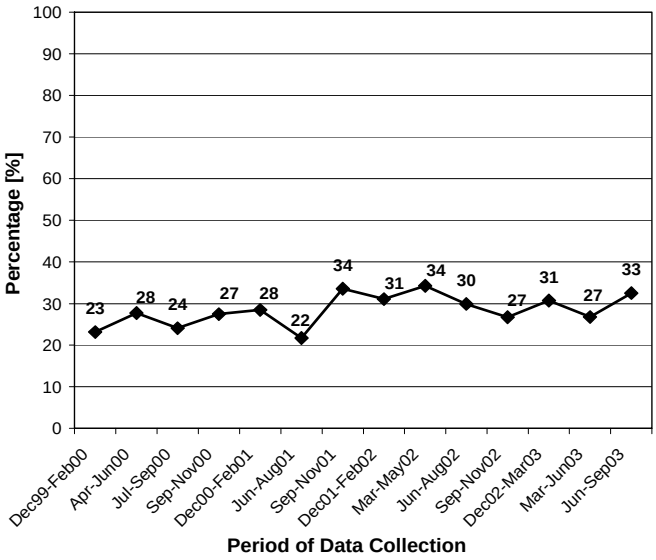


Fig 2. Anemia among Non-Pregnant Mothers



Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in Lombok Province.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

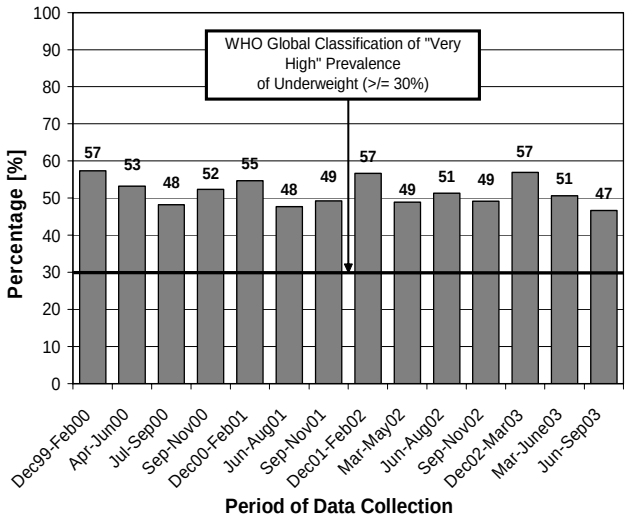
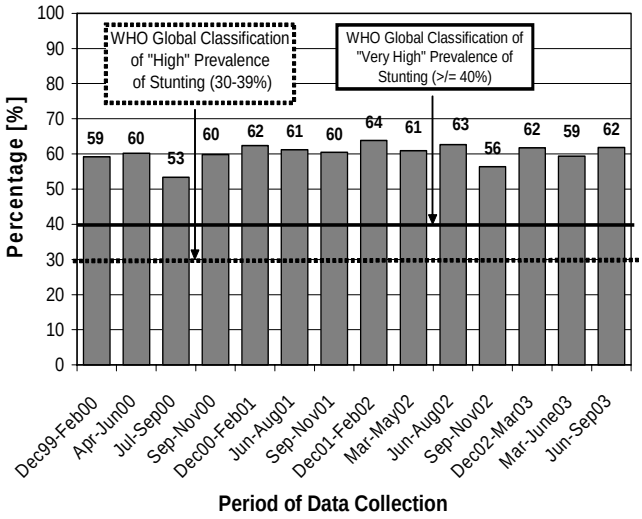


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



signs of improvement. *Lombok* - Prevalence of anemia in Lombok was among the highest observed and rates appeared to rise over time. The prevalence was lowest in Dec 00 - Feb 01 at 74% and highest in Mar-May 02 at 83%. In Jun-Sep 03 it was 81%.

Anemia among Non-Pregnant Mothers
(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *Lombok* - Anemia levels in Lombok increased slightly over time, from 23% in Dec 99 - Feb 00 till 33% in Jun-Sep 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

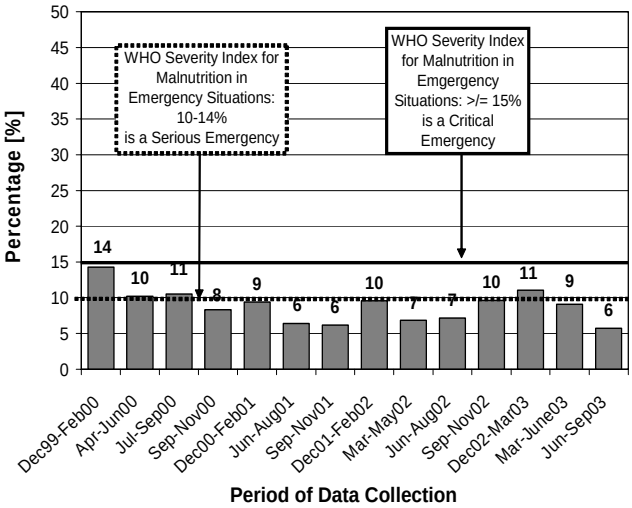
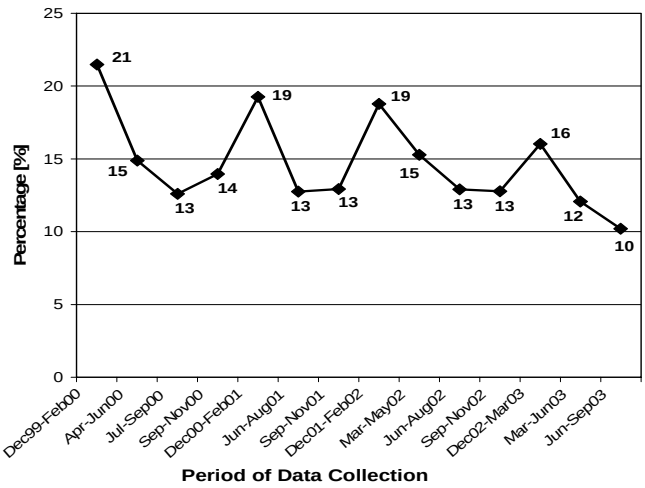


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



12-59 month old children. *Lombok* - Lombok had the highest level of underweight children compared to all other rural provinces (47-57%). The levels did not decline and reached a peak of 57% in multiple rounds of data collection between December and February. These rates are almost 20% over the WHO classification of "very high" for children 12-59 months.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high". [4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *Lombok* - The prevalence of stunting on Lombok is very high at 53-64% (almost two-thirds) and has not changed over the past four years.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation".[4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12-23 months of age varied between 9-13%. *Lombok* - The level of wasting was 14% in Dec 99 - Feb 00 and then declined to 11% at the same time

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

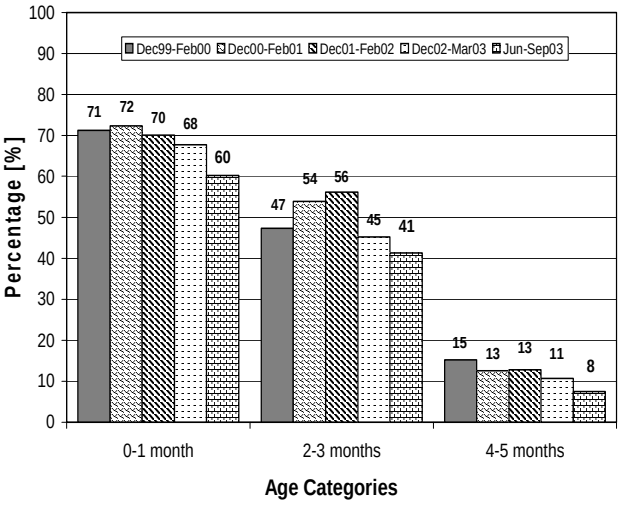
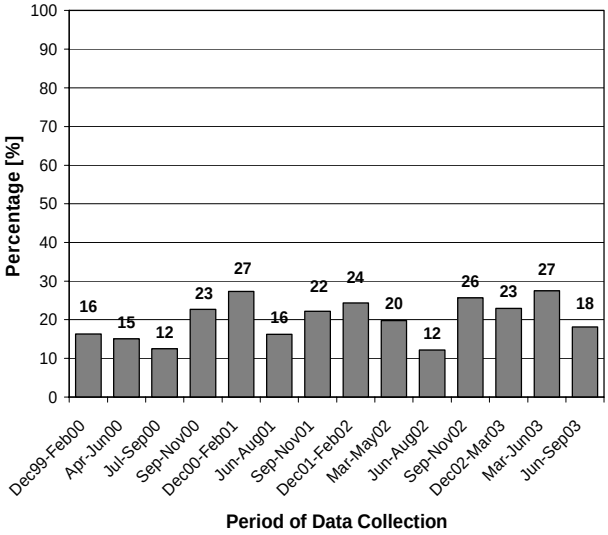


Fig 8. Household Use of Adequately Iodized Salt



of year 3 years later. This trend of decline has also been found during other times of the year, resulting in a prevalence of 6% in Jun-Sep 03, which is below the WHO classification of a serious emergency for children 12-59 months old.

Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *Lombok* - Levels of maternal thinness were high but declined over time, to 10% in Jun-Sep 03. Peaks in prevalence in the December-February rounds of data collection were higher than in other provinces, reaching between 16-21%.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *Lombok* - The exclusive breastfeeding rates in Lombok were among the highest observed and declined more slowly. In Jun-Sep 03, exclusive breastfeeding rates were 60% among 0-1 mo old, 41% among 2-3 mo old and 8% among 4-5 mo old infants.

Fig 9. Vitamin A Intake of Children 12-59 months of age

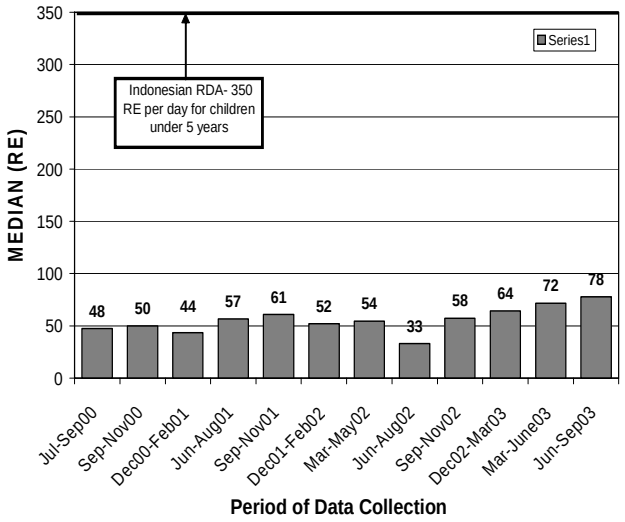
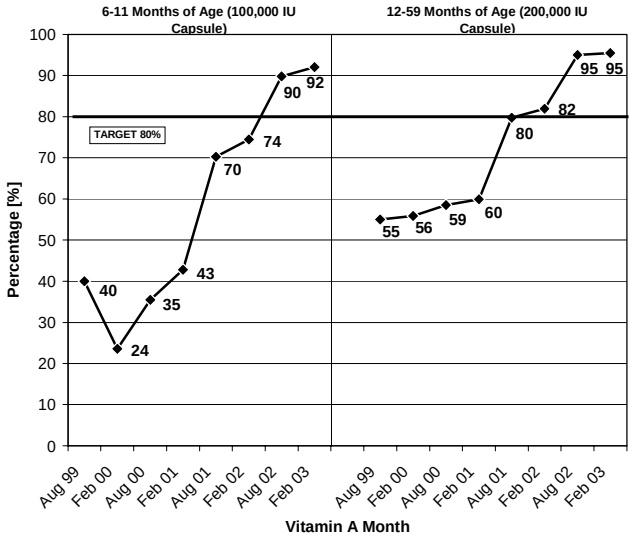


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas, reaching 60-70% during the last rounds. *Lombok* - The use of adequately iodized salt was the lowest among all provinces, reaching no more than 27% at its highest.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. *Lombok* - Vitamin A intake in Lombok was very low. Despite its slight increase over time, by Jun-Sep 03 it was still only one-fifth of the recommended amount.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

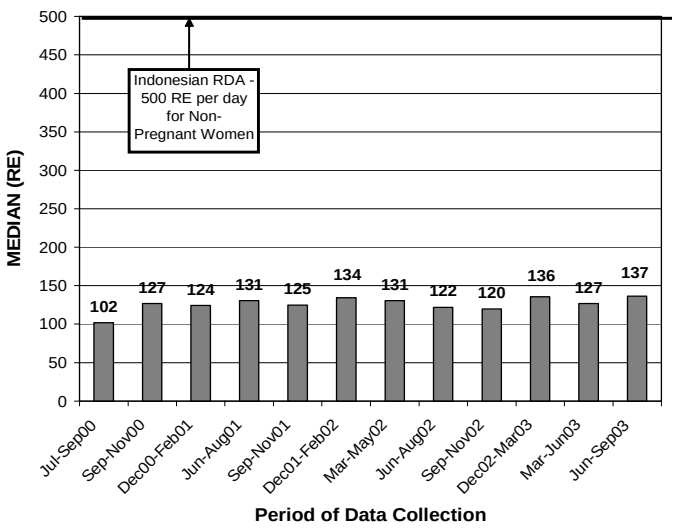
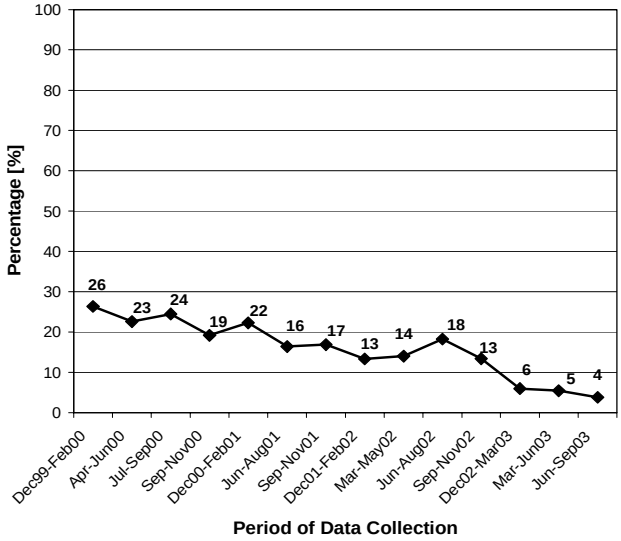


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta- analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *Lombok* - VAC coverage rates in Lombok increased dramatically. In August1999 the coverage level among children 6-11 months of age was 40% and reached its highest level in the last distribution month of February 2003 at 92%. Among children 12-59 months, 55% received a VAC in the August 1999 distribution month and this increased to 95% in the February 2003 VA month.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

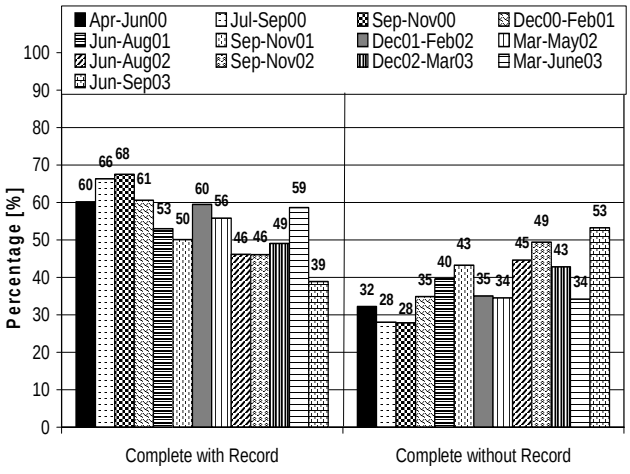
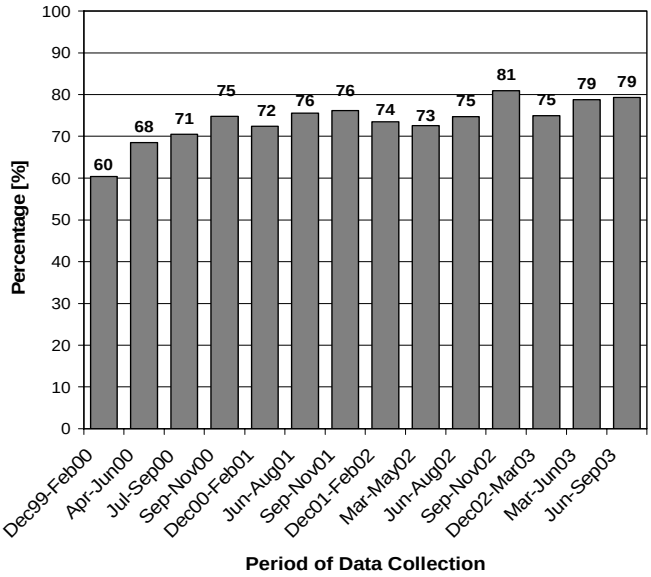


