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# SULEJA COMMUNITY SURVEY

**Final Report**

**November 1991**

**A Survey of Mothers' Knowledge and Treatment Practices related to Primary Health Care with emphasis on Immunization, Diarrhoea, and Fever**

**Conducted by:**
**Suleja Local Government Health Department**
**Niger State Ministry of Health**

**Technical assistance provided by:**
**Combatting Childhood Communicable Diseases (CCCD) Project**
**U.S. Agency for International Development**

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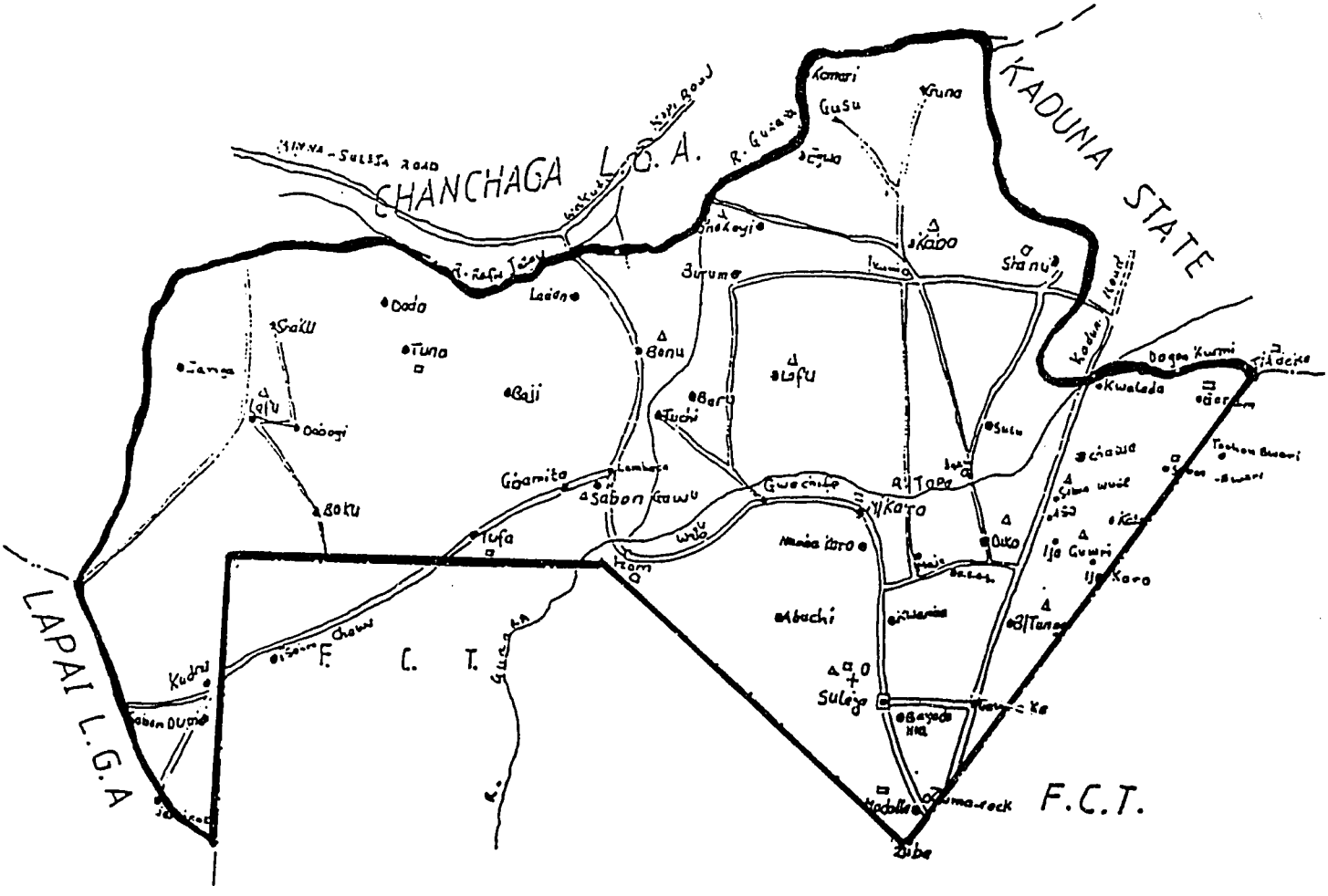
# MAP OF SULEJA LOCAL GOVERNMENT AREA




**Key**

| | |
|---|---|
| Hospital | + |
| MCH | △ |
| Health Clinic | O |

## SUMMARY OF FINDINGS

The Suleja Community Survey was conducted in November 1991. It provides information about mothers' knowledge and treatment practices related to three components of Primary Health Care — immunization, diarrhoea, and fever/malaria — as well as antenatal care practices and tetanus toxoid coverage. Community survey data, combined with information from facility assessments and drug quality studies, will provide a useful planning tool for the Primary Health Care team to establish health priorities and develop short and long term objectives for improving the quality of health service delivery in Suleja LGA.

Immunization activities are well established in Suleja. Among 12-23 month olds, BCG coverage is 91% when card and history are considered. Access to childhood immunization, reflected by corrected DPT1 coverage by card and history, is high (86% by card and history, 64% by card only). Coverage decreases to 56% coverage (43% by card) with DPT3. Corrected immunization coverage has remained low mainly because of high drop out rates between DPT1 DPT3 (33%) and between DPT3 and measles (27%). Higher corrected coverage among children aged 12-23 months compared with those over two years os age indicates that immunization coverage has improved in Suleja over the past five years.

Despite recent improvements, coverage for some specific antigens remains relatively low (33% measles coverage, 23% by card). Only one in ten children aged 12-23 months were fully immunized before their first birthday. Specific health messages must be conveyed to encourage caretakers' to accept services for their children. These messages must emphasize the benefits of immunization and the need for subsequent doses, and educate and reassure mothers about potential side effects.

While the majority of women in Suleja who had delivered in the past year were immunized with the first and second doses of tetanus toxoid (87% and 71%, respectively, card and history), corrected coverage for TT3 through TT5 is zero, reflecting a misunderstanding of the recently adopted five-dose TT schedule in Nigeria. Card confirmed TT coverage is also very low since only 20.6% of mothers had TT cards. Missed opportunities to deliver tetanus toxoid immunization during pregnancy are very high in Suleja, given that 89% of caretakers who delivered during the 12 months prior to the survey paid at least one antenatal visit to a health facility. Health workers need re-orientation on the new TT schedule and strategies to implement it. Facility-level integration of PHC services and provision of daily immunization will help to reduce missed opportunities for immunizing both women and children.

Both diarrhoea and fever remain major causes of childhood morbidity and mortality in Suleja. About 21 percent of children (20.8%) had an episode of diarrhoea in the two weeks prior to the survey, and one-quarter (25.9%) had an episode of fever. On the average, each child under five years in Suleja experienced 4.6 episodes of diarrhoea and 8.8 episodes of fever in 1991. Frequent episodes of diarrhoea and other infections in children with borderline nutrition, can have a serious impact on nutritional status and growth.

During episodes of diarrhoea, almost all mothers continued breast-feeding and giving home fluids, but 42.2% stopped solid food. Forty-four (43.5%) percent of mothers gave sugar-salt-solution at home for diarrhoea; 54.7% of these mothers could prepare the solution correctly. Only 12% of all children with diarrhoea received correctly prepared SSS in adequate quantity.

Among children with fever, over half (65.1%) were given antimalarial medicine (chloroquine) at home. One in four children (25.9%) were given an antibiotic and 68.9% were given paracetamol. Seventy-four percent of children with fever were given increased fluids and a sponge birth. A substantial number of mothers continued to give inappropriate drugs and herbs at home to their children with diarrhoea and/or fever.

The high use rate of antimalarials and other drugs in Suleja may relate to the semi-urban nature of the Local Government (in close proximity to Abuja), and the relatively easy access to health providers by the majority of Suleja inhabitants. Health care services and drugs/medicines are available through a wide range of sources, including medical practitioners (both government and private), chemists, patent medicine vendors, and street or market sellers. Private sector providers are especially predominant in Suleja, with six private hospitals and a number of smaller private clinics.

About one half of children with diarrhoea (50.6%) and 60.2% of children with fever were taken to a health facility for treatment. Oral rehydration (ORS or SSS) was received by 44.8% of children with diarrhoea, and chloroquine (either tablets or syrup) was received by 82.2% of children with fever. Over half of the children with fever (68%) were given an antimalarial injection.

Information on chloroquine dose given by mothers over a three day period was generally associated with under-dosing for syrup and over-dosing for tablets. For both tablets and syrup, it appears mothers do not halve the chloroquine dose on the third day of treatment as indicated in national malaria treatment guidelines. Some mothers used chloroquine syrup to treat 4-year old children instead of the recommended tablets, contributing to under-dosing.

Mothers' perception of the diarrhoea or fever illness as "severe" had a significant influence on home treatment practices. For children with diarrhoea, mothers attempted to treat at home with SSS, herbs, and fluids significantly more often when the diarrhoea was perceived as severe. Mothers sought help outside the home (at a health facility or traditional healer) significantly more often for severe cases. Moreover, mothers took children with severe diarrhoea more quickly to a health facility, within 48 hours of onset.

About one-third of the mothers in Suleja did not understand the reason for their child's diarrhoea. Specific health messages must be conveyed to aid mothers understand their health problems, especially among children. Communities can and must be encouraged to take ownership of their health problems, understand why they occur, and experience the impact of positive behavior change in reducing childhood morbidity and mortality.

# 1 INTRODUCTION

## 1.1 Background: Suleja Local Government

Suleja Local Government*, previously one of ten Local Government Areas (LGA) in Niger State, is situated in the eastern part of the state (see map) with a land area of 5,247 square kilometers. It is bounded on the north by Chanchaga LGA, on the West by Lapai LGA, southward by the new Federal Capital Territory, and on the northeast by Kaduna State.

In August 1991, Suleja was divided into two LGAs, Suleja and Gurara. This was done as part of a Federal Government of Nigeria initiative designed to bring government closer to the people through creation of new states and LGAs. Recently released population census figures indicate that the former Suleja had a combined 1991 population of 171,197 (Suleja-125,259; Gurara-45,938). Previous population projections (based on 1963 census figures and projected annual growth rates of 2.5% to 1976 and 3.1% thereafter) estimated Suleja's population at 326,403.

The former Suleja was composed of five districts (Suleja, Gawu, Gurara, Iku, and Tapa). Gurara, Gawu and Tapa now comprise Gurara Local Government, with Suleja and Iku comprising the new Suleja. Each district has its own headquarters and several medium and smaller settlements. The main occupations of Suleja's inhabitants include farming, hunting, and trading in foodstuffs. Although Suleja town is the only town in the LGA that has pipe-borne water supply, the RUWATSAN Project and DFFRI/FMOH have assisted in the provision of bore holes and the maintenance of hand pumps.

The political structure of the Local Government includes an executive Chairman, Vice-Chairman, Supervisory Councilors, and Secretary, served by Heads of Departments. The traditional system of governance includes the Emir of Suleja, district, ward and village Heads.

Within the LGA Health Department, the Primary Health Care Division is divided into five sections: 1) Immunization, Disease Control and WATSAN, 2) Monitoring and Evaluation, 3) Maternal and Child Health/Family Planning and Nutrition, 4) Essential Drugs, Equipment and Supplies, and 5) Health Education and Women Activities. Each section is headed by an Assistant PHC Coordinator, with overall technical direction and support provided by the LGA PHC Coordinator. Health services are provided through Suleja General Hospital, six private hospitals, approximately 20 health clinics, 17 dispensaries (both public and private), and 3 Maternal and Child Health Clinics.

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* *This survey was carried out in the former Suleja Local Government, which comprised both Suleja and Gurara LGAs. The findings presented in this report apply to Suleja LGA as it existed at the time of the survey.*

Following the LGA split, health facility staff from the former Suleja were redeployed to their parent LGAs and a new PHC infrastructure/health department was established for both LGAs. A new administration with its headquarters at Gawu Babangida has been established in Gurara. These recent and dramatic changes in LGA infrastructure and health personnel have resulted in a situation which constrains the Health Departments in both LGAs, with shortages of trained personnel and inadequate logistics support for PHC implementation.

PHC Implementation: Suleja is in the very early stages of Primary Health Care implementation. In 1989, a "Revised Proposed Implementation Plan for Model Primary Health Care in Suleja" was completed. This document describes priority health problems and potential interventions, along with obstacles and constraints. As of early 1992, both Suleja and Gurara are considered "willing" LGAs, but have not yet benefitted from Federal Ministry of Health "seed money" support funds. Bamako Initiative is not active in Suleja or Gurara, and the provision of essential drugs continues to be a problem area.

State Ministry of Health supervision of PHC activities in Suleja is coordinated through the Zonal Health Office in Suleja. The Zonal Office, in close proximity to Suleja General Hospital, has good accommodations and houses the LGA cold store (used for storage of vaccines, oral rehydration sachets, and other supplies). Staff at the Zonal Office include an officer in-charge of general administration and a zonal officer each for maternal and child health (MCH)/family planning(FP), statistics/monitoring and evaluation (M & E), health education and environmental sanitation, and immunization/control of diarrheal diseases (CDD) and disease control.

The Zonal Office has some logistics support for supervision (two vehicles and a motorcycle), a standby generator (though Suleja is connected to the national grid and enjoys a regular supply of electricity), and a telephone line for regular communication with Minna, the state capital. The officer in-charge of the zonal health office is a member of both the LGA PHC Implementation and Advisory Committees.

Since mid-1991, the Combatting Childhood Communicable Diseases (CCCD) Project has provided support for Primary Health Care in Suleja. Major activities supported by CCCD (in line with Federal Ministry of Health guidelines for PHC implementation) include:

- establishment of district and village health development committees
- house numbering and placement of home-based records
- training of voluntary village health workers (VHW) and traditional birth attendants (TBA)
- PHC supervision support through vehicle repair/maintenance
- establishment of PHC library at LGA Health Department

- orientation workshops for senior LGA decision makers
- training on clinical management of diarrhoea
- strengthening/establishment of ORT units and corners

## 1.2 Objectives of the Survey

The Suleja Community Survey was conducted to obtain information about knowledge and treatment practices related to Primary Health Care among mothers of children under five years old in the Local Government. Special emphasis was placed on obtaining information about immunization, diarrhoea, nutrition, and fever. Among mothers, information was obtained on antenatal care practices and tetanus toxoid coverage.

The community survey had the following specific objectives:

1. to estimate immunization coverage among children, particularly those aged 12-23 months
2. to determine the incidence of diarrhoea and fever among children under five years during the two weeks prior to the survey
3. to describe knowledge and treatment practices among mothers of children with diarrhoea, including use of sugar-salt-solution
4. to describe knowledge and treatment practices among mothers of children with fever, including use of antimalarial drugs
5. to determine tetanus toxoid coverage and antenatal care practices among mothers of children under five years

## 1.3 Methods

**Sampling:**

The Suleja Community Survey was carried out in October 1991. The sampling method used was a cluster scheme based on "probability proportionate to size" (1-3), with 40 clusters randomly selected. Forty clusters were randomly chosen from a 1991 population list of towns, villages, and wards in Suleja. These were added and divided by forty to obtain the sampling interval. A random number between one and the sampling interval was obtained

using a table of random numbers. The geographic unit (town or village) within which this number lay was selected as the first cluster. Remaining clusters were chosen by adding the sampling interval, following standard EPI cluster survey methodology. Appendix A provides a list of the forty selected clusters.

The target group for this survey comprised living children under five years of age. Sample size was calculated using standard formulae for cluster sampling, with the following assumptions:

- the incidence of disease in the 2 weeks prior to the survey is at least 15%
- at least 40% of children receive treatment and at least 50% of these children are treated "correctly"
- after at least two years of programmatic intervention, a post-intervention survey should detect an increase of at least 10% in the proportion of children receiving correct home treatment
- the power of the study (the probability of correctly rejecting the null hypothesis when it is false) should be 80% and the alpha error (significance level) 5%
- the maximum design effect anticipated should be 4.0

Based on these assumptions, a sample size of approximately 1600 children less than 5 years of age was calculated.

In this study, a "household" was defined as a mother (or caretaker) and all her children (or other children living with her in the locality for at least the past 6 months) eating from the same cooking pot. Based on an assumption of 1.41 children/mother, 1160 mothers/caretakers (29 per cluster) and their children were selected and interviewed.

Within each cluster, a starting household was selected by randomly choosing a direction at the center of the cluster. All houses lying in the direction chosen were numbered from the center to the edge of the cluster, and one of the numbered houses was randomly chosen for the first interview. Interviewers then selected the next nearest household and carried on in this fashion until 29 mothers with their children under 5 years had been interviewed.

**Survey Questionnaire:**

The questionnaire was written in English, based on a list of more than fifty key indicators

which address immunization coverage and mothers' knowledge and practices. It was divided into 5 sections (see Appendix B):

I. Mother/Household Information
II. Nutrition/Immunization
III. Diarrhoea
IV. Fever/Malaria
V. Mother Information

The questionnaire was field tested in two demonstration clusters in Hausa and Gwari (the commonest local languages) and revised.

The immunization status of each child under 5 years was assessed using information available from his or her health card and history obtained from the caretaker. If a child had diarrhoea or fever (defined as episodes of these illnesses, as perceived by the caretaker) during the 2-week period prior to the interview, separate questionnaires were completed. For both diarrhoea and fever, mothers were asked if the child experienced "severe" illness (severity as defined by the caretaker) over this 2-week period.

For those who reported episodes of diarrhoea or fever, information was obtained on presenting symptoms, home treatment practices, rate of use of health facilities, delay before seeking treatment, and treatment received at the health facility. Questions were asked about preparation and administration of salt-sugar-solution (SSS) and daily chloroquine dosages administered as treatment for fever/malaria at home and at the health facility.

Mothers were asked their age and immunization status for tetanus toxoid. Those who gave birth in the previous twelve months were questioned further their antenatal care practices.

**Survey personnel:**

Twelve students from Minna School of Health Technology and eight health staff from the Suleja Primary Health Care Department were recruited as interviewers, and paired into ten teams. At least one member of each team was fluent in Gwari and the other in Hausa. Five Supervisors with previous survey experience were recruited from the State Ministry of Health, Minna, and the Zonal Health Office, Suleja (see Appendix C).

Both interviewers and supervisors received five days training prior to the start of field work. Training included an overview of survey goals and objectives, technical issues related to immunization, diarrhoea and fever, and interviewing techniques. Questions on the interview forms were reviewed, and the correct translation into Gwari or Hausa confirmed. The training emphasized role play in English, Hausa, and Gwari. Two field exercises in demonstration clusters were carried out.

**Chloroquine dosage:** Mothers who gave chloroquine to their children with fever were asked the form of chloroquine preparation (tablet or syrup), number of times the medicine was given each day (over a three day period) and the amount of chloroquine administered each time.

The Federal Ministry of Health and Social Welfare has published recommendations for chloroquine administration, specifying 25 mg/kg body weight of chloroquine over a three-day period, with 10 mg/kg on days 1 and 2 and 5 mg/kg on day 3 (4). Where weight is not available, dosage guidelines are provided for different age groups: children aged <1 year, aged 1-3 years, aged 4-6 years. In this survey, the total daily dose received per child over a three-day period was calculated. Comparing this dose with the FMOH recommended dose by age, the actual dose administered each day was classified as low, correct, or high.

The following assumptions were made in calculating total dose of chloroquine administered to a child each day: 1) all chloroquine syrup contained 50 mg chloroquine/5 ml, 2) chloroquine syrup was administered using a 5-ml teaspoon, 3) chloroquine tablets contained 150 mg chloroquine base, and 4) all chloroquine given was potent and of good quality.



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## 2. GENERAL FINDINGS

### 2.1 Completed Interviews

It took 15-45 minutes to administer a questionnaire to each mother, and every day the interviewer teams spent six to ten hours in the field. It took two full days for an interviewer team to complete all interviews in a cluster. The survey field work was completed in 10 days.

During the survey, a total of 1160 mothers were interviewed. Among these mothers, there were a total of 1638 living children under five years of age. The average number of children under five years per mother was 1.41, with a range of 1-4 children under five per mother.

A total of 340 (20.8%) children under 5 years of age had a history of diarrhoea in the 2 weeks prior to the survey (95% confidence interval (CI), 17.5-24.1%; design effect (DE), 2.8). The caretakers reported that 425 (25.9%) children under 5 years of age had at least one febrile episode in the 2-weeks preceding the survey (95% CI, 22.3-29.6%; DE, 2.9).

### 2.2 Characteristics of Mothers and Children

A total of 1160 mothers were interviewed. Age was reported by 1146 (98.8%) of them. The majority of mothers (70.3%) were between 15-19 years of age, and two mothers were under the age of fifteen years (Table 2.1).

**Table 2.1 Age distribution of mothers**

Age distribution of 1160 mothers who participated in the Suleja Community Survey, November 1991

| Characteristic | Percentage of mothers | Number of mothers |
|---|---|---|
| Age (years) | | |
| <15 | 0.2 | 2 |
| 15-29 | 69.5 | 806 |
| >30 | 29.1 | 338 |
| Unknown | 1.2 | 14 |
| Total | 100.0 | 1160 |

Documentary evidence of date of birth was available for 1041 children (63.6%) and mother's history was used for another 560 (34.2%) children. Date of birth was not available for 38 children (2.2%). As shown in Table 2.2, the majority of children (29.2%) were under one year of age, followed by 23.7% of children in the 12-23 month age group. Slightly more than half of the children (50.8%) were female.

**Table 2.2 Sex and age distribution of children**

Sex and age distribution of 1637 children under five years of age for whom information was obtained, Suleja Community Survey, November 1991

| Characteristic | Percentage of children | Number of children |
|---|---|---|
| **Sex** | | |
| Male | 49.2 | 806 |
| Female | 50.8 | 832 |
| **Age (months)** | | |
| <6 | 16.8 | 275 |
| 6-11 | 12.4 | 203 |
| 12-23 | 23.7 | 388 |
| 24-35 | 18.4 | 301 |
| 36-47 | 16.0 | 262 |
| 48-59 | 11.9 | 194 |
| Unknown | 0.8 | 14 |
| **Total** | 100.0 | 1637 |

# 3. IMMUNIZATION

## 3.1 Immunization Coverage, Children aged 12-23 months

Fifty-six percent of children (921) under five years of age had an immunization card. Of these children, date of birth was noted on the card for 852 children (92.5%). Date of birth by history was obtained for 61 children with a vaccination card.

Immunization coverage for children aged 12-23 months is presented in Table 3.1. Rates are presented for crude coverage, corrected coverage, and corrected coverage by the first birthday. According to information from immunization cards, 67% of children received BCG immunization. Since only 67% of children in this age group have cards, mothers' history was used to calculate coverage among children without cards. Seventy-four percent (74%) of children without a card were reported by their mothers as having received BCG,

**Table 3.1 Immunization coverage, 12-23 months**

Immunization coverage among children aged 12-23 months, by antigen, Suleja, November 1991

| | CRUDE | | CORRECTED | | CORRECTED BY 1ST BD | |
|---|---|---|---|---|---|---|
| | Card | Card+Hx | Card | Card+Hx | Card | Card+Hx |
| BCG | 67 | 91 | 66 | 89 | 60 | 80 |
| DPT 1 | 64 | 86 | 49 | 66 | 48 | 64 |
| DPT 2 | 54 | 73 | 40 | 55 | 39 | 53 |
| DPT 3 | 43 | 56 | 33 | 42 | 31 | 40 |
| Polio 1 | 61 | 82 | 46 | 62 | 45 | 60 |
| Polio 2 | 53 | 71 | 40 | 54 | 39 | 53 |
| Polio 3 | 43 | 55 | 32 | 41 | 30 | 38 |
| Measles | 38 | 54 | 23 | 33 | 21 | 29 |
| Fully Immunized | 34 | 44 | 20 | 25 | 12 | 16 |

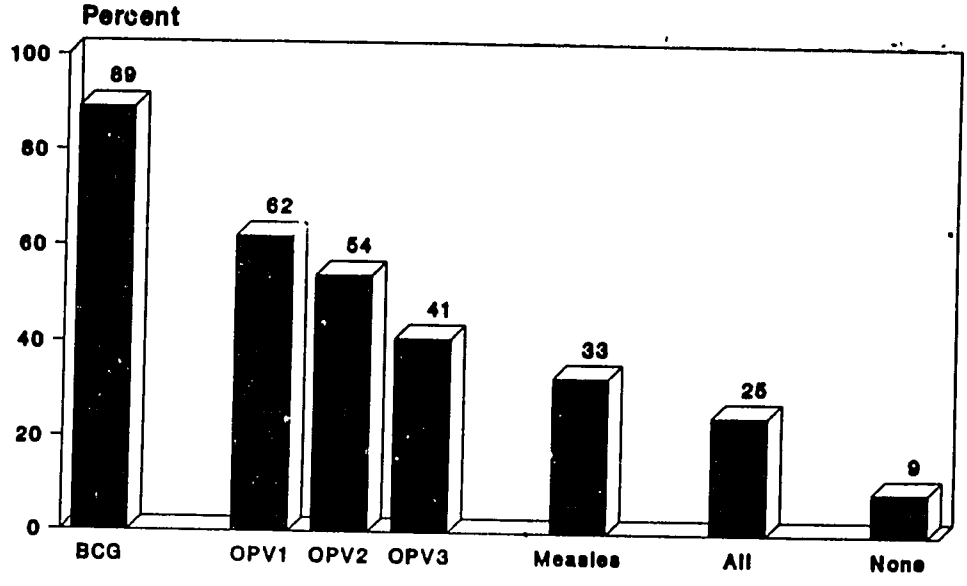
388 Children 12-23 months
CRUDE = DOB by card or history; age at immunization, dose interval not considered
CORRECTED = DOB by card; DPT1, POL1 >=6 wks, 28 days between doses;
Measles >= 39 wks

resulting in an overall BCG coverage rate of 91%. Assuming that the proportion of immunizations given during the first year of life is the same for children whose mothers report their status as for children with card documentation, it can be estimated that 80% of children received BCG immunization by their first birthday. We did not collect information on coverage with BCG scar during this survey.

Crude coverage by card for the first doses of Polio and DPT are similar, 61% and 64% respectively. Coverage drops significantly when corrected for age (> =6 months), to 46% for polio 1 and 49% for DPT1. Fifteen percent (15%) of Polio 1/DPT1 immunizations were given to children under 6 months of age. Coverage declines after the first dose, with fewer children receiving the second and third doses of Polio and DPT. Only 32% and 33% of children correctly received Polio 3 and DPT 3, and only 30% and 31% did so by 12 months of age.

Figure 3.1 shows the percentage of children aged 12-23 months who were correctly immunized by card and history. About one-third (33%) of the children received measles immunization, while one-quarter (25%) received all immunizations correctly. About one-in-ten (9%) children were either never immunized or were not immunized correctly.

Figure 3.1
Immunization Coverage
Children Age 12-23 months




n = 388
Corrected coverage, card + history

## 3.2 Immunization Coverage, Children aged 24-59 months

Immunization coverage by antigen for children under five years of age is shown in Table 3.2. Card confirmed coverage is higher in the 12-23 month age group when compared to coverage for children over 2 years of age. Measles coverage and coverage among fully immunized children was comparable in the two age groups. There was no difference in the percentage of children fully immunized — 21% for each age group.

Generally, drop out rates for children aged 12-23 months were higher than those among children over 2 years of age. Approximately thirty (32.7%) percent of children aged 12-23 months who received DPT 1 did not complete the third dose (DPT 3).

**Table 3.2 Immunization coverage, children under five years**

Immunization coverage among children under five years of age, Suleja, November 1991

| | Age (months) | |
|---|---|---|
| | 12-23 | 24-59 |
| **Had immunization card** | 67 (61,72)* | 43 (38,46) |
| **Received** | | |
| BCG | 61 (56,67) | 37 (33,41) |
| DPT 1 | 49 (44,55) | 29 (26,33) |
| DPT 2 | 41 (35,46) | 28 (24,32) |
| DPT 3 | 33 (2[illegible]37) | 26 (23,29) |
| Polio 1 | 46 (40,[illegible]2) | 29 (26,33) |
| Polio 2 | 40 (34,45) | 27 (24,30) |
| Polio 3 | 32 (27,37) | 25 (22,28) |
| Measles | 24 (19,28) | 23 (20,26) |
| Fully Immunized | 21 (17,25) | 21 (17,24) |
| **Drop Out Rates** | | |
| DPT 1 -> DPT 3 | 32.7 | 10.3 |
| DPT 3 -> Measles | 27.3 | 11.5 |

* Figures in parentheses are the 95% confidence intervals

## 3.3 Cohort analysis of immunization coverage

Table 3.3 shows the percentage of children aged 12-59 months who were immunized by 12 months of age, by their current age. Coverage rates also include information obtained from mothers' history. The percentage of children with an immunization card decreases with increasing age, from 67% among children aged 12-23 months to 29% among children aged 48-59 months. This decline could be due to either a genuine decline in coverage, or to the loss of cards over time. Cards were available for about half (51%) of children aged 12-59 months.

**Table 3.3 Immunizations during the first year of life, by birth cohort**

Percentage of children immunized correctly during the first year of life, by birth cohort, Suleja, November 1991

| Features | Current age of child (months) | | | | All Children 12-59 months |
|---|---|---|---|---|---|
| | 12-23 | 24-35 | 36-47 | 48-59 | |
| **Had immunization card** | 67 | 50 | 43 | 29 | 51 |
| **Percent immunized at 0-11 months:** | | | | | |
| BCG | *60 (80) | 42 (77) | 33 (71) | 25 (77) | 42 (61) |
| DPT1 | 48 (64) | 31 (56) | 25 (53) | 19 (58) | 34 (47) |
| DPT2 | 39 (53) | 31 (53) | 21 (43) | 16 (46) | 29 (41) |
| DPT3 | 31 (40) | 24 (41) | 19 (36) | 14 (37) | 24 (32) |
| Polio 1 | 45 (60) | 32 (58) | 25 (54) | 19 (57) | 33 (36) |
| Polio 2 | 39 (53) | 29 (52) | 21 (42) | 16 (45) | 28 (40) |
| Polio 3 | 30 (38) | 25 (41) | 18 (35) | 13 (33) | 24 (32) |
| Measles | 21 (29) | 17 (29) | 11 (24) | 9 (28) | 15 (23) |
| **Fully immunized** | 12 (16) | 10 (16) | 8 (15) | 5 (13) | 9 (9) |
| **No immunizations received**** | 9 | 11 | 11 | 12 | 11 |
| **Number of Children** | 388 | 301 | 262 | 194 | 1145 |

* 60 (80) = 60% by card only, 80% by card+history

** No immunizations received = immunizations either never received or received at incorrect age/dose interval (card only)

Overall, 42% of children aged 12-59 months received BCG before their first birthday. Thirty-three percent (33%) received the first doses of Polio and DPT, with only 24% receiving the third doses of these antigens. Fifteen percent (15%) of children received measles immunization.

As shown in the table, immunization coverage has improved in the very recent past, with the highest coverage rates occurring among children one year of age. The percentage of children fully immunized correctly by the first year of life has not improved significantly during this five year period. Coverage increased from 5% among children aged 48-59 months to 12% among children aged 12-23 months.

### 3.4 Source of Information

Sources of information about immunization as reported by mothers are described in Table 3.4. Three main sources of information include health facilities (44%), mobile vans during outreach activities (28%), and health related programs on radio and television (19%).

Inhabitants of Suleja enjoy their nearness to the Federal Capital Territory (FCT), Abuja. They receive radio and television transmission from Abuja, as well as from nearby Kaduna and Plateau States. Other less common sources of information about immunization (10%) include word of mouth from neighbors, village health workers, and churches.