Fig 14. Posyandu Attendance in the Previous Month



that are lactating since their RDI is higher) for every rural province in every round of data collection. *Lombok* – Vitamin A intake in Lombok was low and changed little over time. No more than one-fourth of the Recommended Daily Intake for non-pregnant, non-breastfeeding women was consumed.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However, there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum within 4 weeks after delivery was very low at ~15%. *Lombok* - Post partum VA supplementation coverage in Lombok has declined from above 20% till late 2000 to below 10% in 2003.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

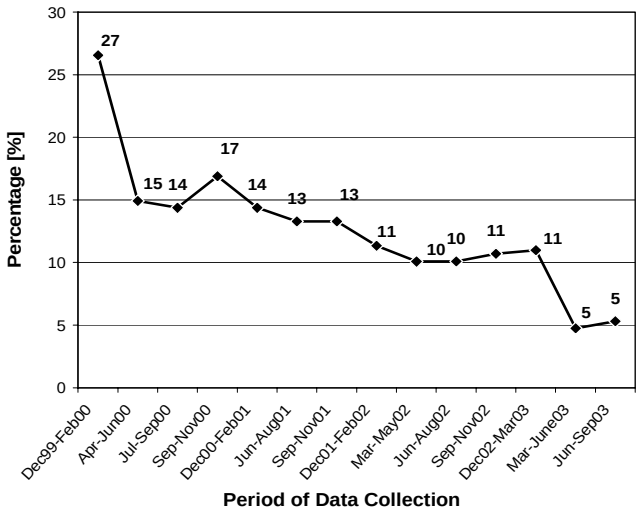
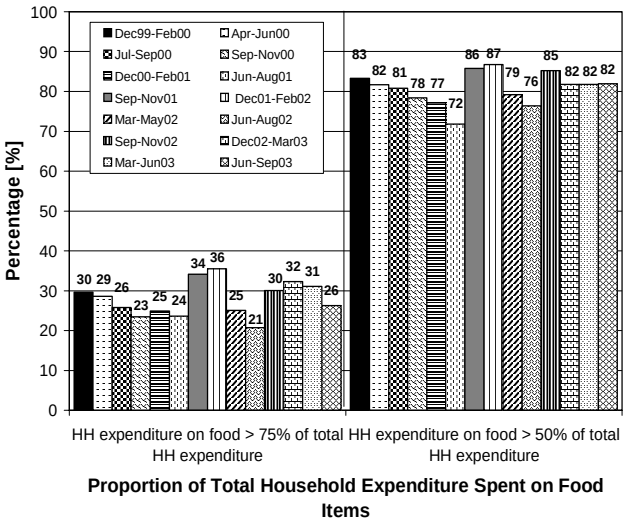


Fig 16. Household Expenditures on Food Items



official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while completed immunization without an official record increased. Combined, levels varied between 65-75%. *Lombok* - Complete immunization with an official record also declined in Lombok, particularly in the last round of data collection. In Jun-Sept 03, immunization with official record was 39% and without official record was 53%. If mothers reported complete immunization status correctly, more than 90% of children were fully vaccinated in each round of data collection, which is among the highest observed.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *Lombok* - *Posyandu* attendance in Lombok increased over time, from 60% in Dec 99 - Feb 00 to 79% in Jun-Sept 03.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

(SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including

nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *Lombok* - The most dramatic decrease of diarrhea prevalence was observed in Lombok, from 27% in Dec 99 - Feb 00 to 5% in Jun-Sep 03.

Household Expenditures on Food Items

(SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *Lombok* - Over 80% of households on Lombok spent more than 50% of their expenditures on food and in fact more than 20-25% spent more than 75% on food. These proportions were among the highest observed.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%.

Lombok - Prevalence of anemia among children 12-23 mo of age was among the highest observed (81% in Jun-Sep 03), and prevalence of underweight and stunting in this age group was also extremely high. While prevalence of maternal thinness declined, it was relatively high. And no more than 27% of households used adequately iodized salt. However, positive findings included that exclusive breastfeeding was practiced relatively widely and declined more slowly, VAC coverage reached over 90% in Feb 03, *Posyandu* attendance had increased considerably to nearly 80%, completed immunization rate was high (>90%) and the prevalence of diarrhea had declined dramatically from 27% to 5%.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

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I N D O N E S I A

Year 5, Issue 13
January 2004

Provincial Findings
Dec 1999 – Sep 2003
Issues 1-13

CRISIS BULLETIN

– INDONESIA IN TRANSITION –

Nutrition and Health Surveillance in rural South Sulawesi

Key results for the period: Apr 2000 – Sep 2003

Data collected over time provides the opportunity to determine trends in health and nutrition status. Frequent collection also demonstrates fluctuations during the year in health conditions to be displayed and allows policy makers and implementers to adjust or tailor interventions to these changes. Between 1999-2000, the GOI/HKI Nutrition and Health Surveillance System (NSS) has collected data representative of 70% of Indonesia's population among households with children under five years of age. In general, findings for Indonesia's population reveal that underweight, stunting and wasting in children 12-23 mo old is high for all rounds for all sites, anemia levels among young children have remained alarmingly high, completed immunizations with an official record are declining, vitamin A intake for mothers and children are low, and vitamin A capsule coverage for post partum women is low. However, coverage of vitamin A capsules has increased dramatically and diarrhea prevalence has declined by ~50%. The main findings for South Sulawesi are that – *Although rates of anemia amongst children 12-23 months of age recently declined to 61%, they were higher than in most other rural areas. Prevalence of stunting among 12-23 mo old children increased to a very high level of 52% and the prevalence of exclusive breastfeeding of 0-5 mo old infants decreased. Vitamin A capsule coverage for children 6-59 months of age was just below 70%. Completed immunization was reported for 60-70% of young children, however, by Jun-Sep 03, this could only be verified by an official record for 20% of children. Posyandu attendance was below 50%. A positive finding was the steady increase of the availability of iodized salt at household level from 44% to 72%.*

Introduction

The collection of data over time allows the analysis of trends in health and nutrition status for Indonesian households. Data reveal changes in selected indicators over time for urban and rural areas surveyed by the NSS. This information has demonstrated proven value to policy makers and those responsible for determining health status, planning and implementing new interventions and evaluating current activities. The objective of this bulletin series is to report on trends in health and nutrition status and to identify where changes, if any, have occurred in these indicators. These bulletins add important information for understanding health status and health intervention efforts in rural areas and urban slum areas. The information below presents the main findings from almost four years of data collection and a discussion of possible reasons for them.

Data Collection Methods

The NSS collected cross-sectional data four times a year (i.e. one round of data collection every

Helen Keller INTERNATIONAL

Fig 1. Anemia among Children 12-23 Months of Age

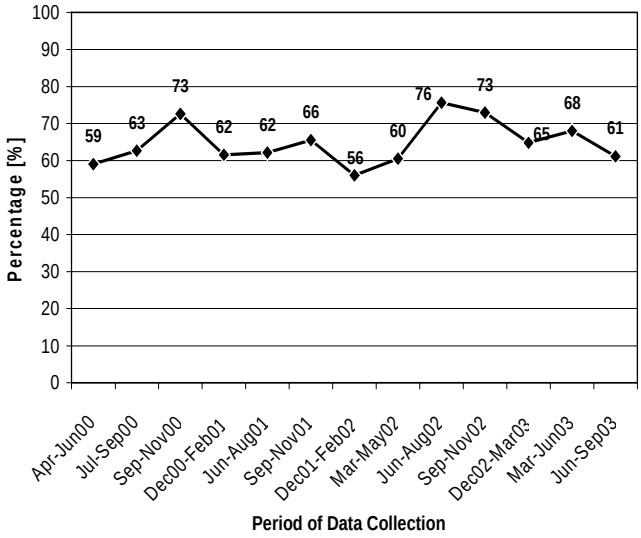
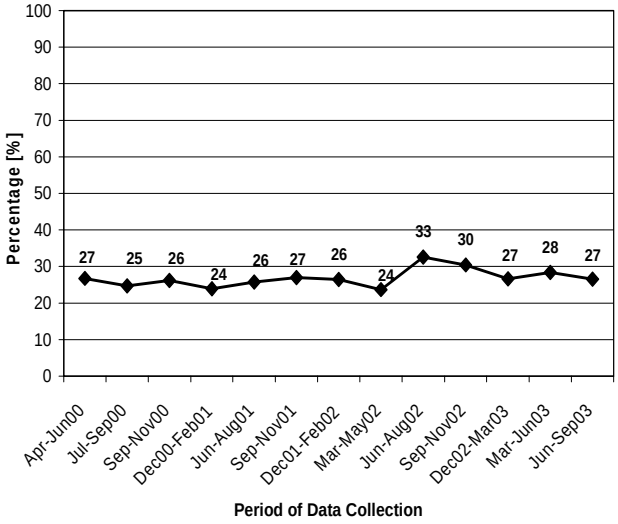


Fig 2. Anemia among Non-Pregnant Mothers



three months) in all sites. The sampling frames applied to rural sites and urban poor sites differed slightly. In the rural sites, a multi-stage cluster sampling design was used to obtain a random sample based on probability proportional to size (PPS). In the urban poor sites, a purposive sampling design was used to target urban poor households. The total sample size for each round of data collection was approximately 40,000 households. Since 1998, the NSS operated in 9 provinces, including urban poor populations in 4 cities, representing approximately 70% of the country's total population.

A 20% sub-sample of the full sample was selected (stratified by cluster) from both rural and urban households for hemoglobin concentration assessment of mothers, under-five children, and fathers (if available).

The variables, or indicators, selected for the NSS were based on the conceptual framework of the causes of malnutrition developed by the United Nations Children's Fund (UNICEF, 1996). These variables provide information on the immediate, underlying and basic causes of malnutrition as well as socio-demographic information and economic indicators.[1]

Data presented in this Bulletin highlight the health and nutrition situation in South Sulawesi Province.

Findings

Anemia among Children 12-23 Months of Age

(SEE FIG. 1)

Children 12-23 months old are known to be at a vulnerable age for nutritional inadequacies, such as iron deficiency, which leads to anemia. For this reason, and because there is no established program for addressing anemia among this age group, the prevalence of anemia in this group is a sensitive indicator for changes of iron status in a population. Anemia prevalence among young children in developed countries ranges from 5-10%.[2]

Importance: The consequences of iron deficiency (besides anemia) include reduced psychomotor and mental development, reduced immunity, impaired growth and learning capacity, reduced muscle function and energy utilization, increased lead absorption leading to lead poisoning, and difficulty regulating body temperature when cold.[3]

Data Collection Method: Blood hemoglobin levels were measured to assess anemia prevalence. Blood was obtained by finger prick from all underfives in a 20% sub sample of households and assessed using a HemoCue. Children with hemoglobin levels less than 11 g/dL were classified as anemic.

Findings: *General* - Levels of anemia were universally high in rural provinces and showed few signs of improvement. *South Sulawesi* - The level of anemia in South Sulawesi fluctuated considerably. After an increase, there was a decline during the last year of data collection from 76% in Jun-Aug 02

Fig 3. Prevalence of Underweight Children 12-23 Months of Age

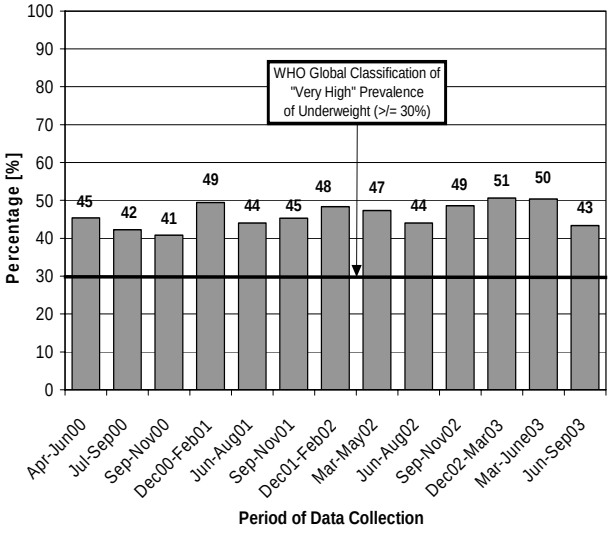
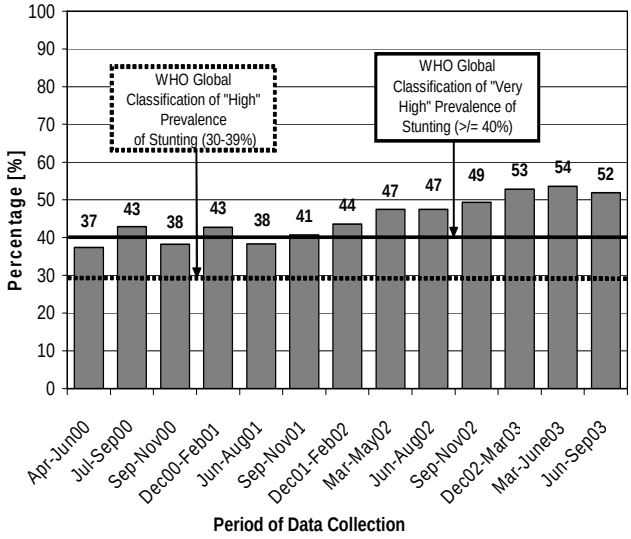


Fig 4. Prevalence of Stunted Children 12-23 Months of Age



to 61% in Jun-Sep 03. In contrast to other provinces where the fluctuation appears to follow a pattern throughout the year, the pattern in South Sulawesi was not consistent over time.

Anemia among Non-Pregnant Mothers

(SEE FIG. 2)

Anemia in women has multiple possible causes in addition to low dietary iron intake, including blood loss during menstruation and increased iron demands during pregnancy and lactation. Additionally, excessive blood loss caused by parasitic infections, heavy menstrual flow, and diarrhea exacerbate anemia. In industrialized countries, studies among non-pregnant women document prevalence levels between 1-6%.[2]

Importance: Iron deficiency in non- pregnant women is known to cause anemia, reduced immunity and muscle function, and difficulty regulating body temperature in the cold. Iron deficiency in women also leads to increased risk of complications during pregnancy, including premature delivery and low birth weight. It is also associated with increased maternal mortality rates.

Data Collection Method: Blood hemoglobin levels were used to determine anemia status. Blood was obtained by finger prick from mothers of a 20% sub sample of households, and assessed using a HemoCue. Non-pregnant women with hemoglobin levels less than 12 g/dL were classified as anemic.

Findings: *General* - Anemia levels in rural areas ranged between 23-27% and did not change over time. *South Sulawesi* - Anemia levels remained stable and ranged from 27-33% between Jun-Aug 02 to Jun-Sep 03.

Prevalence of Underweight Children 12-23 Months of Age (SEE FIG. 3)

Nutritional status is affected by both diet and disease, particularly among children 12-23 months, the prevalence of underweight in this age group is a sensitive indicator of the general nutrition and health status of a population. The WHO classifies an underweight prevalence of $\geq$ 30% as "very high" for children under 5 years.[4]

Importance: Being underweight is a measure of growth retardation due to under nutrition. Under nutrition affects every organ, tissue, and cell of the body. This is evidenced by the fact that being underweight puts a child at a greater risk for both morbidity and mortality.

Data Collection Method: Children were classified as underweight if their weight for age was less than -2 SD of the median of the reference population (NCHS). Weight (kg) was measured by a trained enumerator, age was determined using a local calendar.