**Table 3.4 Source of information about immunization**

Source of information about immunization, as reported by mothers, Suleja, November, 1991

| Source of information | Percentage of children |
|---|---|
| Clinic | 43.8 |
| Radio/TV | 19.2 |
| Neighbor | 3.7 |
| VHW | 5.2 |
| Mobile van | 27.7 |
| Other | 0.3 |
| Don't Know | 0.1 |

n = 1638 children

# 4. DIARRHOEA

## 4.1 Incidence in past 2 weeks

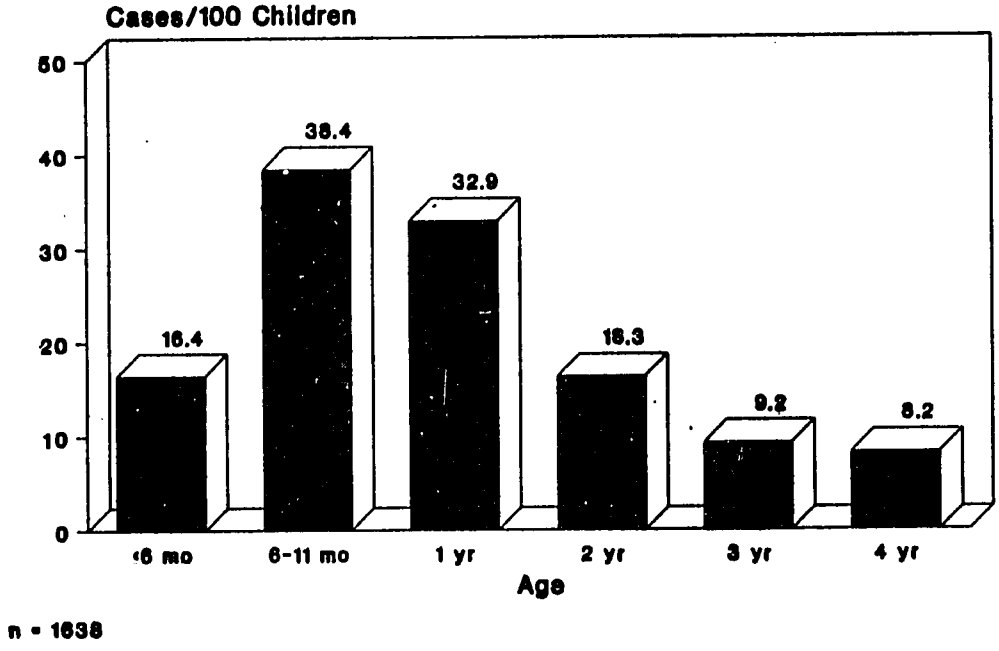
Of 1638 children under five years of age, 340 had diarrhoea during the two weeks prior to the survey, resulting in a two-week diarrhoea incidence rate of 20.8% (95% CI, 17.5-24.1, DE 2.8).

The two-week incidence rate was adjusted for seasonal variation using monthly diarrhoea cases in Suleja during 1991. The annual incidence rate adjusted for seasonality, 4.6 episodes per child, is similar to that reported for Nigeria (4.3) during the 1989 EPI/CDD In-Depth Review (5).

## 4.2 Characteristics of Children with Diarrhoea

The age specific 2-week diarrhoea incidence is shown in Figure 4.1. The highest incidence of diarrhoea occurred among 6-23 month olds, with incidence declining among children above 2 years. There were slightly more diarrhoea cases in males than females.

Figure 4.1
Age-specific 2-week Diarrhoea Incidence
Children < 5 years




n = 1638

As shown in Table 4.1, nearly half (47%) of the diarrhoea cases were of short duration, lasting 1 to 3 days. Twelve percent (12%) of diarrhoea cases lasted 1 to 2 weeks, and 2% were of unknown duration.

Symptoms associated with diarrhoea included mucous in the stool (58%), blood in the stool (22%), and fever coincident with the diarrhoea (53%). Twenty-nine percent of the diarrhoea cases were perceived as "severe" by mothers.

**Table 4.1 Characteristics of children with diarrhoea**

Characteristics of 340 children who had diarrhoea during the two weeks prior to the survey, Suleja, November, 1991

| Characteristic | Percentage of children | |
|---|---|---|
| **Diarrhoea in past two weeks** | 20.8 | (17.5, 24.1) |
| **Age (months)** | | |
| <6 | 13.2 | |
| 6 - 11 | 22.9 | |
| 12 - 23 | 37.7 | |
| 24 - 35 | 14.4 | |
| 36 - 47 | 7.1 | |
| 48 - 59 | 4.7 | |
| **Sex** | | |
| Male | 51.8 | |
| Female | 48.2 | |
| **Duration** | | |
| 1 - 3 days | 47.0 | |
| 4 - 6 days | 37.6 | |
| 1 - 2 weeks | 13.6 | |
| **Mucus in stool** | 57.6 | (52.4, 62.9) |
| **Blood in stool** | 22.1 | (17.1, 26.4) |
| **Fever associated with diarrhoea** | 52.9 | (46.1, 59.8) |
| **"Severe" diarrhoea** | 29.1 | (24.6, 33.6) |

n = 340 children with diarrhoea

## 4.3 Home Treatment Practices

Caretakers treated 83% of children (95% CI 76-90) at home. Forty-one percent of these children (41%) were treated at a health facility.

### 4.3.1 Use of home-made Salt Sugar Solution (SSS)

Salt sugar solution (SSS) was given to 43.5% of children with diarrhoea at home (Table 4.2). This is higher than the SSS use rate reported for Nigeria (35%) during the 1989 In-Depth Review (4).

**Table 4.2 Diarrhoea: Home treatment and feeding practices for diarrhoea**

Home treatment and feeding pracrices among mothers of children under five years of age with diarrhoea, Suleja, November, 1991

| | Mothers' response | | |
|---|---|---|---|
| | Voluntary* | Prompted | Total |
| Sugar salt solution | 32.4 | 11.1 | 43.5 (37.2, 49.8) |
| Drugs | 30.3 | 23.3 | 53.5 (48.3, 58.8) |
| Herbs | 10.0 | 22.9 | 32.9 (26.8, 39.0) |
| Enema | 1.8 | 12.3 | 14.1 (9.2, 19.0) |
| Continue other "home fluids" | | | |
| Normal | 5.3 | 50.3 | 55.6 |
| Increase | 1.8 | 20.0 | 21.8 |
| Decrease | 0.3 | 22.3 | 22.6 |
| Nothing | 32.0 | 0.0 | 32.0 |
| Continued breastfeeding** | | | 92.3 |
| Stopped/less solid food*** | 2.1 | 40.3 | 42.4 |

n = 340 children with diarrhoea
* Mothers' first response, before being prompted
** n = 194 children breastfed before diarrhea started
*** n = 302 children, excluding 38 children not yet weaned

As shown in Table 4.3, about half (55%, 95% CI 47-63%) of the mothers prepared SSS solution correctly. When one considers all mothers of children with diarrhoea in the survey, this translates to only 23.8% (approximately one-quarter) of mothers being able to prepare SSS correctly. Among children whose caretakers were unable to prepare SSS correctly, 73% added sugar incorrectly and 63% added salt incorrectly. Water was added incorrectly by 35% of mothers.

The frequency of SSS administration and quantity administered each time was also studied. Most children received SSS 6-9 times daily and were given 1-9 teaspoons of it each time. Only 27% of children given SSS at home were estimated to have received an adequate quantity. When one considers all the children with diarrhoea included in this survey, this translate to 12% of children receiving correctly prepared SSS in adequate quantity at home.

In addition to SSS, caretakers in Suleja used other home available fluids to rehydrate children with diarrhoea. The exact types of home fluids commonly used were not determined in this survey. Sixty-six percent of mothers of children with diarrhoea continued normal home fluids, while 22% increased fluids given to children with diarrhoea. Twenty-three percent of mothers decreased the quantity of home fluids administered during diarrhoea.

Source of information about SSS preparation in Suleja was considered important since, in line with government policy, much effort has gone into promoting home use of SSS and other available fluids to prevent dehydration. As shown in Table 4.3, government health facilities are the main source of information for 86.9% of mothers. Other sources of information include neighbors (4.6%), chemists/patent medicine vendors (9%), village health workers, and radio and television.

### 4.3.2 Feeding practices

With regards to dietary management of diarrhoea, nearly all children (92.3%) who were breast-fed prior to the onset of diarrhoea continued to receive breast-milk during the episode (Figure 4.3). Only 7.7% of mothers stopped breast-feeding. 42.4% of children with diarrhoea who were on semi-solid or solid foods prior to the onset of diarrhoea received less to eat or had foods stopped altogether during the episode.

**Table 4.3 Home preparation of sugar salt solution**

**Preparation and administration of sugar salt solution among mothers of children with diarrhoea, and source of information ablout SSS, Suleja, November 1991**

| Practice | Percentage of children |
|---|---|
| Prepared SSS correctly | 54.7 (46.8, 62.6) |
| Among those unable to prepare SSS, ingredient added incorrectly* | |
| Water | 34.7 |
| Sugar | 72.9 |
| Salt | 62.5 |
| Gave SSS on the first day of diarrhoea | 42.6 |
| Frequency of SSS administered each day | |
| After each episode | 22.9 |
| 2-5 times | 17.1 |
| 6-9 times | 48.6 |
| >= 10 times | 11.4 |
| Quantity given each time | |
| 1-6 tsp | 59.3 |
| 7-20 tsp | 12.8 |
| Half a cup | 5.7 |
| About a cup | 15.0 |
| More than a cup | 7.2 |
| Among all children with diarrhoea, those who received | |
| SSS at home** | 43.5 |
| Correctly preprared SSS | 23.8 |
| Correctly prepared SSS and in adequate quantity*** | 11.7 |
| Source of information on SSS | |
| Government clinic | 86.9 |
| Neighbor | 4.6 |
| Village Health Worker | 3.8 |
| Other | 4.7 |

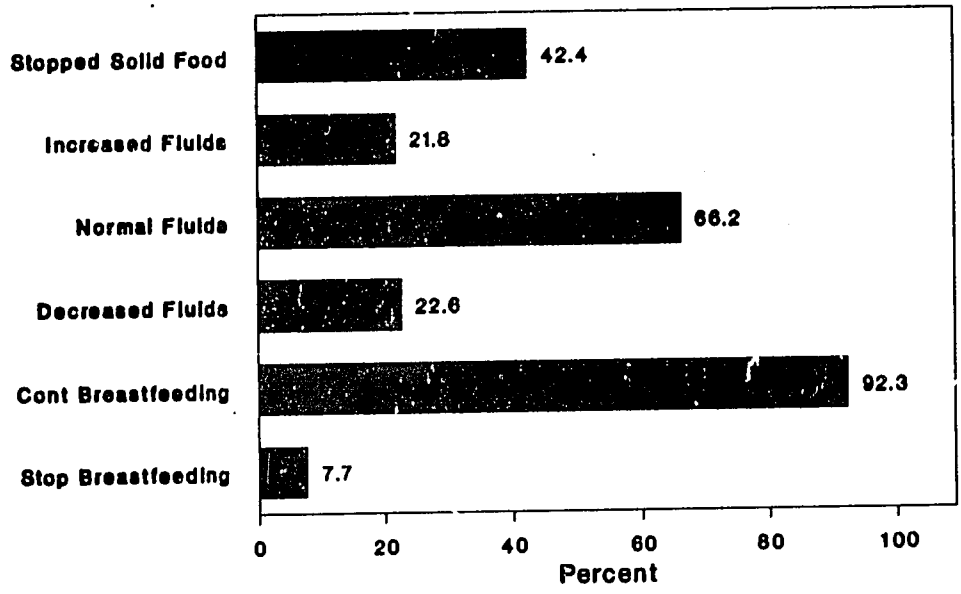
n = 148 children given SSS at home

* n = 67 children whose mothers prepared SSS incorrectly

** n = 340 children with diarrhoea

*** At least half a cup of correctly prepared SSS given after each episode or >= 6 times a day

Figure 4.2
Diarrhoea Case Management
Home Feeding Practices, by Type




n = 340 children with diarrhoea

### 4.3.3 Use of drugs

The drug use rate at home was 53.5%. Another 33% of children with diarrhoea were given herbs of unknown active component and efficacy. Fourteen percent of children with diarrhoea were given an enema, a practice which can be dangerous for young children. We did not enquire about the source of advice or source of purchase of these drugs in this survey.

## 4.4 Referral Practices

Altogether, 50.6% of children (95% CI, 44-57) with diarrhoea were taken to a health worker, and 17.9% were taken to a traditional healer. In this survey, we did not inquire about other possible places (such as patent medicine vendors, pharmacists, etc.) where diarrhoea cases may be referred.

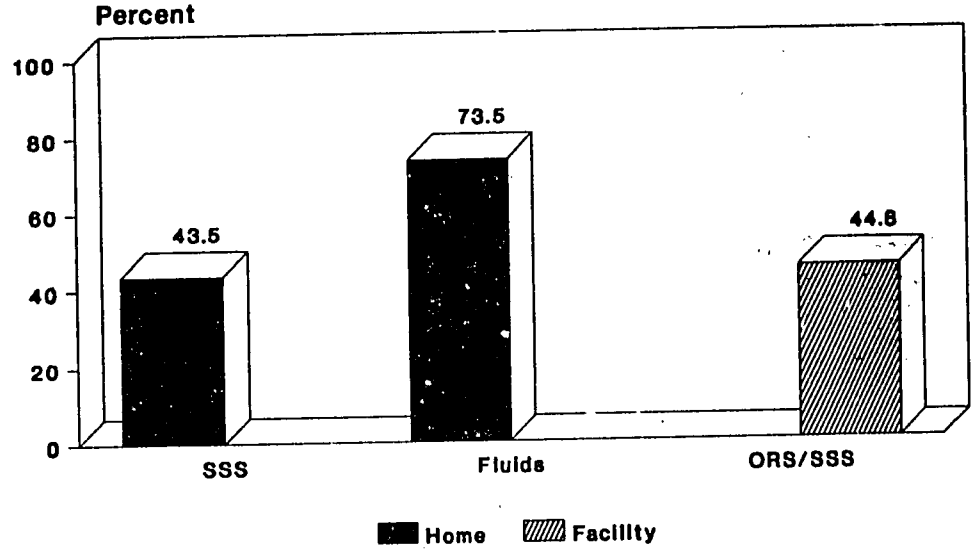
## 4.5 Facility Treatment

Facility treatment practices reported by mothers of 172 children taken to a health facility are shown in Table 4.4. The oral rehydration therapy (ORT) use rate was 44.8% (Figure 4.3). In Nigeria, mothers are not told whether "fluids" obtained at health facilities are salt sugar solutions (SSS) or oral rehydration solution of the WHO recommended type.

The drug use rate in health facilities (public or private) is very high. Vitamins were given to 59.9% of children with diarrhoea, antibiotics to 54.7% and other unknown drugs that to 38.6% of children with diarrhoea. One-in-two children (56.4%) with diarrhoea was given an injection. The average number of drugs given per episode of diarrhoea was 2.2 (Figure 4.4). On the average, about 2.6 drugs were given to those children who received medicine for the current episode.

Of 172 children with diarrhoea taken to a health facility, 25 (14.5%) were admitted. Considering all the diarrhoea cases that occurred in the 2 weeks prior to the survey, this translates to 7.4% of all diarrhoea cases being admitted to a health facility. About half c children with diarrhoea (48.9%) were taken to a health facility on the second day of diarrhoea onset.

Figure 4.3
ORT Use Rates
Home and Facility




Home, n = 340
Facility, n = 256

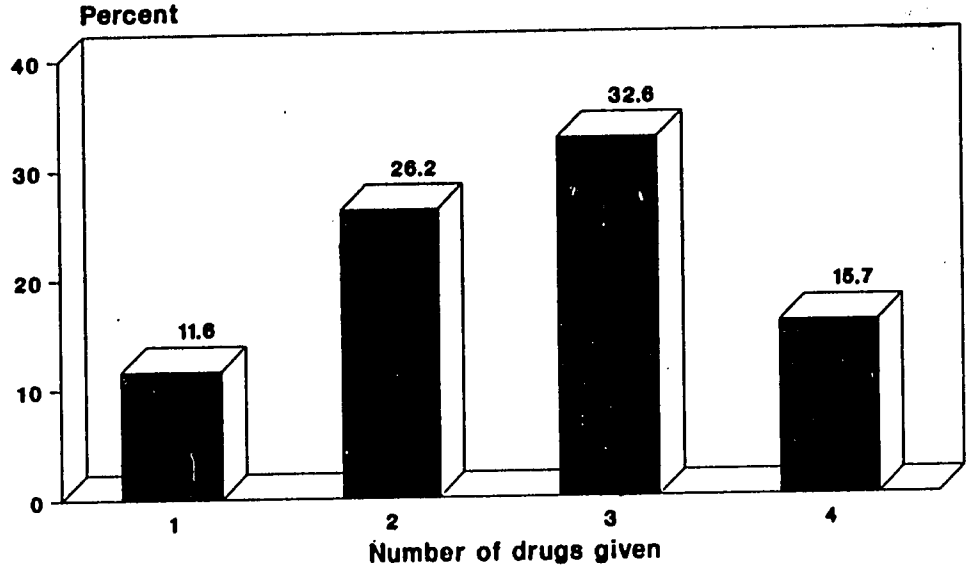
**Table 4.4 Diarrhoea referral practices and treatment at health facility**

Referral practices and treatment at health facilities, as reported by mothers who sought treatment for their children with diarrhoea, Suleja, November 1991

| Practice | Percentage of children | |
|---|---|---|
| Took child to a herbalist | 17.9 | (13.8, 22.1) |
| Took child to a health facility | 50.6 | (44.2, 57.0) |
| Day taken to health facility* | | |
| Day 1 | 19.9 | |
| Day 2 | 48.9 | |
| Day 3 | 14.2 | |
| Day 4 | 1.1 | |
| Treatment at health facility* | | |
| ORS/SSS | 44.8 | (34.0, 52.2) |
| Vitamins | 59.9 | |
| Antibiotics | 54.7 | |
| Injection | 56.4 | |
| Other | 53.5 | |
| Admitted to health facility* | 14.5 | (8.5, 20.6) |

n = 340 children with diarrhoea
* n = 172 children taken to a health facility

## Figure 4.4
## Multiple Drug Use by Case Children with Diarrhoea




n = 172 children with diarrhoea treated at health facilities (public or private)

## 4.6 Reasons for "severity"

Mothers who perceived their children as having "severe" diarrhoea were asked their reasons for thinking so. As shown in Table 4.5, the most common reasons mentioned include the child having fever (23.2%), child being weak, vomiting persistently, or being dried out (17-18%). Long duration of the diarrhoea episode or mucous in the stool were cited as reasons for severity by 11% of mothers. Blood in stool was identified as a reason by only 2.2% of mothers. Reasons such as the child being very thirsty, having sunken eyes, or not drinking or eating well were mentioned infrequently by the caretakers interviewed.

**Table 4.5 Reasons for perceived severity of diarrhoea**

Reasons mothers of children with diarrhoea perceive the diarrhoea as "severe," Suleja, November 1991

| Reason | Percentage of children |
|---|---|
| Long duration | 23.2 |
| Mucous in stool | 17.9 |
| Fever | 16.8 |
| Weakness | 16.8 |
| Blood in stool | 10.5 |
| Vomiting | 10.5 |
| Child "dried out" | 2.2 |
| Other | 2.1 |

n = 99 children with "severe" diarrhoea

### 4.6.1 Association between perceived severity and home treatment and referral practices

Treatment at a health facility or at home was more frequent for episodes perceived as "severe" by the caretaker (___% vs ___%, respectively, $p<.001$). Severe diarrhoea were more common in children under the age of 2 years ($p<.001$). Diarrhoea treatment practices, by severity are as shown in Table 4.6. The following summary highlights key practices among mothers, depending upon the perceived severity of the diarrhoea episode:

- Children with "severe" diarrhoea were given SSS at home more frequently than those with non-severe diarrhoea (55.6% vs 38.6%, $p<.01$)

**Table 4.6 Diarrhoea treatment practices, by severity**

Home treatment and referral practices among mothers of children with diarrhoea, by perceived severity of the diarrhoeal episode, Suleja, November 1991

| Characteristic/Practice | Mothers' perception: Severe (n = 99) | | Mothers' perception: Not severe (n = 241) |
|---|---|---|---|
| Age < 2 years | 77.2 | *** | 51.8 |
| Gave SSS at home | 55.6 | * | 38.6 |
| Gave drug | 61.6 | | 50.2 |
| Gave fluids | 63.6 | ** | 42.3 |
| Herbs | 41.4 | * | 29.5 |
| Enema | 19.2 | | 12.0 |
| Took to health facility | 64.6 | ** | 44.8 |
| Within 24 hours | 11.9 | *** | 1.5 |
| Within 48 hours | 43.6 | *** | 5.0 |
| Admitted to health facility | 15.6 | | 13.9 |
| Took to traditional healer | 27.3 | ** | 14.1 |

* $p < .05$
** $p < .01$
*** $p < .00001$

- Severity of diarrhoea did not influence the ability of mothers to correctly prepare SSS. Mothers of children with non-severe diarrhoea prepared SSS with roughly the same ability as mothers of children with severe diarrhoea

- Children with "severe" diarrhoea were given home available fluids more frequently than those with non-severe diarrhoea (63.6% vs 42.3%, $p<.01$)

- Children with "severe" diarrhoea were treated with herbs at home more than those with non-severe diarrhoea (41.4% vs 29.5%, $p<.05$)

- Children with "severe" diarrhoea were referred for treatment outside the home more often than those with non-severe diarrhoea. Children with severe diarrhoea were taken significantly more often to a health facility ($p<.001$) or to a traditional healer ($p<0.01$) than those children with non-severe diarrhoea

- When a child with "severe" diarrhoea was taken to a health facility for treatment, he/she was taken there significantly more quickly (i.e. within the first 24 or 48 hours of onset) ($p=.03$) than children with non-severe diarrhoea

## 4.7 Mothers' Knowledge about diarrhoea

Reasons for children's diarrhoea, as reported by mothers, are described in Table 4.7. Fifty-eight percent of mothers believed the child's diarrhoea was due to "teething," while 7.1% attributed the diarrhoea to drinking and use of contaminated water. About one-third of mothers (32%) had no idea about the cause of diarrhoea.

**Table 4.7 Mothers' knowledge about diarrhoea**

Reason for child's diarrhoea as reported by mothers of children with diarrhoea, Suleja, November, 1991

| Knowledge Item | Percentage of children |
|---|---|
| **Reason for child's diarrhoea** | |
| Teething | 57.5 |
| Contaminated water | 7.1 |
| Other | 3.4 |
| Don't know | 32.0 |

n = 340 children

## 5. Fever

### 5.1 Incidence in past 2 weeks

Of 1638 children under five years, 425 had fever during the two weeks prior to the survey, resulting in a two-week incidence rate of 25.9% (95% CI 22.3-29.6, DE 2.9) (Table 5.1). An annual incidence rate of 8.8 episodes of fever per child, adjusted for seasonality, was calculated using monthly reports of fever cases in Suleja during 1991.

### 5.2 Characteristics of Children with Fever

The age specific 2-week fever incidence is shown in Figure 5.1. While the highest incidence occurs among 6-23 month olds, incidence declines with age in children older than 2 years. Fever is significantly more common in males than females ($p < .05$).

Figure 5.1
Age-specific 2-week Fever Incidence
Children < 5 years

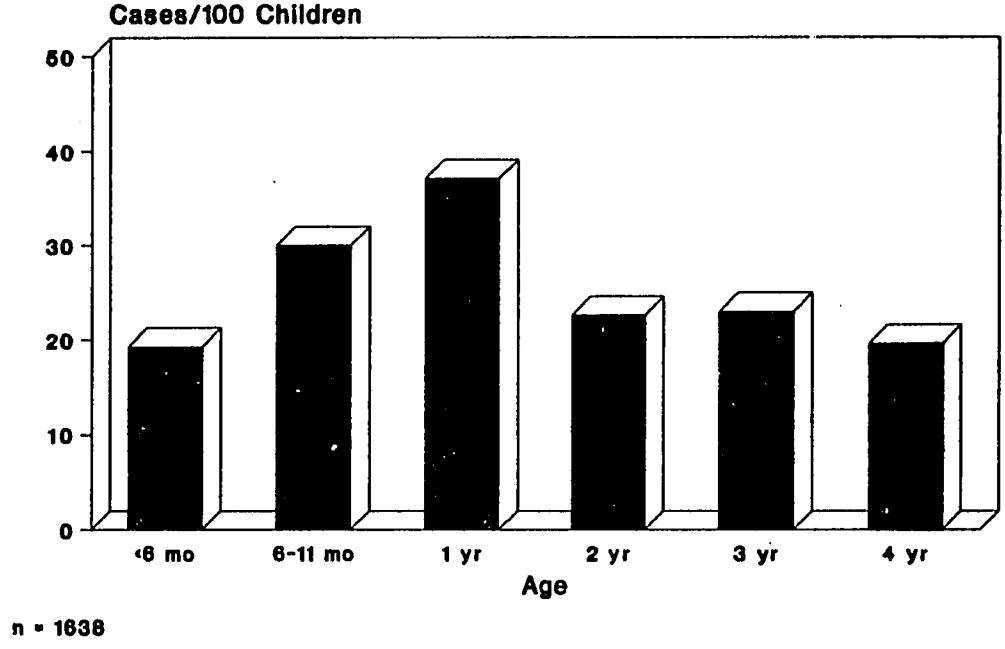


**Table 5.1 Characteristics of children with fever**

Characteristics of 425 children who had fever in the two weeks prior to the survey, Suleja, November, 1991

| Characteristic | Percentage of children |
|---|---|
| Fever in past two weeks | 25.9 (22.3, 29.5) |
| Age (months) | |
| <6 | 12.5 |
| 6 - 11 | 14.4 |
| 12 - 23 | 33.9 |
| 24 - 35 | 16.0 |
| 36 - 47 | 14.1 |
| 48 - 59 | 8.9 |
| Sex | |
| Male | 49.2 |
| Female | 50.8 |
| Symptoms | |
| Shivering | 57.2 |
| Cough | 48.0 |
| Vomiting | 43.3 |
| Diarrhoea | 24.5 |
| Skin rash | 15.3 |
| Convulsions | 13.4 |
| "Severe" fever | 30.4 (25.5, 35.3) |

Symptoms associated with fever are reported in Table 5.1. Over half of the children with fever had shivering (57.2%), 48% had cough, and 43.3% vomiting. Diarrhoea was associated with fever in a quarter (24.5%) of the cases. Other less common symptoms associated with fever were skin rash (15.3) and convulsions (13.4%).

## 5.3 Home Treatment Practices

Mothers treated 89.9% (95% CI, 87.3-92.5%) of children with fever at home, while 10.1% did nothing for the fever. Sixty-five percent of caretakers gave at least one form of antimalarial to their children with fever (Table 5.2). Almost 70% (95% CI, 63.5-74.4) of the caretakers gave paracetamol.

Several practices were not often voluntarily reported by mothers, but were mentioned only when the mothers were prompted. These include removing clothes (0.4%), giving drink (5.2%), sponge bath (15.1%), and giving herbs (10.8%) 80% of mothers removed the child's clothes, while 74% gave a sponge bath and something to drink.

**Table 5.2 Fever: Home treatment practices**

**Treatment practices among mothers who reported providing home treatment for their children under five years of age with fever, Suleja, November 1991**

| | Mothers' response | | | |
|---|---|---|---|---|
| Treatment/Practice | Voluntary* | Prompted | Total** | |
| Drug | | | | |
| Antimalarial | 32.9 | 32.2 | 65.1 | (59.7, 70.7) |
| Paracetamol | 28.7 | 40.2 | 68.9 | (63.5, 74.4) |
| Antibiotic | 2.1 | 23.8 | 25.9 | (21.7, 30.3) |
| Gave herbs | 10.8 | 16.9 | 27.7 | (23.8, 31.7) |
| Sponge bath | 15.1 | 58.8 | 73.9 | (69.2, 78.5) |
| Increased fluids | 5.2 | 68.4 | 73.6 | (68.0, 79.3)) |
| Remove clothes | 0.4 | 79.8 | 80.2 | (76.1, 84.4) |

* Mothers' first response, before being prompted

** n = 425 children with fever

The sources (supply or purchase) of antimalarial drugs used for home treatment in Suleja are shown in Figure 5.2. Clinics and hospitals (public and private) are the major source (76.5%), with pharmacists/chemists and patent medicine vendors accounting for about 18% of antimalarial drug purchases.

Of 277 mothers who gave an antimalarial to their children with fever, 54% gave the antimalarial on the first day of the fever episode. Thirty-three percent gave an antimalarial drug on day two (Table 5.3), while 6% began treatment on the third or fourth day. Seven percent of mothers who treated with antimalarial drugs could not remember the day treatment was started.

Figure 5.2
Source of Home Supply
or Purchase of Antimalarials

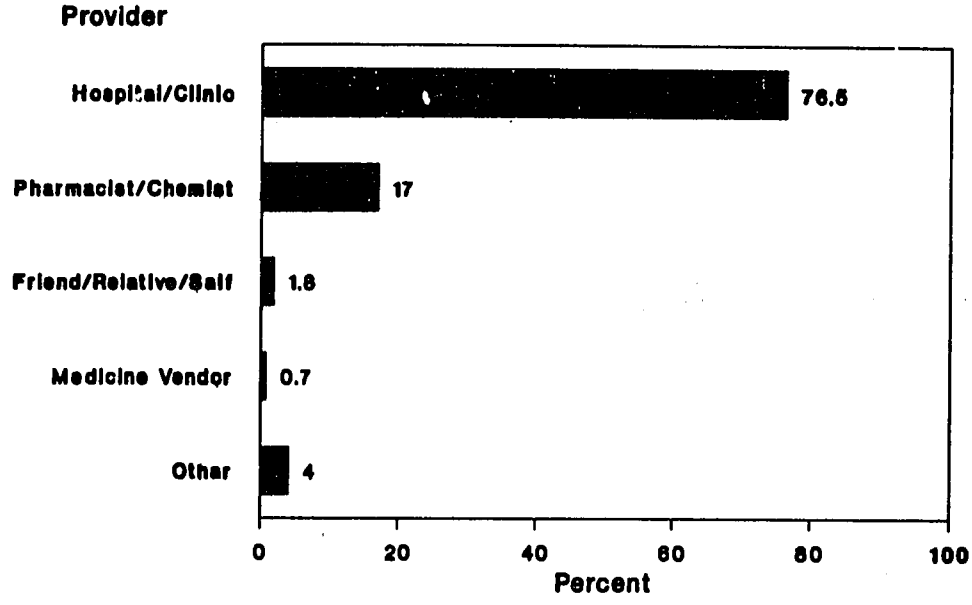


**Table 5.3 Treatment with antimalarial**

**Administration of antimalarial medicine (chloroquine) at home by mothers of children with fever, and source of antimalarial, Suleja, November 1991**

| Practice | Percentage of children |
|---|---|
| **Gave antimalaria*** | 65.1 (59.7, 70.7) |
| **Day antimalarial first given**** | |
| Day 1 | 53.8 |
| Day 2 | 32.8 |
| Day 3 | 3.8 |
| Day 4+ | 9.6 |
| **Source of antimalarial** | |
| Clinic/hospital | 76.5 |
| Chemist | 17.0 |
| Friend | 1.4 |
| Street vendor | 0.7 |
| Other | 4.3 |

* n = 425 children with fever

** n = 277 children with fever who received an antimalarial at home

All antimalarial medicine given at home was chloroquine

## 5.4 Referral Practices and Facility Treatment

Sixty two percent (95% CI, 54.7-65.8%) of children with fever were taken to a health facility (public or private) for further treatment, while 15.8% (95% CI, 12.6-18.9%) were referred to traditional healers for treatment.

Treatment at health facilities reported by mothers of 256 children with fever is described in Table 5.4. Use rate of antimalarial drugs is very high. Eighty-two percent of children less than 5 years old taken to health facilities were given oral antimalarial drugs (tablets or syrup). Sixty-eight percent received an antimalarial injection.

Table 5.4 Fever referral practices and treatment at health facilities

Referral practices and treatment at health facilities, as reported by mothers who sought treatment for their children with fever, Suleja, November 1991

| Practice | Percentage of children |
|---|---|
| Took child to a herbalist | 15.8 (12.6, 18.9) |
| Took child to a health facility | 60.2 (41.1, 50.7) |
| Day taken to health facility* | |
| Day 1 | 30.4 |
| Day 2 | 51.2 |
| Day 3 | 6.6 |
| Day 4 | 2.3 |
| Treatment at health facility* | |
| Antimalarial | |
| Either tablet or syrup | 82.2 (77.2, 88.4) |
| Injection | 68.0 (60.6, 75.3) |
| Paracetamol | 62.9 (54.8, 71.0) |
| Antibiotic | |
| Oral | 25.8 (18.9, 32.6) |
| Injection | 12.9 (8.7, 17.0) |
| Other drugs | 16.0 (10.0, 22.0) |
| Admitted to health facility* | 6.3 (3.1, 9.4) |

n = 425 children with fever
* n = 256 children taken to a health facility

Other drugs prescribed at health facilities include paracetamol (63%), oral antibiotics (25.8%), and antibiotic injections (13%). On the average, 2.5 drugs were given to each child during his/her episode of fever.