Findings: *General* - For every province, in every round of data collection, the percentage of underweight children 12-23 months was well above the WHO indication of a "very high" prevalence for 12-59 month old children. *South Sulawesi* - South Sulawesi had very high levels of underweight

Fig 5. Prevalence of Wasted Children 12-23 Months of Age

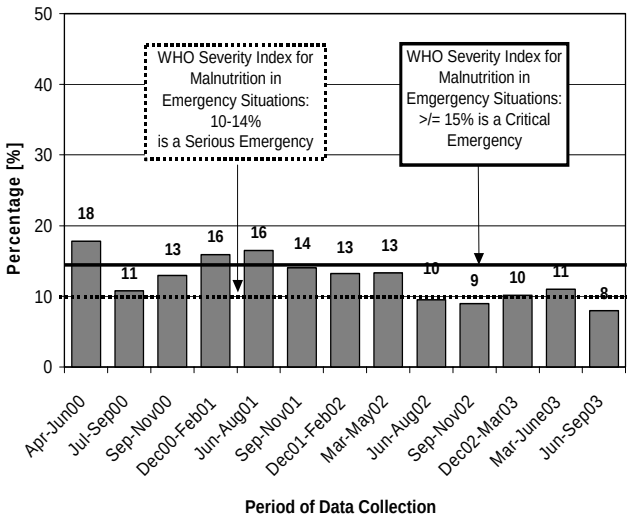
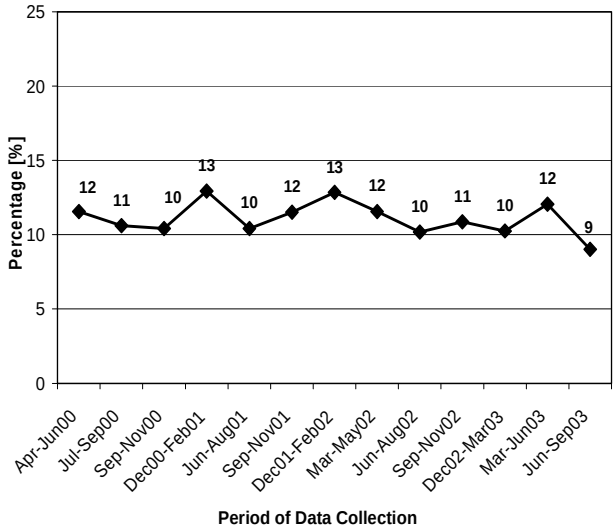


Fig 6. Percentage of Non-Pregnant Mothers with Low Body Mass Index



children, ranging between 41%-51%. Prevalence was highest in the December months.

Prevalence of Stunted Children 12-23 Months of Age (SEE FIG. 4)

Stunting (low height for age) among children is considered an indicator of chronic undernourishment of a population. It occurs when child growth in height is limited due to a diet low in quantity or quality of food for a prolonged period of time. The WHO classifies a stunting prevalence among children younger than five years ≥ 40% as "very high" and levels ≥30-39% as "high".[4]

Importance: Studies have found that stunted children (up to 2 years of age) were at a much greater risk for dying than non- stunted children[5], related to lower cognitive ability[6], and increased risk of obesity as an adult.[7]

Data Collection Method: Children were classified as stunted if their height for age was less than -2 SD from the median of the reference population (NCHS). Length (cm) was measured by a trained enumerator, age was determined using a local calendar, and data was verified by quality control teams.

Findings: *General* - Most rural provinces had levels of stunting among children 12-23 months of age classified as "high" by WHO standards for children 12-59 months for all rounds, and in general these levels did not decline. *South Sulawesi* - Stunting increased 15% within a 3 year period. The prevalence of stunting was 37% in Apr-Jun 00 and increased to 52% in Jun-Sep 03. This is among the highest levels documented throughout the four-year period of data collection and is classified as a "very high" level by WHO for children 12-59 months old.

Prevalence of Wasted Children 12-23 Months of Age (SEE FIG. 5)

Wasting (low weight for height) among children is an indicator of acute deprivations in nourishment and food security. The WHO classifies prevalence of wasting among children younger than five years ≥ 15% as a "critical emergency situation" and levels ≥ 10-15 % as a "serious emergency situation". [4]

Importance: Wasting is often thought of as an effect of growth reversal in terms of weight lost due to a reduction in fat. Moderate to severe levels of wasting are associated with child mortality.[8]

Data Collection Method: Children were classified as wasted if their weight for height was less that -2 SD from the median of the reference population (NCHS). Weight (kg) and length (cm) were measured by a trained enumerator and data was verified by quality control teams.

Findings: *General* - Wasting among rural Indonesia children 12-23 months of age varied between 9-13%. *South Sulawesi* - The prevalence of wasting has gradually declined from 16% in Jun-Aug 01 to 8% in Jun-Sep 03. That is from a level classified as a 'critical emergency' by the WHO classification to below the level of a 'serious emergency'.

Fig 7. Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age

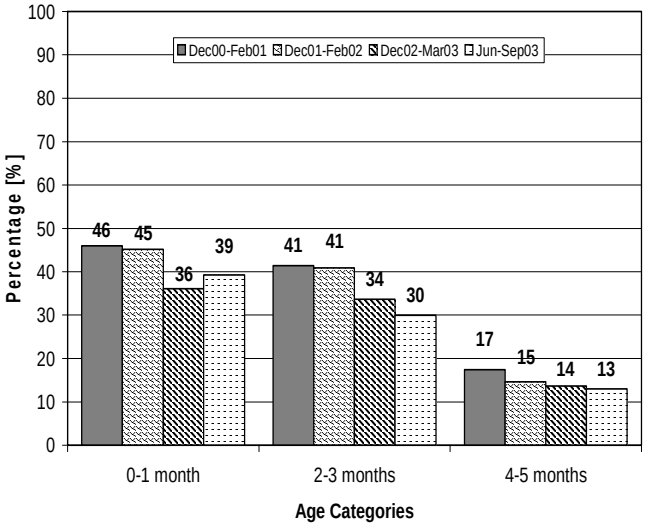
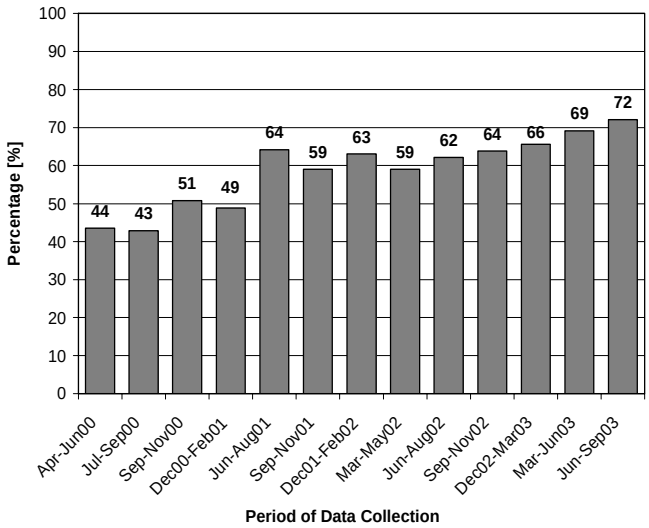


Fig 8. Household Use of Adequately Iodized Salt



Percentage of Non-Pregnant Mothers with Low Body Mass Index (SEE FIG. 6)

The prevalence of maternal thinness is a good indicator for shortage of food in a population.

Importance: Low maternal BMI (body mass index) increases the likelihood of maternal morbidity during pregnancy and the post partum period. It leads to an increased risk of having a low birth weight baby and can decrease the quality and quantity of breast milk; both directly affecting the nutritional status of infants. It also decreases physical output and productivity, which includes maternal caring practices.

Data Collection Method: Maternal thinness was defined as having a BMI below 18.5 kg/m2. BMI is calculated by dividing body weight (kg) by height (m) squared.

Findings: *General* - Maternal thinness appeared to decline slightly in rural provinces. The most notable similarity was the tendency for levels to increase in rounds of data collection between December and February. *South Sulawesi* - Levels of maternal thinness did not decline much over time. The prevalence of low BMI was 12% in Apr-Jun 00 and 9% in Jun-Sep 03.