Of 256 children with fever taken to a health facility (public or private), sixteen (6.3%) (95% CI, 3.1-9.4%) were admitted. When one considers all the fever cases that occurred in Suleja during the 2 weeks prior to the survey, this translates to 4% of all fever cases being admitted to health facilities.

Of 256 mothers who reported taking their children with fever to a health facility, 31% took their child on the first day, 53% took their child on day two, and 6% took their child on the third or fourth day. Three percent of mothers could not remember the day on which day they took their child to a health facility.

## 5.5 Severity of Fever

Reasons mothers perceived their child's fever episode as "severe" are summarized in Table 5.5. The most common reasons mentioned by mothers included shaking (38.7%), fever lasting a long time (21.8%), child having convulsions (12%), or child not eating well (12%). Diarrhoea with fever was associated with severity by 7.3% of mothers.

**Table 5.5 Reasons for perceived severity of fever**

Reasons mothers of children with fever perceive the fever as "severe," Suleja, November 1991

| Reason | Percentage of children |
|---|---|
| Child was shaking | 38.7 |
| Fever lasted long | 21.8 |
| Convulsions | 12.9 |
| Not eating | 12.1 |
| Diarrhoea | 7.3 |
| Don't know | 3.2 |
| Other | 4.0 |

n = 129 children with "severe" fever

### 5.5.1 Association of perceived severity of fever episode on home treatment and referral practices

Home treatment and referral practices among mothers of children with fever, by perceived severity of the fever episode, are shown in Table 5.6 The following is the summary of findings related to severity of fever as perceived by the mother/caretaker:

- Children with "severe" fever were given an antimalarial at home significantly more often than those with non-severe fever (72.1% vs 62.2%, $p<.05$)

- Children with "severe" fever were given antibiotic drugs at home significantly more often than those with non-severe fever (34.9% vs 22.0%, $p<.01$)

- Children with "severe" fever had their clothes removed more than those with non-severe fever (89.1% vs 76.4%, $p<.01$), and they also received a sponge bath more often (80.6% vs 70.9%, $p<.05$). Children with severe fever received increased fluids at home more often than those with non-severe fever (87.6% vs 67.6%, $p<.001$)

- Children with "severe" fever were referred to health facilities for treatment outside the home more often than those with non-severe fever (75.% vs 53.7%, $p<.001$)

- When a child with "severe" fever was taken to a health facility for treatment, he/she was taken there significantly more quickly (i.e. within the first 48 hours of onset) ($p<.01$) than children with non-severe fever. There was no significant difference in referral to a health facility within the first 24 hours.

**Table 5.6 Fever treatment practices, by severity**

**Home treatment and referral practices among mothers of children with fever, by perceived severity of the fever episode, Suleja, November 1991**

| Characteristic/Practice | Mothers' perception: Severe (n = 129) | | Mothers' perception: Not severe (n = 296) |
|---|---|---|---|
| Age <2 years | 60.8 | * | 50.8 |
| Gave home treatment | | | |
| Antimalarial | | | |
| At any time | 72.1 | * | 62.2 |
| Within 24 hours | 37.2 | | 36.5 |
| Within 48 hours | 65.1 | | 56.4 |
| Antibiotic | 34.9 | ** | 22.0 |
| Paracetamol | 73.6 | | 66.9 |
| Remove clothes | 89.1 | ** | 76.4 |
| Gave herbs | 32.6 | | 25.7 |
| Sponge bath | 80.6 | * | 70.9 |
| Increased fluids | 87.6 | *** | 67.6 |
| Took to health facility | | | |
| At any time | 75.2 | *** | 53.7 |
| Within 24 hours | 22.5 | | 16.6 |
| Within 48 hours | 59.7 | ** | 44.6 |
| Took to traditional healer | 18.6 | | 14.5 |

* $p < .05$
** $p < .01$
*** $p < .001$

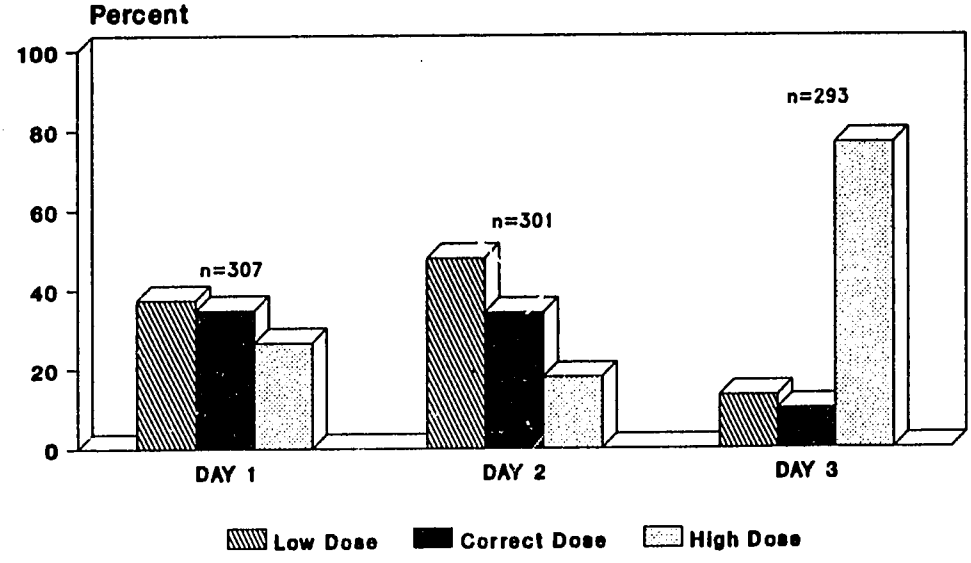
## 5.6 Chloroquine Dosage

Figure 5.3 shows chloroquine doses administered per child per day in Suleja. Generally, about 35% of children who were given chloroquine received a "correct" dose on days one and two, followed by 10% on the third day. High doses of chloroquine were most common on the third day, while low dosing was common on days one and two.

Figure 5.4 shows chloroquine doses administered by day, for tablets versus syrup. High dosing occurs more frequently with tablets on all three days. Low dosing is more frequent with syrup on days one and two.

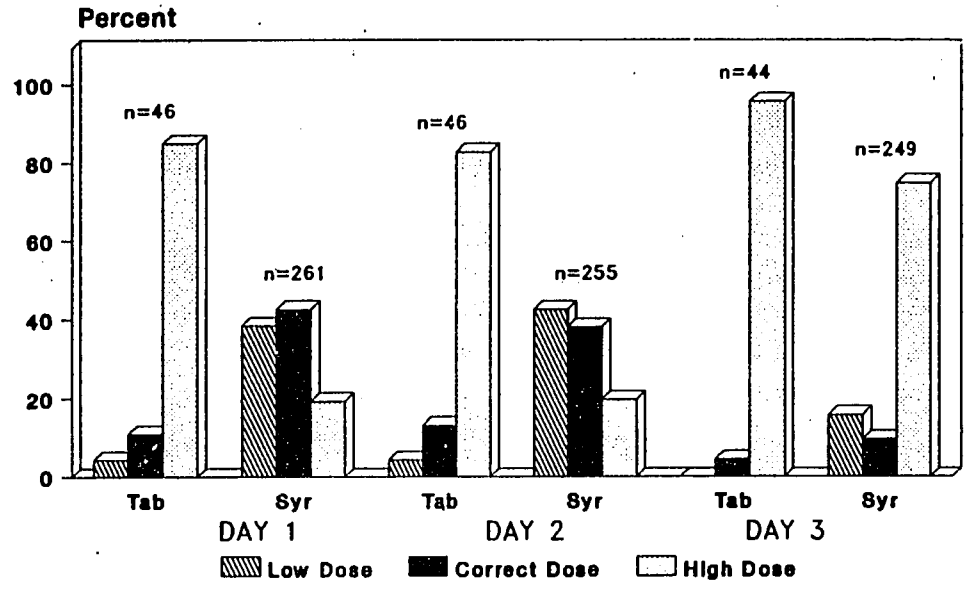
Figure 5.5a-c show chloroquine doses administered by day to children in three different age groups. Among children aged less than one year, high dosage was a problem on all three days (Fig. 5.5a). Among children aged one to three years, about 40% received the correct dose on days one and two, but high dosing occurred on day three (Fig. 5.5b). Among children aged 4 years, low dosing occurred on days two and three. On day three, almost all children received a low dose of chloroquine (Fig. 5.5c).

Fig 5.3
Chloroquine Doses Administered, by Day
Home and Facility Combined




Chloroquine - Tablets or Syrup
425 Children aged < 5 years with fever

Figure 5.4
Chloroquine Doses Administered, by Day
Tablets vs Syrup




n = 425 Children with Fever

## 5.7 Mothers' Knowledge

Table 5.7 describes mothers' knowledge about prevention of malaria. The three most common ways of preventing malaria reported by mothers were: use of repellents (40.5%), removal of standing/stagnant water (36%), and use of mosquito nets (32.2%). One-quarter

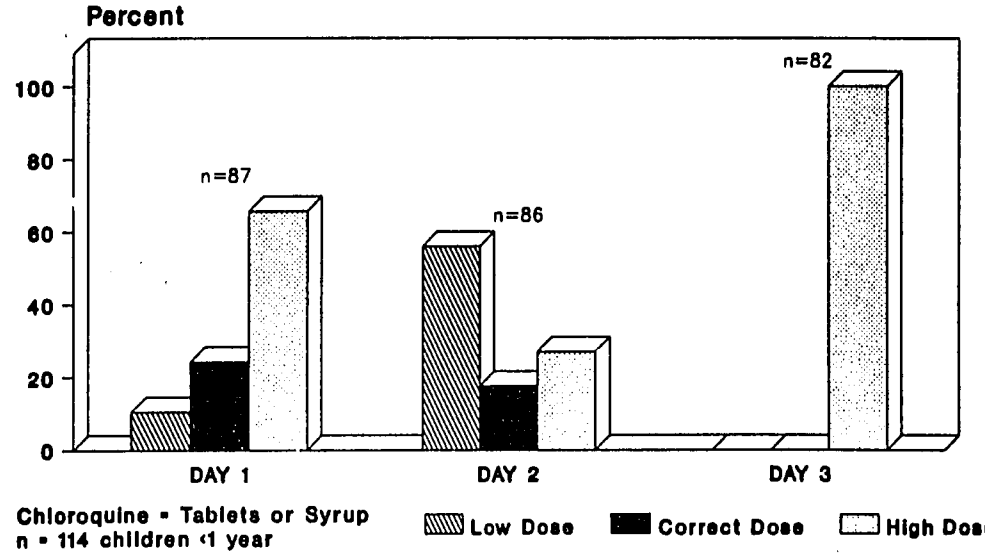
**Table 5.7 Mothers' knowledge about malaria**

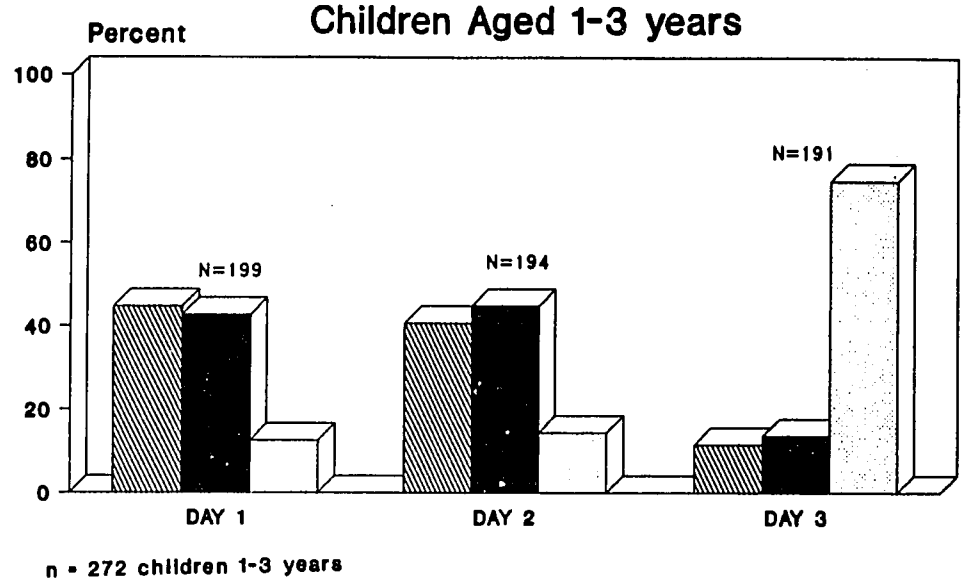
Ways to prevent malaria, as reported by mothers of children with fever, Suleja, November 1991

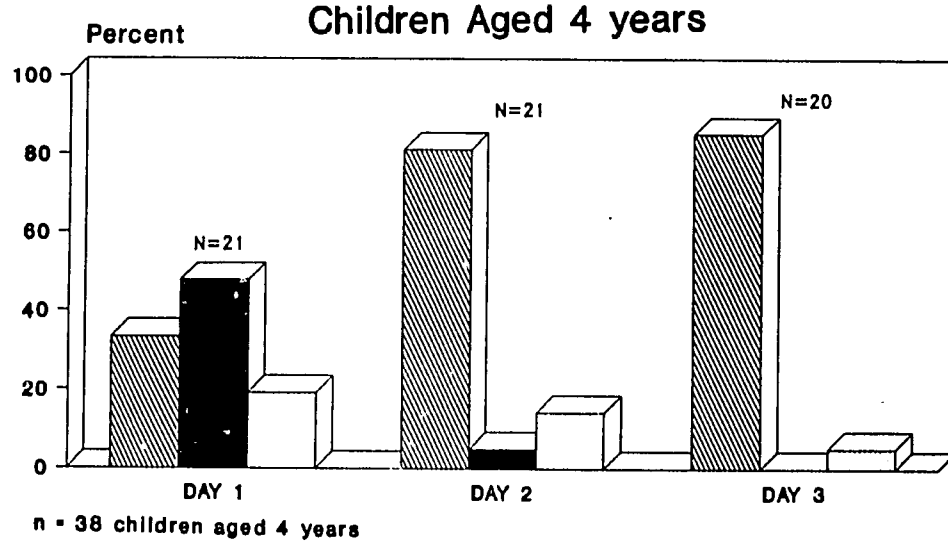
| Prevention of malaria | Percentage of children |
|---|---|
| Repellent | 40.5 |
| Remove standing water | 36.0 |
| Use mosquito nets | 32.2 |
| Wear protective clothing | 29.2 |
| Use insecticide spray | 24.2 |
| Stay indoors at night | 22.1 |
| Prophylaxis | 13.2 |

n = 425 mothers of children with fever

## Figure 5.5a-c
## Chloroquine Doses Administered by Day, Children Aged <1 year



of the caretakers (24.2%) mentioned use of insecticide spray as a method of preventing malaria. Other less methods mentioned less frequently by mothers included staying indoors at night (22.1%) and antimalarial prophylaxis (13.2%).

# 6 MATERNAL HEALTH

## 6.1 Tetanus Toxoid Coverage

Table 6.1 shows tetanus toxoid coverage, by card and card plus history, for 464 women in Suleja who delivered in the 12 months prior to the survey. Card documented coverage is low for all doses of tetanus toxoid (TT), most likely due to low TT card possession among mothers.