Prevalence of Exclusive Breastfeeding among Children 0-6 Months of Age (SEE FIG. 7)

As recommended by WHO, it is crucially important for a child development to be exclusively breastfed for the first 6 months of an infant's life as breast milk meets all the nutritional needs of the child and provides enhanced protection from illness and infections. Current Indonesian recommendations follow these guidelines; although in the past exclusive breastfeeding was recommended for just 4 months.

Importance: Breast milk composition provides for the changing nutritional needs of rapidly growing babies. It provides resistance to infection through passive immunity, but also protects infants from disease by eliminating contaminated water and food sources from their diet.

Data Collection Method: The mother was asked if she currently breastfeeds and, if so, whether or not her child ever received other foods or liquids. The designation of a child as exclusively breastfed means that the child has not received any other food or liquids besides breast milk.

Findings: *General* - The prevalence of exclusive breastfeeding for the first 6 months of life tended to decline in rural provinces. *South Sulawesi* - Exclusive breastfeeding rates were low in South Sulawesi but not as low as in other rural areas and they did not decline as much. By Jun-Sep 03, the proportion of infants that was exclusively breastfed was 39% among those aged 0-1 mo, 30% among those aged 2-3 mo and 13% among those aged 4-5 mo.

Household Use of Adequately Iodized Salt (SEE FIG. 8)

Adequate salt iodization very nearly eliminates all of the consequences of iodine deficiency and its associated disorders. Since this is the case, a high

Fig 9. Vitamin A Intake of Children 12-59 months of age

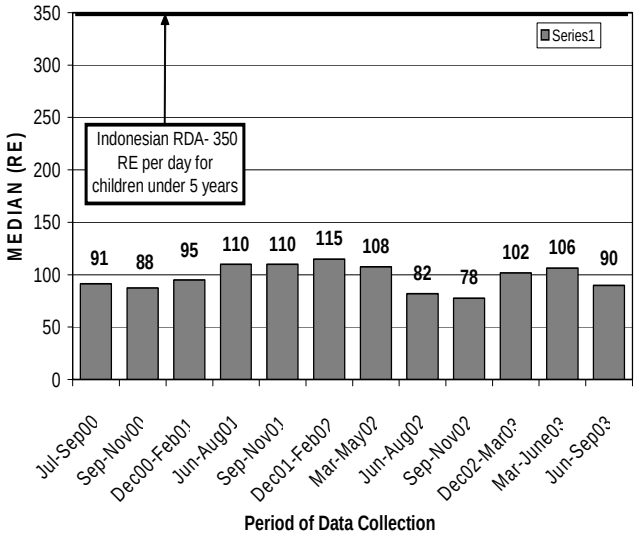
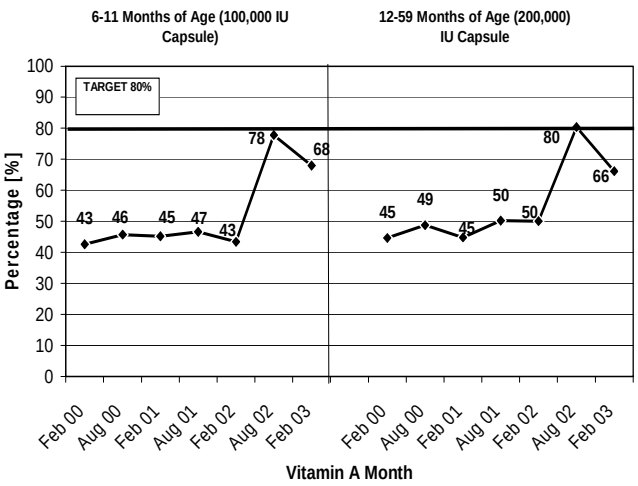


Fig 10. Vitamin A Capsule Coverage among Children 6-59 Months of Age



level of adequately iodized salt usage indicates a high level of protection against the occurrence of iodine deficiency disorders.

Importance: Iodine deficiency causes lowered cognitive development, hypothyroidism, goiter, lack of energy, and impaired fetal development.[9]

Data Collection Method: The iodine content of household cooking salt was evaluated with a semi-quantitative rapid test kit. Salt with at least 30ppm of iodine tested positive for adequate iodization.

Findings: *General* - Household use of adequately iodized salt has declined slightly in rural areas, reaching 60-70% during the last rounds. *South Sulawesi* - Contrary to most of the other provinces, the use of adequately iodized salt increased steadily, from 44% in Apr-Jun 00 to 72% in Jun-Sep 03.

Vitamin A Intake of Children 12-59 months of age (SEE FIG. 9)

Dietary intake of vitamin A is an important indicator of whether or not a chronic problem of vitamin A deficiency is likely to exist and indicates the need for interventions to control Vitamin A Deficiency (VAD).

Importance: The severest forms of VAD are defined in terms of clinical symptoms, which include night blindness, ulceration of the cornea and full blindness. It is estimated that 70% of children blinded by VAD will die within the year, and mortality rates ranging from 3-26% have been observed among children with corneal disease.[10] However, long before eye damage can be observed, other body functions are impaired. This includes immune function, which leads to increased morbidity and mortality, often even before the clinical eye-signs of VAD have been observed.

Data Collection Method: The 24-hour Vitamin A Semi-Quantitative (VASQ) method developed by Helen Keller International[11] was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything their child ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake was well below the Indonesian Recommended Daily Intake and has improved little over time. *South Sulawesi* - Vitamin A intake in South Sulawesi was less than one-third of the children's Recommended Daily Intake.

Vitamin A Capsule Coverage among Children 6-59 Months of Age (SEE FIG. 10)

In recognition of vitamin A deficiency (VAD) as a public health problem, the government of Indonesia has set a target of 80% coverage with vitamin A capsules (VAC) among children 6-59 months of age.[12] All children in this group are to receive age-appropriate doses of vitamin A twice a year. As there are two VA campaign distribution months each year (February and August), the achievement of this goal can be evaluated by estimating the level of coverage for each.

Fig 11. Total Vitamin A Intake among Non- Pregnant Mothers

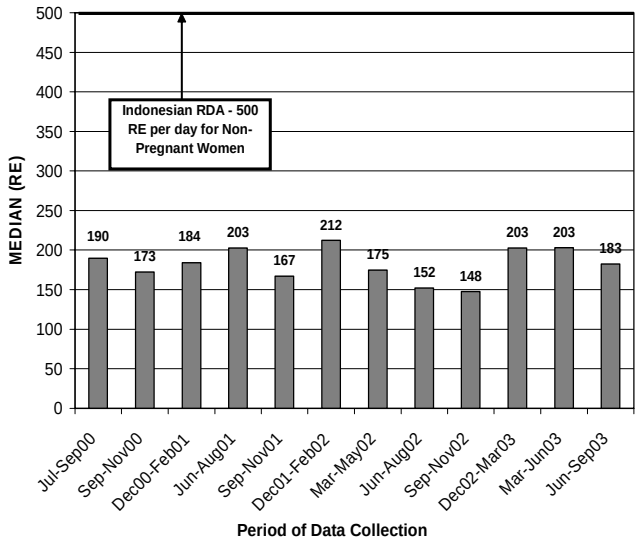
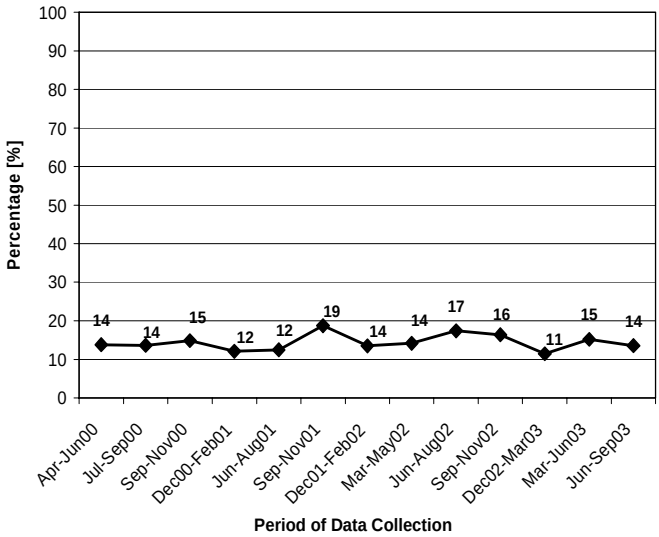


Fig 12. Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery



Importance: Supplementation with VAC has been shown to reduce clinical symptoms of VAD such as xeropthalmia and to reduce morbidity, mortality, and blindness rates among children. In Indonesia, a 34% reduction in mortality was observed among children supplemented with VAC.[10] Also, a meta- analysis of eight mortality trials indicated that improving VA status among children 6-59 months of age reduces all-cause mortality by 23%.[13]

Data Collection: Mothers were asked whether or not their child received a VAC during the last campaign month, February or August. The age of the child at the start of the campaign month was determined based on the child's birth date.

Findings: *General* - Vitamin A capsule coverage has increased considerably, reaching the target of 80% coverage in August 2002 and February 2003. *South Sulawesi* - Until Feb 02 VAC coverage was below 50%. In August 2002 coverage increased to a high of 78-80%, nearly reaching the target, but then declined again to 66-68%.

Total Vitamin A Intake among Non- Pregnant Mothers (SEE FIG. 11)

Low total dietary vitamin A (VA) intake among populations where food consumption is the predominant source of VA indicates that vitamin A deficiency is likely to exist.

Importance: VAD has the same consequences for the mother as the child. These include increased morbidity and severity of illness, exacerbated anemia, and blindness and death (refer to *Total Vitamin A Intake among Children 12-59 Months)*. However, maternal deficiency has the added consequence of contributing to the poor health status of the newborn. One study in rural Nepal found an increased mortality rate of 63% among infants of night blind women.[14] Furthermore, VAD among lactating women lowers the VA concentration of breast milk, which can lead to a VAD among breastfed infants.

Data Collection Method: The 24- hour Vitamin A Semi- Quantitative (VASQ) method was used to assess total VA intake for a 20% sub sample of households. Mothers were asked to recall everything they ate or drank in the last 24 hours, and details about portion sizes and cooking methods were recorded. Vitamin A intake was estimated based on portion size and vitamin A content of the food.

Findings: *General* - Vitamin A intake among non-pregnant mothers was less than half of the Indonesian Recommended Daily Intake (even less for mother that are lactating since their RDI is higher) for every rural province in every round of data collection. *South Sulawesi* – Vitamin A intake was between 30-40% of the Recommended Daily Intake for non-pregnant, non-breastfeeding women.

Maternal Receipt of Vitamin A Capsule within 4 Weeks of Delivery (SEE FIG. 12)

The government of Indonesia's official policy is for 100% of post partum women to receive a high dose VA capsule within 4 weeks of delivery. However,

Fig 13. Complete Immunization Status of Children 12-17 Months of Age

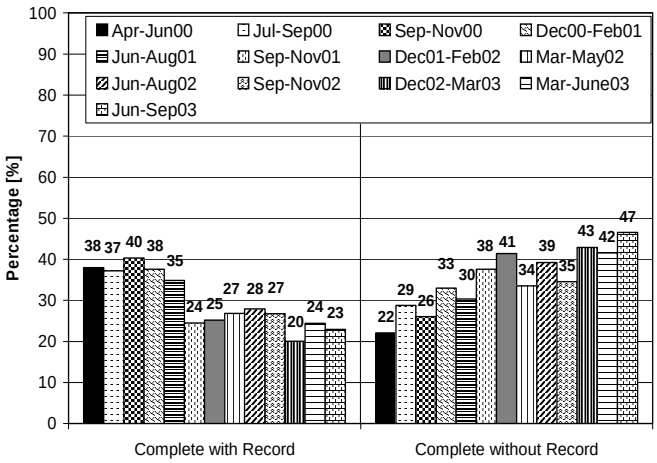
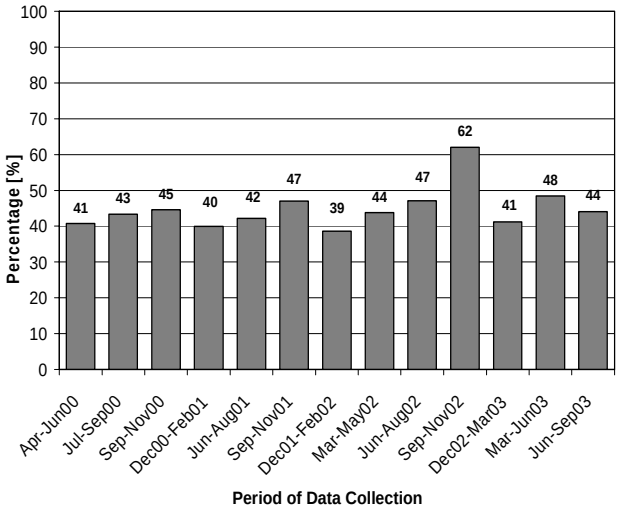


Fig 14. Posyandu Attendance in the Previous Month



there is currently no wide scale national program or delivery system in place to reach all women. Women presently receive capsules at health centers or from some cadres (volunteer health worker) and midwives.

Importance: Vitamin A supplementation of women after delivery in areas where vitamin A deficiency (VAD) is a public health problem protects infants and mothers from developing severe VAD. The health of women improves by preventing further depletion of VA stores due to the losses resulting from lactation. Supplementation increases the vitamin A content of breast milk, which benefits the infant's nutrition. Even infants of healthy mothers with proper nutrition have marginal VA stores at birth, and these stores must be built up very quickly to ensure the health of the infant. Studies show that supplementing lactating mothers with VA increases the vitamin A status of infants for 2-6 months.

Data Collection Method: Mothers who had given birth in the previous 12 months were asked if they received a VA capsule within 4 weeks of the delivery of their last child.

Findings: *General* - Maternal receipt of Vitamin A capsules post partum 4 weeks after delivery was very low at ~15%. *South Sulawesi* - Post partum VA supplementation coverage in South Sulawesi increased slightly, but remained below 20%.

Complete Immunization Status of Children 12- 17 Months of Age (SEE FIG.13)

High levels of complete immunization coverage rates among children indicate that they will be protected from infectious diseases, and the resulting morbidity and mortality that result. By separating complete immunization rates into groups with and without an official record, the level of confidence that can be placed in these figures can be better assessed. The government target for completed immunizations is 80% and the immunizations should be completed by 12 months of age.

Importance: Morbidity and mortality in a population can be significantly lowered with high levels of immunization (> 80%). High immunization rates not only protect those immunized, but also members of the population who are not immunized.

Data Collection Method: Mothers were asked if their children received each of the following vaccinations: tuberculosis (BCG), Diphtheria, Tetanus, and Pertusis (DTP, 3 times), polio (3 times), hepatitis (3 times), and measles. If mothers had an official record of each vaccination, the child was classified as complete, with record. If mothers said the child was completely immunized, but did not have any or only a partial official record, the child was classified as complete, without record. Incomplete immunization was recorded if any one of the vaccinations was not received.

Findings: *General* - Complete immunization documented by an official record declined, while

Fig 15. Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

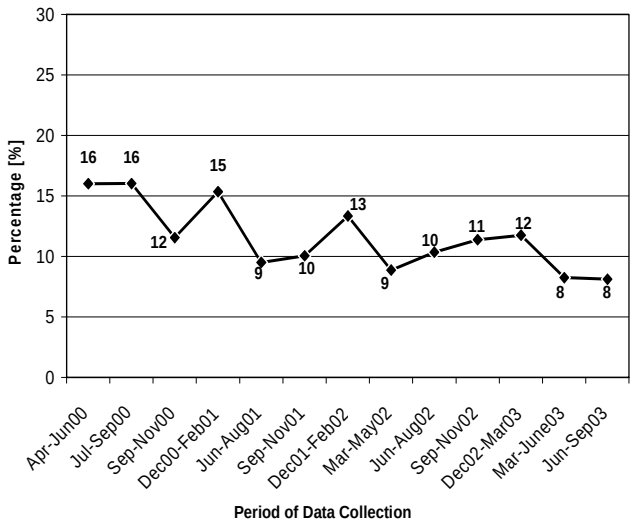
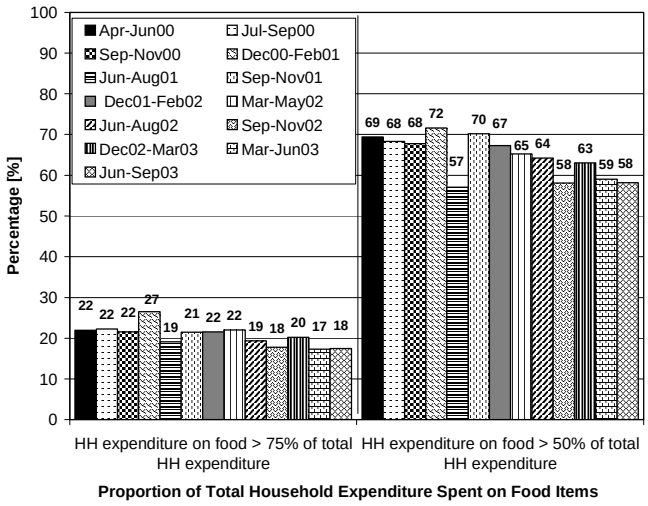