**Table 6.1 Tetanus toxoid coverage**

Tetanus toxoid coverage, by card and history, among 464 women who gave birth in the 12 months prior to the survey, Suleja, November 1991

| Dose Received | Card | History | Card + History |
|---|---|---|---|
| **Crude** | | | |
| TT 1 | 21.1 | 66.7 | 87.8 |
| TT 2 | 16.2 | 54.7 | 70.9 |
| TT 3 | 1.4 | 7.2 | 8.6 |
| TT 4 | 0.8 | 2.0 | 2.8 |
| TT 5 | 0.5 | 0.6 | 1.1 |
| **Corrected** | | | |
| TT 1 | 21.1 | 66.7 | 87.8 |
| TT 2 | 13.8 | 43.4 | 57.2 |
| TT 3 | 0.0 | 0.0 | 0.0 |
| TT 4 | 0.0 | 0.0 | 0.0 |
| TT 5 | 0.0 | 0.0 | 0.0 |

n = 464 women
Corrected TT2 = 28 days between TT1 and TT2, TT2 at least 2 weeks before delivery

When corrected for valid dose intervals, only 13.8% of women received the second dose of TT by card. When history of the remaining women who did not have TT cards was considered (and a ming no difference in TT immunization status between women with and without cards), coverage with the second dose of TT increased to 57.2%. All third, fourth, and fifth doses of tetanus toxoid were found to be invalidly given.

## 6.2 Antenatal Care

Antenatal care practices of 464 women who delivered in the 12 months prior to the survey are summarized in Table 6.2. Of the 80.9% of women who claimed to have possessed an antenatal card in the past, only 20.6% still possessed their card at the time of interview. Half of the women (50.2%) reported losing their card, while 26.9% had their cards withdrawn and kept by the health facility at the time of delivery.

Eighty-nine percent of mothers paid at least one antenatal care visit to a health facility during pregnancy. The total number of antenatal care visits per women ranged from 1 to 18. Twenty percent of women who delivered in the past 12 months paid between one and three visits, 30% between four and six visits, and only 5% had more than nine antenatal visits during the entire pregnancy.

**Table 6.2 Antenatal care practices**

Antenatal care practices among 464 women who gave birth in the 12 months prior to the survey, Suleja, November 1991

| Practice | Percentage of women |
|---|---|
| **Antenatal card** | |
| Ever had | 80.9 |
| Still possess | 20.6 |
| **No. of antenatal visits** | |
| None | 10.9 |
| 1-3 | 20.0 |
| 4-6 | 30.3 |
| 7-9 | 11.8 |
| >9 | 4.9 |
| Don't know | 22.2 |

n = 464 women

## 7. DISCUSSION

This survey provides an initial evaluation of three components of primary health care (immunization, diarrhoea, and fever/malaria) and antenatal care practices in Suleja Local Government. Similar methods have been used in Conakry (5) and other developing countries.

Information obtained from this type of community survey can serve as a useful planning tool for the Primary Health Care team. Community survey data (combined with information from facility assessments and drug quality studies) could be used to establish LGA health priorities and develop short- and long-term objectives for improving health delivery. Appropriate intervention strategies (community health education, immunization outreach, commodity management) can be developed to address LGA priorities.

A simple monitoring plan to periodically review on-going program activities would serve as a useful tool for assessing progress towards achieving objectives over time. In addition, a follow-up community survey to measure changes in mothers' knowledge and practices after a period of intensive program implementation might be considered. The sample size in this survey was large enough to allow for valid statistical comparisons in such a follow-up study. The low design effect measured suggests that a smaller sample size might be used, reducing logistics requirements and survey costs. Any follow-up study should include information on mothers education, location (urban vs rural), and family size. Among children, information on nutritional status and birth order should be collected.

**Immunization:** A comparison of corrected coverage between children 12-23 months old and those aged over two years indicates that coverage has improved over the last five years. It is clear from immunization coverage rates determined in this survey that 80% immunization coverage was never achieved in Suleja in 1990. Despite recent improvements, coverage for some specific antigens remains relatively low (33% measles coverage, 23% by card) and drop out rates for multiple dose antigens are high. Cohort analyses suggest that measles coverage in Suleja has remained consistently low during the past four years.

Revised EPI was started in Niger State in early 1985. Although there has been considerable experience with implementing EPI in Suleja since that time, implementation has been the business of State Ministry of Health officials in the LGA. Primary health care implementation at the LGA level started in Nigeria in 1990. Implementation of EPI activities solely by Suleja Health Department officials started only in late 1990. Since that time, there has been a rapid turn-over of key LGA officials and decision makers in this LGA. There is therefore the need for continuous re-orientation of such officials about the national policy (adopting in 1991) targeting 80% immunization coverage. Measures must be taken now to improve coverage and prevent further accumulation of susceptibles over time. Unless action is taken urgently, a measles epidemic can be predicted to occur during the next measles

season (January to May 1993).

Assuming access to immunization services is approximately equal to crude coverage with DPT1, then 86% of children aged 12-23 months in Suleja have access to immunization services. Low rates of corrected coverage may have resulted from high dropout rates (in the range of 25-35% in Suleja), high missed opportunities for immunization, and consequences of mass immunization campaigns, referred to as LGA Immunization Days (LID).

Reasons for high dropout rates and children receiving no immunizations at all should be investigated to develop effective corrective measures. The 1989 EPI/CDD In-Depth Review in Nigeria cites ten reasons given by mothers for partial immunization or no immunization at all. These reasons include: lack of awareness about EPI generally or the need for additional doses, lack of faith in EPI, fear of side effects, place and time unknown or immunization site too far away, mother too busy or with family problems, child either sick or not brought for immunization, or vaccine unavailable. Seven of these reasons, accounting for about 80% of the responses, relate to lack of information or motivation on the part of mothers (6).

Facility-level integration of PHC activities and provision of daily immunization will help to reduce the problem of missed opportunities for immunization . Continued mobilization and education of mothers and all community members on EPI/PHC issues will reduce immunization drop out rates.

In this survey, immunization coverage analyses took into consideration both information obtained from immunization cards and mothers' history. Ignoring caretakers' reports of children's immunization status has been found to significantly underestimate true immunization coverage in developing countries (7). According to Federal Ministry of Health policy, all immunizations given to a child should be recorded on an immunization card. In Suleja, only 56.2% of all children under 5 years of age had an immunization card. When stratified by age, possession of immunization cards was highest in the youngest children, suggesting some recent improvement in immunization card availability. Despite this recent improvement, problems with childhood immunization cards remain numerous. Some problems noted in this survey include:

- poor card retention by mothers due to loss, mutilation, or "safe-keeping" with the husband (who may oftentimes be away on the farm or in government employment)
- date of birth is not written on some immunization cards
- in some instances, immunizations are recorded as "given" without indicating the date

Immunization coverage (by card) might be considerably higher if all cards had dates recorded. Health staff need re-orientation on the need to properly document dates of immunizations administered.

**Diarrhoea:** Table 4.8 shows the estimated total number of acute diarrheal illnesses and deaths which occurred among children under 5 years in Suleja during 1991. These estimates are based on an annual diarrhoea incidence rate of 4.6 episodes per child and on the recently released 1991 population of Suleja/Gurara (171,197). Based on these data, it is estimated that 141,754 episodes of diarrhoea and at least 1,645 diarrhoea-related deaths occurred in Suleja (8). Clearly, diarrhoea remains a major cause of childhood morbidity and mortality in Suleja.

Previous research examining recall error among mothers of children with diarrhoea suggest that diarrhoea incidence may be underestimated in studies based on a recall period of more than two days. In a one-week diarrhoea recall survey in Teknaf, Bangladesh, reporting error was found to be directly related to the length of the recall period, and inversely related to the severity of diarrhoea as indicated by presence of fever and frequent motions (9). This one-week recall survey underestimated severe diarrhoea cases in Teknaf by 20-22% and less severe cases by 42-44%.

**Table 4.8 Diarrhoea morbidity and mortality**

Estimates of annual number of cases of acute diarrheal illness and deaths for children under 5 years old, Suleja, 1991

| | |
|---|---|
| Population < 5 years of Age* | 30,816 |
| Median annual diarrheal morbidity rate for children < 5 years of age (Episodes/child) | 4.6 |
| Diarrheal illnesses/year | 141,754 |
| Median diarrheal mortality rate for children < 5 years of age (Deaths/1000 pop)** | 11.6 |
| Diarrheal deaths/year | 1,645 |
| Case-Fatality-Ratio (Deaths/100 episodes) | 1.2 |

* Suleja population (1991) census figure = 171,197

** Source: see reference 8

Although it is recognized that under-reporting increases with length of recall, the extent of the problem has not been clearly defined in Nigeria. Assuming the degree of underestimation of diarrhoea cases documented in Teknaf applies to Suleja, one can assume a 30% underestimation of diarrhoea cases during 1991. Estimated diarrhoeal illnesses would increase to 184,280, with at least 2,139 diarrhea related deaths. For every child admitted to a health facility for diarrhoea in Suleja, at least eighteen cases occur in the community.

The enormity of these estimates in Suleja, with a total population of less than 200,000, emphasizes the need for immediate and effective efforts to reduce diarrhoea morbidity and mortality. The urgency of the diarrhoea problem in Suleja is further compounded by the increasing prevalence of malnutrition throughout Nigeria, especially in the northwest(10). In populations where young children are marginally nourished, frequent episodes of diarrhoea and other infections can have a serious impact on nutritional status and growth (11).

**Home treatment:** From the planning stage, information bias was considered a potential problem in this survey. Caretakers might over-report episodes if they believe the interviewers can provide some additional services. Under-reporting might occur if parents sense that the measures taken on their child's behalf were not in accord with that expected by the interviewer. For these reasons, considerable attention was paid to teaching interview technique during training.

In this survey, there was a significant increase in some diarrhoea/fever treatment practices, following prompting of mothers. The improved response is particularly marked for practices which caretakers sense may not be in accord with the response the interviewer may expect. Hence, our estimate of the rate of use of herbs, enema, and utilization of the services of traditional healers could be artificially low. Focus group discussions with selected caretakers in the community are likely to give better results with these variables.

**Salt-sugar solution:** Among mothers who prepared SSS incorrectly, the most common mistakes were use of too little water, too much salt or sugar, or both too much salt and too much sugar. Oftentimes, use of too much sugar or salt occurred because mothers used a 5-ml teaspoon instead of the recommended 3-ml teaspoon. Too much water resulted either from ignorance about the proper amount of water or from use of the new 350 ml "cocacola" bottle, two bottles of which gives 700 ml.

Type of salt used, spoon size, levelling technique, and sugar/salt moisture content (due to inadequate storage) are also potential reasons for incorrect preparation. Data was not collected on the types of teaspoons available in homes in Suleja. A previous study indicated that there are over 12 types of teaspoons in Nigerian homes and that these vary in volume from 1.8 to 5 ml (12).

As a result of these measurement errors, a substantial number of mothers prepared salt-sugar-solutions that were too concentrated in either sugar, salt, or both sugar and salt. Similar evaluations of home-made SSS preparation in Nigeria report findings comparable to

that noted in Suleja (13-14).

The success rate of oral rehydration therapy depends on several factors, including the adequacy of the volume of oral solution ingested in relation to fluid losses in stool and vomitus.
In this survey, only 27% of mothers (half of those able to prepare SSS correctly) were estimated to have "adequate" administered SSS to their children with diarrhoea. "Adequate" was defined as 100-200 ml of correctly prepared SSS administered at least six times per day beginning on the first day of diarrhoea.

Health education messages on salt-sugar solution in Nigeria should consider three critical issues. First, feeding a hypernatremic solution to a dehydrated child may be dangerous. Mothers need to taste SSS first before giving the solution to their children. If prepared properly, SSS should taste like tears. Second, there is a need to give an adequate quantity of SSS at home to replenish fluid loss. Efforts should be made to discourage the belief that SSS is a medication that should be administered in small quantities only. Third, there is a need to emphasize the frequency of rehydration at home. Official policy states that 100-200 ml of SSS should be given to children with diarrhoea after each episode of diarrhoea or vomiting.

Finally, the CDD program in Nigeria should consider enhancing commercial production of 3 ml teaspoons, especially the cheap plastic forms, to ensure that these are universally available in homes.

**Home fluids:** Home fluids (other than SSS) were frequently given to children with diarrhoea in Suleja. During diarrhoeal episodes, 22% of children were given increased amounts of fluids, 66% the same amount, and 22% a lesser amount of fluid. Future studies in Suleja should determine the exact nature of these fluids (other than water), especially traditional fluids, administered to children with diarrhoea. Such studies should examine use rate, availability, affordability, and safety as a basis for potential official inclusion on the list of home fluids recommended for use in Nigeria.

**Continued feeding:** As a result of community education in Suleja, nearly all mothers in Suleja who breastfed their child before the onset of diarrhoea continued breastfeeding throughout the episode. While information on the duration of exclusive breastfeeding was not obtained in Suleja, only 2.1% of Nigerian mothers breastfeed exclusively for less than 3 months (10).

Nearly half of all mothers reduced solid food intake or stopped giving food altogether during the child's diarrhoea episode. This finding must be interpreted with caution. From anecdotal reports, mothers in Suleja often attempt to continue feeding and or even force the child to increase consumption. Stoppage of semi-solid and/or solid food during the diarrhoea episode often results from rejection of available foods by sick children who have a poor appetite or who may be anorexic. There is a need to modify the non-specific advice given to

mothers to continue feeding their children during episodes of diarrhoea. Development of a nutritious alternative to the traditional dilute pap or "kunu" served as food, regardless of health status, should be considered. Such a home-prepared fortified liquid, "Eko Ilera," has been promoted in Ilorin (Kwara State) since 1989.

**Use of drugs:** A substantial number of mothers continue to give inappropriate drugs to their children with diarrhoea. Studies of diarrhoea treatment (both at home and at some health facilities) show that a large number of antidiarrheals, antibiotics, and other pharmaceutical agents without proven efficacy but with potential toxicity, are widely used throughout Nigeria. In one study in Maiduguri, interviews with persons seeking treatment at retail pharmacies showed that the second most frequent treatment prescribed for dysentery and diarrhoea was an antibiotic, either oral or injection (15).

Potential problems associated with extensive drug misuse are multiple and include adverse reactions, widespread antibiotic resistance, unnecessary cost, and diversion of attention from appropriate diarrhoea treatment. Actions to limit the widespread, inappropriate use of drugs and to promote a more rational use of such agents in the management of acute diarrhea should be a high priority for health policy makers and medical professionals in Suleja Local Government, and in Nigeria at large.

Antibiotics for acute diarrhoea should be given only when cholera is suspected on clinical and epidemiologic grounds or if there is bloody stool suggestive of shigellosis. For amoebiasis, an appropriate antiparasitic drug should be administered only after antibiotic treatment cf bloody diarrhoea has failed or trophozoites of Ent. histolytica containing red blood cells are seen in the feces. For giardiasis, an antiparasitic drug should be used only when diarrhoea has lasted for at least 14 days and cysts or trophozoites of Giardia are seen in feces or small bowel fluid.

**Mothers' understanding:** In general terms, this study demonstrates the importance of using a classification of diarrhoeal episodes that is based upon what the people themselves perceive. Caretakers appear to understand the importance of using SSS solution for "severe" diarrhoea episodes. Mothers refer for treatment outside the home (to health facilities as well as traditional healers) more often for "severe" diarrhoea.

Caretakers' responses to diarrheal illnesses and compliance with prescribed treatment are influenced by many factors including cultural attitudes and practices, socioeconomic status, and level of education/literacy. The mother's concept of diarrhoea, ability to recognize signs of dehydration and severe disease, understanding of ORT (SSS and ORS), and time available for child care, are factors that must be understood in order to define relevant messages on early home treatment of diarrhoea and assure effective communication of these messages to mothers (16-18). Development of context-specific, culturally appropriate messages is more likely to achieve sustained correct home treatment of diarrhoea than use of a standardized model and concept of dehydration (19).

Correct case management of diarrhoea must start in the home. Nearly one-third of all mothers in Suleja have no idea about the aetiology of diarrhoea. Health workers need to enable mothers understand the causes of diarrhoea in the community, especially among children. Feasible preventive interventions have been identified that could have a significant effect on diarrhoea morbidity (20-21) and mortality (22). These include improved nutrition (breast-feeding and proper weaning), use of safe water, good personal and domestic hygiene (hand-washing, use of latrines, disposal of infant stools) and measles immunization (23).

**Fever:** Fever remains a major cause of childhood morbidity in Suleja. Based on 1991 population estimates and an annual fever incidence rate of 8.8 episodes per child (adjusted for seasonality), it is estimated that 271,181 episodes of fever occurred among children under 5 years of age in Suleja during 1991.

Among mothers who took their child with fever to a health facility, nearly three-quarters reported fever to have been diagnosed as "malaria" by the health worker. This finding is comparable to that found by researchers in the Gambia (24). "Malaria" is a major cause of death in children in Nigeria and other African countries. It is estimated that 1% of all malaria episodes are severe enough to require hospitalization. Fifteen to 25% of hospitalized pediatric malaria patients die. In this survey, 4% of all fever episodes were admitted to a health facility. These fever cases are estimated to have resulted in 1,470 to 2,240 fever related deaths in Suleja during 1991.

Projected fever-related cases and deaths in Suleja during 1991 may be underestimated due to recall error over the two-week survey period. While shorter recall periods produce more accurate estimates, factors such as sample size, cost, and survey logistics were considered in the decision to use a two-week recall period.

**Home treatment:** The principal malaria control strategy recommended by WHO for countries with high malaria mortality and scarce resources for vector control is prompt treatment of malaria cases with antimalarial drugs. In countries where malaria is highly endemic, antimalarial drug treatment is recommended for all cases of fever in children under five years, even when microscopic diagnosis cannot be made (4, 25).

More than half of the children with fever in this survey were given antimalarial medicine (chloroquine) at home. Almost as many children were given paracetamol, and one in four children were given an antibiotic. The high use rate of antimalarials and other drugs in Suleja may relate to the semi-urban nature of the Local Government (in close proximity to Abuja), and the relatively easy access to health providers by the majority of Suleja inhabitants. Health care services and drugs/medicines are available through a wide range of sources, including medical practitioners (both government and private), chemists, patent medicine vendors, and street or market drug sellers. Private sector providers are especially predominant in Suleja, with six private hospitals and a number of smaller private clinics. Home treatment with antimalarial drugs has several advantages. First, home treatment greatly increases the proportion of children with fever who receive an antimalarial drug. In

this survey, 65% of children with fever were given an antimalarial drug (essentially all chloroquine) at home. Of the 60.2% of children with fever taken to a health facility, 82% received an antimalarial. If prescription of antimalarial drugs is recommended at the facility level only, 49% of all fever episodes occurring among children in the community would not receive an antimalarial drug.

A second advantage of home treatment is promptness. While 54% of children received home treatment with an antimalarial on the first day of fever, only 31% of children were seen by a health worker on the first day. Promptness in treating malaria fever at home reduces the mean duration of the illness and its case fatality rate. The challenges of implementing prompt home treatment with antimalarials is illustrated by the analysis of chloroquine doses administered by mothers.

**Chloroquine dosage:** It is well known that under-dosage with chloroquine may contribute to chloroquine resistance, a problem which has been reported in Niger State and other parts of Nigeria. In this survey, the dose of chloroquine administered to children with fever each day was calculated, regardless of source of the antimalarial. These calculations were based on the assumption that all syrup contained 50 mg chloroquine/5 ml and was administered with a 5-ml teaspoon, tablets were 150 mg base, and all chloroquine was potent and of good quality.

Acknowledging the limitations posed by these assumptions, this study suggests that parental administration of chloroquine in Suleja may be associated with under-dosing for syrup and over-dosing for tablets. For both tablets and syrup, mothers did not halve the chloroquine dose on day three. While children aged four years should be given tablets, syrup was often administered.

Although teaspoon size was not examined in this survey, it is likely that many mothers used a spoon size different from the recommended 5 ml teaspoon, increasing the potential for incorrect dosing. Moreover, if anecdotal reports suggesting that up to 40% of chloroquine drugs in circulation in Nigeria may be of inferior or questionable quality are true, the problem of chloroquine under-dosing moves beyond the amount of drug administered. A study is currently underway to examine the quality of antimalarials and other PHC essential drugs in Suleja.

The clinical implication of incorrect dosing found in this survey is not clear. More detailed studies (such as that carried out in Togo) are needed to further define the extent of chloroquine under- and over-dosing in Nigeria (26). Eighteen percent of mothers obtained antimalarials from the private sector (patent medicine vendors, chemists, etc.) in Suleja. To achieve proper management of fever at home and in health facilities, private sector practitioners must be identified and oriented on new malaria case management guidelines. Health education efforts must target mothers to enable them become aware of case management guidelines for treating malaria fever at home.

**Facility treatment:** Excessive use of injections at health facilities in Suleja is a serious problem. Sixty-eight percent of children with fever were given antimalarial injections (56.4% of children with diarrhoea were given an injection), while 13% received an antibiotic injection. Inappropriate use of injections is a potentially dangerous practice. Injections administered during the pre-paralytic stage of poliomyelitis increase the risk of acute paralysis (provocative cases) (27). Other potential problems with injections include transmission of hepatitis B, spread of HIV virus, and injection abscesses.

To improve facility-based case management of fever in Suleja and throughout Nigeria, there is an urgent need to provide orientation on the new national malaria treatment guidelines for all cadres of health workers in the government and private sectors. It might be helpful to design, field test, and print a 3-day chloroquine treatment poster for distribution in Suleja.

**Tetanus toxoid coverage and antenatal care:** While the majority of women in Suleja who had delivered in the past year were immunized with the first and second doses of tetanus toxoid (87% and 71%, respectively, card and history), corrected coverage for TT3 through TT5 is zero, reflecting a misunderstanding of the recently adopted five-dose TT schedule in Nigeria

Missed opportunities to deliver tetanus toxoid immunization during pregnancy are very high in Suleja, given that 89% of caretakers who delivered during the 12 months prior to the survey paid at least one antenatal visit to a health facility. The new 5-dose tetanus toxoid schedule has also not been well understood by health workers and caretakers. All third to fifth doses of TT administered were wrongly given. There is an urgent need to orient health workers (public and private) on the new TT schedule. Mothers of children taken to health facilities should routinely have their immunization status screened by health workers and referred for TT immunization if needed.

Several approaches to improve TT coverage in Suleja might be considered. First, focus group discussions could be carried out with mothers, traditional birth attendants (TBA) and health clinic staff in Suleja to learn more about health practices during pregnancy and child birth, perceptions of neonatal tetanus, and tetanus toxoid immunization. Reasons for low TT acceptance (including its erroneous association with family planning) could be further explored. Focus group discussions targeting these groups (mothers, traditional birth attendants, and health workers) have been successfully conducted in two communities (Kawo and Barnawa Kaduna) in Kaduna State (28). Second, a missed opportunity survey at selected health facilities in Suleja would address clinic management and referral patterns that contribute to the problem. Third, newly approved personal health cards for documenting tetanus toxoid immunizations should be made available at all health facilities. Women should be advised to bring these cards with them each time they visit a health facility.

## REFERENCES


1. Henderson, R.H. et al. Assessment of vaccination coverage, vaccination scar rates, and smallpox scarring in five areas of West Africa. Bulletin of the World Health Organization 1973; 48: 183-94.

2. Henderson, R.H. and Sundaresan, T. Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. Bulletin of the World Health Organization 1982; 60: 253-60.

3. Lemeshow, S. and Robinson, D. Surveys to measure programme coverage and impact: a review of the methodology used by the Expanded Programme on Immunization. World Health Statistics Quarterly 1985; 38: 65-75.

4. Federal Ministry of Health, Document: Guidelines for malaria control in Nigeria, 1989.

5. Dabis F, et al. Monitoring selective components of primary health care: methodology and community assessment of vaccination, diarrhoea, and malaria practices in Conakry, Guinea. Bull Wld Hlth Org 1989; 67: 675-84.

6. Federal Ministry of Health, Report: In-depth Programme Review of EPI and CDD, Federal Ministry of Health, Nigeria, 1989.

7. Gareaballah ET, Loevinsohn BP. The accuracy of mothers' reports about their children's vaccination status. Bull Wld Hlth Org 1989; 67: 669-74.

8. Snyder JD, Merson MH. The magnitude of the global problem of acute diarrhoeal disease: a review of acute surveillance data. Bull Wld Hlth Org 1982; 60: 605-13.

9. Alam N, Fitzroy J, Henry, Rahaman M. Reporting errors in One-week diarrhoea recall surveys: Experience from a prospective study in rural Bangladesh. Int J Epidemiology
1989; 18: 697-700.

10. Federal Ministry of Health, United States Agency for International Development, Report: Nigeria Demographic and Health survey, Nigeria, 1990.

11. Black RE, Brown KH, Becker S. Effects of diarrhoea associated with specific enteropathogens on the growth of children in rural Bangladesh. Pediatrics 1984; 73: 799-805.

12. Grange AO, et al. Standardization of home-made salt-sugar solution for the treatment of acute diarrhoeal diseases of childhood in Nigeria. Nig J of Paediat 1985; 12: 41-7.

13. Nwoye LO, Uwagboe PE, Madubuko GU. Evaluation of home-made salt-sugar oral rehydration solution in a rural Nigerian population. J Trop Med Hyg 1988; 91: 23-7.

14. Ransome-Kuti O, Bamisaiye A. Oral therapy of infant diarrhoea (letter). Lancet 1978; 2: 471.

15. Igun UA. Why we seek treatment here: retail pharmacy and clinical practice in Maiduguri, Nigeria. Soc Sci Med 1987; 24: 689-95.

16. Patel VL, Eisemon TO, Arocha JF. Causal reasoning and the treatment of diarrhoeal diseases by mothers in Kenya. Soc Sci Med 1988; 159: 1061-4.

17. Bentley M. The household management of childhood diarrhea in rural North India. Soc Sci Med 1988; 27: 75-85.

18. Claeson M, Merson MH. Global progress in the control of diarrheal diseases. Pediatr Infect Dis J 1990; 345-55.

19. Chowdury AM, Vaughan JP, Adel FH. Use and safety of home-made oral rehydration solutions: an epidemiologic evaluation from Bangladesh. Int J Epidemiol 1988;
17: 655-65.

20. Feachem RG, Hogan RC, Merson MH. Diarrhoeal diseases control: review of potential interventions. Bull Wld Hlth Org 1983; 61: 637-40.

21. Federal Ministry of Health, Document: Nigeria control of diarrhoeal diseases (CDD) programme, 1991-1995; 1991.

22. Feachem RG, Koblinsky MA. Interventions for the control of diarrheal diseases among young children: measles immunization. Bull Wld Hlth Org 1983; 61: 641-52.

23. Feachem R. Preventing diarrhoea: what are the policy options? Health Policy Planning 1986; 1: 109-17.

24. Greenwood BW. et al. Mortality and morbidity from malaria among children in a rural area of the Gambia, West Africa. Transactions of the Royal Society of Tropical Medicine and Hygiene 1987; 81: 478-86.

25. WHO Technical Report Series No. 735, 1986 (WHO Expert).

26. Deming MS, Gayibor A, Murphy K, Jones TS, Karsa T. Home treatment of febrile children with antimalarial drugs in Togo. Bull Wld Hlth Org 1989; 67: 695-700.

27. Wyatt HV. The popularity of injections in the third world: origins and consequences for poliomyelitis. Soc Sci Med 1984; 19: 911-15.

28. Dickin KL, Binchan RK, Purdue RN, Obinya EA. Perceptions of neonatal tetanus and immunization during pregnancy: A report of focus group discussions in Kaduna, Nigeria. Int'l Quarterly of Community Health Education 1991; 11:371-83.