Fig 16. Household Expenditures on Food Items



completed immunization without an official record increased. Combined, levels varied between 65-75%. *South Sulawesi* - Total completed immunization status, with or without an official record, remained at 60-70% over time. However, the proportion with an official record declined considerably to a low of 20% and without an official record increased to 47% by Jun-Sep 03.

Posyandu Attendance in the Previous Month

(SEE FIG.14)

The *Posyandu* system was designed to combat the poor health and nutrition situation among Indonesian children during the 1970's. Its effectiveness has been debated; but continued monitoring of household attendance is important because it points to the viability of the system, and indicates the ability to monitor health status and receipt of immunization.

Importance: Children under five years of age are supposed to attend the *Posyandu* (integrated health post at sub village level) every month in order to benefit from a number of services, including growth monitoring, immunization, and vitamin A capsule distribution. Mothers can also receive family planning services. Furthermore, most government maternal and child health surveillance information is obtained from *Posyandu r*ecords. If a significant proportion of the population is not regularly attending, the information collected on health service performance will be incomplete.

Data Collection Method: Mothers were asked to remember the last time they brought their child under-five years of age to the *Posyandu*.

Findings: *General* - *Posyandu* attendance within the previous month tends to be relatively high in rural areas (63-75%). *South Sulawesi* - *Posyandu* attendance in South Sulawesi was low (generally <50%), but increased somewhat with slight peaks in September-November periods.

Percentage of Children 12-23 Months of Age that Suffered from Diarrhea in the Previous 7 Days

(SEE FIG.15)

Diarrhea is a good indicator of general morbidity because it occurs often enough to monitor and its definition is easy to communicate. It is also a reflection of water quality and sanitation, as improvements in both have been associated with decreases in the reduction of morbidity due to diarrhea.[15]

Importance: Proper sanitation is one of the most important public health measures as it directly relates to the incidence and severity of disease and infection. This influences morbidity and mortality, including nutritional status, as frequent and severe illness is known to adversely affect nutrition. Diarrhea, in particular, has been noted as a contributor to poor nutritional status, and is an underlying cause of early childhood and infant death.

Data Collection Method: Mothers were asked if their child suffered from diarrhea any time during

the previous 7 days. A diarrhea episode was defined as defecating 3 or more loose or watery stools in a day.

Findings: *General* - Overall, diarrhea among children in rural areas declined from 12% to 6%. *South Sulawesi* - Diarrhea among children in South Sulawesi tended to peak between December and February, but still declined overall over time from 16% in Apr-Jun 00 to 8% in Jun-Sep 03.

Household Expenditures on Food Items

(SEE FIG.16)

The proportion of total expenditures on food has been suggested as a measure of poverty because the poor tend to spend a higher proportion of their total expenditures on food. Expenditure data is used in this report rather than income because generally expenditures are thought to be a more valid measure of economic stability.[16]

Importance: Economic stability is a key component to the reduction of poverty and in maintaining food security. Both poverty and food security directly impact the health and nutrition status of all members of the household, particularly of women and children. Therefore, monitoring the economic environment provides important contextual information that is crucial to the planning, development, and implementation of health policy and programs.

Data Collection Method: Mothers were asked how much money (in *Rupiah*) their household spent on a list of food and non- food items. The monetary value of borrowings, transfers, and self-produced items were estimated, and included in the calculation. The list was considered to be a complete inventory of all possible expenditures for rural area and urban slum households in Indonesia based on extensive pre-testing and multiple years of data collection. Total expenditures on all items were divided by the total expenditure on food items to determine the proportion spent on food. Then, the percentage of households spending more that 50% and 75% of their total expenditures on food was calculated.

Findings: *General* - The proportion of total household expenditure spent on food items has declined since data collection began, but is still quite high with 60-70% of households spending >50% on food. *South Sulawesi* - The percentage of families spending more than 50% of their total expenditure on food has declined gradually from 72% in Dec 00 - Feb 01 to 58% in Jun-Sep 03. There was less decline in the proportion that spent >75% on food.

Conclusions

General - In summary, the overall picture for mothers and children under five years of age demonstrates that few indicators in either urban slum areas or rural areas have improved dramatically between late 1999 and second half of 2003. The two exceptions to this are the dramatic increase of vitamin A capsule coverage for children, especially for those aged 6-11 mo, but also among those aged 12-59 mo there was a considerable increase, and the decline of diarrhea prevalence by approximately 50%. *South Sulawesi* – Although rates of anemia amongst children 12-23 months of age recently declined to 61%, they were higher than in most other rural areas. Prevalence of stunting among 12-23 mo old children increased to a very high level of 52% and the prevalence of exclusive breastfeeding of 0-5 mo old infants decreased. Vitamin A capsule coverage for children 6-59 months of age was just below 70%. Completed immunization was reported for 60-70% of young children, however, by Jun-Sep 03, this could only be verified by an official record for 20% of children. *Posyandu* attendance was below 50%. A positive finding was the steady increase of the availability of iodized salt at household level from 44% to 72%.

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FOR INFORMATION AND CORRESPONDENCE, CONTACT:

Dr. Rachmi Untoro, M.P.H.
Directorate of Community Nutrition
Ministry of Health
Jl. H.R. Rasuna Said
Blok X 5 Kav. 4-9
Jakarta 12950
Indonesia
Tel (62-21) 520-3883
Fax (62-21) 521-0176
E-mail: Rachmi@gizi.net

Dr. Soewarta Kosen, M.P.H., Dr.PH.
National Institute for Health
Research & Development
Jl Percetakan Negara No. 23A
Jakarta 10560
Indonesia
Tel (62-21) 424-3314 / 426-1088 ext. 192
Fax (62-21) 421-1845
E-mail: kosen@centrin.net.id

- Martin W. Bloem, M.D., Ph.D.
  Senior Vice President, Chief Medical Officer, Regional Director, Asia Pacific, Helen Keller International
  E-mail: mwbloem@singnet.com.sg
- Regina Moench-Pfanner, M.Sc., Ph.D.
  Regional Coordinator
  E-mail: remoench@singnet.com.sg
- Saskia de Pee, Ph.D.
  Regional Scientific Advisor
  E-mail: sdepee@compuserve.com
- Federico Graciano
  Communications Officer
  E-mail: graciano@singnet.com.sg
- John Palmer
  Country Director, Indonesia
  E-mail: jpalmer@hki-indonesia.org
- Ame Stormer, MA, M.P.H.,Ph.D.
  Nutrition & Health Surveillance System Program Director
  E-mail: astormer@hki-indonesia.org
- Elviyanti Martini, M.Sc
  Field Operation and Data Management Director, Indonesia
  E-mail: emartini@hki-indonesia.org
- Roy Tjiong M.D.
  Deputy Country Director
  E-mail: rtjiong@hki-indonesia.org

Helen Keller International
Asia Pacific Regional Office
20 Cross Street
#20-13 China Court
Singapore 048422
Tel (65) 6236 1972
Fax (65) 6327 4293

Helen Keller International
Indonesia Country Office
P.O. Box 4338
Jakarta Pusat
Indonesia
Tel (62-21) 719-9163
Fax (62-21) 719-8148

For general enquiries:
Federico Graciano
E-mail: graciano@singnet.com.sg

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