## Appendix A

### LIST OF CLUSTERS

# Estimated* populations of villages and wards, Suleja LGA

| District | Village | Pop. | Cum. Pop. | % of Total | Cum. % | Cluster No |
|---|---|---|---|---|---|---|
| Gurura | Diko Pada | 2,337 | 2,337 | 0.716 | 0.716 | |
| | Dika S/Gari | 335 | 2,672 | 0.103 | 0.819 | |
| | Diko Hausa | 571 | 3,243 | 0.175 | 0.994 | |
| | Boyi Sarki | 433 | 3,676 | 0.133 | 1.126 | |
| | Boyi Hausa | 308 | 3,984 | 0.094 | 1.221 | 1 |
| | Boyi Makaki | 276 | 4,260 | 0.085 | 1.305 | |
| | Uaguru | 201 | 4,461 | 0.062 | 1.367 | |
| | Yaguru | 198 | 4,659 | 0.061 | 1.427 | |
| | T/Auta | 198 | 4,857 | 0.061 | 1.488 | |
| | Ganukuci | 218 | 5,075 | 0.067 | 1.555 | |
| | Kayigwana | 173 | 5,248 | 0.053 | 1.608 | |
| | Damo | 320 | 5,568 | 0.098 | 1.706 | |
| | Layiba | | 5,568 | 0.000 | 1.706 | |
| | Kuciko | | 5,568 | 0.000 | 1.706 | |
| | Shako Madaki | 597 | 6,165 | 0.183 | 1.889 | |
| | Shako Wakili | 450 | 6,615 | 0.138 | 2.027 | |
| | Shako Sarki | 355 | 6,970 | 0.109 | 2.135 | |
| | Laka Pago | 497 | 7,467 | 0.152 | 2.288 | |
| | Laka Madaki | | 7,467 | 0.000 | 2.288 | |
| | Laka Sarki | | 7,467 | 0.000 | 2.288 | |
| | Ikumi | 201 | 7,668 | 0.062 | 2.349 | |
| | Bouci | 247 | 7,915 | 0.076 | 2.425 | |
| | Kujayi Gwari | | 7,915 | 0.000 | 2.425 | |
| | T/Murici | 109 | 8,024 | 0.033 | 2.458 | |
| | Chinbi | 174 | 8,198 | 0.053 | 2.512 | |
| | Gutudabe | 190 | 8,388 | 0.058 | 2.570 | |
| | Yalwa Kowu | 500 | 8,888 | 0.153 | 2.723 | |
| | Kowu Sarki | 3,342 | 12,230 | 1.024 | 3.747 | 2 |
| | Bwazare | 213 | 12,443 | 0.065 | 3.812 | |
| | Wagu | | 12,443 | 0.000 | 3.812 | |
| | Gwacipa Pandar | | 12,443 | 0.000 | 3.812 | |
| | Hausawa | 268 | 12,711 | 0.082 | 3.894 | |
| | Murugu | 2,369 | 15,080 | 0.726 | 4.620 | |
| | Gwacipa Pada | | 15,080 | 0.000 | 4.620 | |
| | Abuchi Gwari | 724 | 15,804 | 0.222 | 4.842 | |
| | Abuchi Koro | 546 | 16,350 | 0.167 | 5.009 | |
| | Apuge (1) | 307 | 16,657 | 0.094 | 5.103 | |
| | Gape (1) | | 16,657 | 0.000 | 5.103 | |
| | Gape (11) | | 16,657 | 0.000 | 5.103 | |
| | Gora | 172 | 16,829 | 0.053 | 5.156 | |
| | Jigodo | 238 | 17,067 | 0.073 | 5.229 | |
| | Gwale (1) | 472 | 17,539 | 0.145 | 5.373 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Gwale (11) | | 17,539 | 0.000 | 5.373 | |
| | Jigamami | 176 | 17,715 | 0.054 | 5.427 | |
| | Tuchi | 576 | 18,291 | 0.176 | 5.604 | |
| | Bulu | 514 | 18,805 | 0.157 | 5.761 | |
| | Lafu | 307 | 19,112 | 0.094 | 5.855 | |
| | Duma | 184 | 19,296 | 0.056 | 5.912 | |
| | Furushe (1/11) | 222 | 19,518 | 0.068 | 5.980 | |
| | Iwa | 266 | 19,784 | 0.081 | 6.061 | |
| | Fidakuruda | 224 | 20,008 | 0.069 | 6.130 | 3 |
| | Sayida | 189 | 20,197 | 0.058 | 6.188 | |
| | T/Kawa | 108 | 20,305 | 0.033 | 6.221 | |
| | Layigba | 161 | 20,466 | 0.049 | 6.270 | |
| | Gbobo | 194 | 20,660 | 0.059 | 6.330 | |
| | Jatayi | 149 | 20,809 | 0.046 | 6.375 | |
| | Izom | 2,585 | 23,394 | 0.792 | 7.167 | |
| | Kwaka | 1,212 | 24,606 | 0.371 | 7.539 | |
| | Kabo | 1,010 | 25,616 | 0.309 | 7.848 | |
| | Mallan Karo | 850 | 26,466 | 0.260 | 8.108 | |
| | Pekuchi | 105 | 26,571 | 0.032 | 8.141 | |
| | Padaha | 870 | 27,441 | 0.267 | 8.407 | |
| | Numba Koro | 820 | 28,261 | 0.251 | 8.658 | 4 |
| | Numba Gwari | 725 | 28,986 | 0.222 | 8.880 | |
| | Shingere | 290 | 29,276 | 0.089 | 8.969 | |
| | Kushashi | | 29,276 | 0.000 | 8.969 | |
| | T/Gajere | 106 | 29,382 | 0.032 | 9.002 | |
| | Diga | 595 | 29,977 | 0.182 | 9.184 | |
| | Abuchi Padama | 670 | 30,647 | 0.205 | 9.389 | |
| | Sulu | 510 | 31,157 | 0.156 | 9.546 | |
| | Daku | 236 | 31,393 | 0.072 | 9.618 | |
| | Kuru Kasa | 712 | 32,105 | 0.218 | 9.836 | |
| | Shanu | 520 | 32,625 | 0.159 | 9.995 | |
| | Zaki Madaki | 570 | 33,195 | 0.175 | 10.170 | |
| | Guma | 1,450 | 34,645 | 0.444 | 10.614 | |
| | Gursu | 413 | 35,058 | 0.127 | 10.741 | |
| | Shayi | 128 | 35,186 | 0.039 | 10.780 | |
| | Kadna | 123 | 35,309 | 0.038 | 10.818 | |
| | Kwalayi | 145 | 35,454 | 0.044 | 10.862 | |
| Suleja | Emir's Palace | 10,486 | 45,940 | 3.213 | 14.075 | 5, 6 |
| | Angnwan Gwanda | 15,384 | 61,324 | 4.713 | 18.788 | 7, 8 |
| | Bakin Kasuwa | 12,213 | 73,537 | 3.742 | 22.530 | 9 |
| | Dawaki/Salanke | 14,645 | 88,182 | 4.487 | 27.016 | 10, 11 |
| | Daudu Gyara | 5,670 | 93,852 | 1.737 | 28.753 | 12 |
| | Kurmin Sarki | 8,432 | 102,284 | 2.583 | 31.337 | 13 |
| | Kabula | 4,385 | 106,669 | 1.343 | 32.680 | |
| | Yaskwa | 1,925 | 108,594 | 0.590 | 33.270 | 14 |
| | Ashada | 1,298 | 109,892 | 0.398 | 33.668 | |
| | Karofi | 2,118 | 112,010 | 0.649 | 34.316 | |
| | Jakada | 2,413 | 114,423 | 0.739 | 35.056 | |
| | Pangamu | 5,894 | 120,317 | 1.806 | 36.862 | 15 |
| | Kpaco | 2,264 | 122,581 | 0.694 | 37.555 | |
| | Matan Akwa | 2,548 | 125,129 | 0.781 | 38.336 | 16 |
| | Koko | 3,432 | 128,561 | 1.051 | 39.387 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Kurenkaka | 4,876 | 133,437 | 1.494 | 40.881 | 17 |
| | Iyan Bakakin Was | 2,376 | 135,813 | 0.728 | 41.609 | |
| | Dankiwuka | 2,484 | 138,297 | 0.761 | 42.370 | 18 |
| | Barebari | 2,713 | 141,010 | 0.831 | 43.201 | |
| | Kuyanbana | 2,550 | 143,560 | 0.781 | 43.982 | |
| | Karfe | 2,085 | 145,645 | 0.639 | 44.621 | |
| | Zariyawa | 2,895 | 148,540 | 0.887 | 45.508 | 19 |
| | Aho | 3,784 | 152,324 | 1.159 | 46.667 | |
| | Magajin Mallan | 2,414 | 154,738 | 0.740 | 47.407 | 20 |
| | Gwari | 2,358 | 157,096 | 0.722 | 48.129 | |
| | Rubu | 2,292 | 159,388 | 0.702 | 48.832 | |
| | Biko | 3,558 | 162,946 | 1.090 | 49.922 | |
| | Bai | 3,140 | 166,086 | 0.962 | 50.884 | |
| | Iya | 3,405 | 169,491 | 1.043 | 51.927 | 21 |
| | Jarmai | 1,348 | 170,839 | 0.413 | 52.340 | |
| | Sarauniya | 2,845 | 173,684 | 0.872 | 53.212 | |
| | Kachenia | 1,240 | 174,924 | 0.380 | 53.591 | 22 |
| | Dallatu | 1,814 | 176,738 | 0.556 | 54.147 | |
| | Masallachi | 2,085 | 178,823 | 0.639 | 54.786 | |
| | Kanffa | 1,156 | 179,979 | 0.354 | 55.140 | |
| | Danzaria | 2,105 | 182,084 | 0.645 | 55.785 | |
| | Gabashi | 1,083 | 183,167 | 0.332 | 56.117 | 23 |
| | Gayan | 1,256 | 184,423 | 0.385 | 56.502 | |
| | Galadima | 2,314 | 186,737 | 0.709 | 57.211 | |
| | Juma | 1,388 | 188,125 | 0.425 | 57.636 | |
| | Gade | 1,025 | 189,150 | 0.314 | 57.950 | 24 |
| | Badaru | 1,150 | 190,300 | 0.352 | 58.302 | |
| | Shamaki | 1,547 | 191,847 | 0.474 | 58.776 | |
| | Kasuwan Dole | 1,385 | 193,232 | 0.424 | 59.200 | |
| | Pawa | 2,313 | 195,545 | 0.709 | 59.909 | |
| | Yara | 1,228 | 196,773 | 0.376 | 60.285 | |
| Gawu | Kaura Gawu | 9,381 | 206,154 | 2.874 | 63.159 | 25, 26 |
| | Kopati | 31 | 206,185 | 0.009 | 63.169 | |
| | Dawaki | 525 | 206,710 | 0.161 | 63.330 | |
| | Tando | 391 | 207,101 | 0.120 | 63.449 | |
| | Soita | 292 | 207,393 | 0.089 | 63.539 | |
| | Kitikpa | 451 | 207,844 | 0.138 | 63.677 | |
| | Gusakpa | 607 | 208,451 | 0.186 | 63.863 | |
| | Tufa | 3,091 | 211,542 | 0.947 | 64.810 | |
| | Boku 1 | 1,549 | 213,091 | 0.475 | 65.285 | |
| | Boku 11 | 1,400 | 214,491 | 0.429 | 65.714 | 27 |
| | Domi | 633 | 215,124 | 0.194 | 65.907 | |
| | Gwarbaba | 891 | 216,015 | 0.273 | 66.180 | |
| | Lambata | 2,321 | 218,336 | 0.711 | 66.892 | |
| | Kokogbe | 437 | 218,773 | 0.134 | 67.025 | |
| | Fuka | 150 | 218,923 | 0.046 | 67.071 | |
| | Gbiti | 87 | 219,010 | 0.027 | 67.098 | |
| | Tuna | 2,553 | 221,563 | 0.782 | 67.880 | 28 |
| | Tuna/Baji | 559 | 222,122 | 0.171 | 68.051 | |
| | Kuturi | 412 | 222,534 | 0.126 | 68.178 | |
| | T/Wada (1&2) | 842 | 223,376 | 0.258 | 68.436 | |
| | Bogota | 369 | 223,745 | 0.113 | 68.549 | |

| | | | | | |
|---|---|---|---|---|---|
| Lefu | 974 | 224,719 | 0.298 | 68.847 | |
| Kuajere | 337 | 225,056 | 0.103 | 68.950 | |
| Petepe | 222 | 225,278 | 0.068 | 69.018 | |
| Solipule | 204 | 225,482 | 0.062 | 69.081 | |
| Tayile | 539 | 226,021 | 0.165 | 69.246 | |
| Buzhi | 652 | 226,673 | 0.200 | 69.446 | |
| Bonu | 1,543 | 228,216 | 0.473 | 69.918 | |
| Bonu Peita | 417 | 228,633 | 0.128 | 70.046 | |
| Padawa | 363 | 228,996 | 0.111 | 70.157 | |
| Dogibe | 567 | 229,563 | 0.174 | 70.331 | 29 |
| Kokogbe | 537 | 230,100 | 0.165 | 70.496 | |
| Tikum | 1,281 | 231,381 | 0.392 | 70.888 | |
| Jakum | 1,088 | 232,469 | 0.333 | 71.221 | |
| Kudna | 1,042 | 233,511 | 0.319 | 71.541 | |
| Gwale | 587 | 234,098 | 0.180 | 71.721 | |
| Gwari Baba | 128 | 234,226 | 0.039 | 71.760 | |
| Agwara | 125 | 234,351 | 0.038 | 71.798 | |
| Domi | 280 | 234,631 | 0.086 | 71.884 | |
| Kuara titi | 105 | 234,736 | 0.032 | 71.916 | |
| Jega | 115 | 234,851 | 0.035 | 71.951 | |
| Wukupi | 142 | 234,993 | 0.044 | 71.995 | |
| Baji | 813 | 235,806 | 0.249 | 72.244 | |
| Kwamba | 3,844 | 239,650 | 1.178 | 73.422 | 30 |
| Maje | 1,220 | 240,870 | 0.374 | 73.795 | |
| Daguru | 1,090 | 241,960 | 0.334 | 74.129 | |
| Kuchiko | 1,304 | 243,264 | 0.400 | 74.529 | |
| Zariyawa | 240 | 243,504 | 0.074 | 74.602 | |
| Kajiji | 345 | 243,849 | 0.106 | 74.708 | |
| Tungan Albara | 2,685 | 246,534 | 0.823 | 75.531 | 31 |
| Baban Tunga | 1,205 | 247,739 | 0.369 | 75.900 | |
| Tungan Makama | 512 | 248,251 | 0.157 | 76.057 | |
| Gajipi | 620 | 248,871 | 0.190 | 76.247 | |
| Tungan Sauni | 240 | 249,111 | 0.074 | 76.320 | |
| Sanaje | 570 | 249,681 | 0.175 | 76.495 | |
| Rafin Karfe | 645 | 250,326 | 0.198 | 76.692 | |
| Yaguru | 789 | 251,115 | 0.242 | 76.934 | |
| Buntu | 650 | 251,765 | 0.199 | 77.133 | |
| Danchilo | 490 | 252,255 | 0.150 | 77.283 | |
| Kofa | 1,880 | 254,135 | 0.576 | 77.859 | 32 |
| Bakin Iku | 2,594 | 256,729 | 0.795 | 78.654 | |
| Tutulu | 845 | 257,574 | 0.259 | 78.913 | |
| Madalla Hause | 3,848 | 261,422 | 1.179 | 80.092 | |
| Madalla Gwari | 2,240 | 263,662 | 0.686 | 80.778 | 33 |
| Chachi | 2,143 | 265,805 | 0.657 | 81.435 | |
| Gauraka | 4,556 | 270,361 | 1.396 | 82.830 | 34 |
| Iyu | 1,517 | 271,878 | 0.465 | 83.295 | |
| Chaza | 2,050 | 273,928 | 0.628 | 83.923 | |
| Rafin Sanyi | 1,300 | 275,228 | 0.398 | 84.322 | 35 |
| Konkache | 1,534 | 276,762 | 0.470 | 84.792 | |
| Ang.Barack | 985 | 277,747 | 0.302 | 85.093 | |
| Police Barack | 2,038 | 279,785 | 0.624 | 85.718 | |
| Gwazunu | 1,452 | 281,237 | 0.445 | 86.163 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Aho | 589 | 281,826 | 0.180 | 86.343 | |
| | Ang.Tivi | | 281,826 | 0.000 | 86.343 | |
| Tapa | Bwari | 2,980 | 284,806 | 0.913 | 87.256 | |
| | Barangoni | 250 | 285,056 | 0.077 | 87.333 | |
| | Kuduru | 990 | 286,046 | 0.303 | 87.636 | 36 |
| | Kaima | | 286,046 | 0.000 | 87.636 | |
| | Yaupe | 140 | 286,186 | 0.043 | 87.679 | |
| | Pada | 250 | 286,436 | 0.077 | 87.755 | |
| | Shishipe | 540 | 286,976 | 0.165 | 87.921 | |
| | Chipo | 240 | 287,216 | 0.074 | 87.994 | |
| | Ijakoro | 2,100 | 289,316 | 0.643 | 88.638 | |
| | Adagurusu | 290 | 289,606 | 0.089 | 88.727 | |
| | Ang.Ladan | 413 | 290,019 | 0.127 | 88.853 | |
| | Kata Sarki | 890 | 290,909 | 0.273 | 89.126 | |
| | Kata Tupe | | 290,909 | 0.000 | 89.126 | |
| | Kata Madaki | | 290,909 | 0.000 | 89.126 | |
| | Ang.Kata | | 290,909 | 0.000 | 89.126 | |
| | Apo | 150 | 291,059 | 0.046 | 89.172 | |
| | Galife | 345 | 291,404 | 0.106 | 89.277 | |
| | Wuse Hausa | 2,580 | 293,984 | 0.790 | 90.068 | 37 |
| | Wuse Dage | 3,940 | 297,924 | 1.207 | 91.275 | |
| | Kududuma | 1,070 | 298,994 | 0.328 | 91.603 | |
| | Katampe | | 298,994 | 0.000 | 91.603 | |
| | Kokuba | 420 | 299,414 | 0.129 | 91.731 | |
| | Gapam | 285 | 299,699 | 0.087 | 91.819 | |
| | | | 299,699 | 0.000 | 91.819 | |
| | Aso Koro | 1,135 | 300,834 | 0.348 | 92.166 | |
| | Karomajigi | 572 | 301,406 | 0.175 | 92.342 | 38 |
| | Tungan Adaka | 1,312 | 302,718 | 0.402 | 92.744 | |
| | Tungan Bijimi | 1,040 | 303,758 | 0.319 | 93.062 | |
| | Ang.Gwari | 520 | 304,278 | 0.159 | 93.222 | |
| | Dogon Kurmi | 6,065 | 310,343 | 1.858 | 95.080 | 39 |
| | Chawa | | 310,343 | 0.000 | 95.080 | |
| | Kpalada | | 310,343 | 0.000 | 95.080 | |
| | Azhi Sama | | 310,343 | 0.000 | 95.080 | |
| | Azhi Kasa | | 310,343 | 0.000 | 95.080 | |
| | Gyada | | 310,343 | 0.000 | 95.080 | |
| | Azu | | 310,343 | 0.000 | 95.080 | |
| | Ang.Makama Bub | 560 | 310,903 | 0.172 | 95.251 | |
| | Ang. Pada | 480 | 311,383 | 0.147 | 95.398 | |
| | Ang.Makama Kara | 413 | 311,796 | 0.127 | 95.525 | |
| | Ang.S/Pada Gaga | 150 | 311,946 | 0.046 | 95.571 | |
| | Ang.Diko Bojiko | 280 | 312,226 | 0.086 | 95.657 | |
| | Ang.Wambai | 960 | 313,186 | 0.294 | 95.951 | |
| | Makama Kwayida | 140 | 313,326 | 0.043 | 95.994 | |
| | Kayanbana | 290 | 313,616 | 0.089 | 96.082 | |
| | S/Pada Gumu | 270 | 313,886 | 0.083 | 96.165 | |
| | Makama Paduma | 175 | 314,061 | 0.054 | 96.219 | |
| | Bowu | 570 | 314,631 | 0.175 | 96.393 | |
| | Bonu Madaki | 570 | 315,201 | 0.175 | 96.568 | |
| | Kuchiko Ija | 1,345 | 316,546 | 0.412 | 96.980 | |
| | Yaguru | 875 | 317,421 | 0.268 | 97.248 | |

| | | | | | |
|---|---|---|---|---|---|
| T/Kure | 188 | 317,609 | 0.058 | 97.306 | |
| T/Kuyaga | 213 | 317,822 | 0.065 | 97.371 | |
| T/Jagaba | 108 | 317,930 | 0.033 | 97.404 | |
| T/Bambwa | 514 | 318,444 | 0.157 | 97.562 | |
| T/Dandu | 330 | 318,774 | 0.101 | 97.663 | |
| Apya | 450 | 319,224 | 0.138 | 97.801 | |
| Baye | 712 | 319,936 | 0.218 | 98.019 | |
| Kaboyi | 1,144 | 321,080 | 0.350 | 98.369 | |
| Garam | 1,845 | 322,925 | 0.565 | 98.934 | 40 |
| Garam Hausa | 1,213 | 324,138 | 0.372 | 99.306 | |
| Tudun Wafa | 1,042 | 325,180 | 0.319 | 99.625 | |
| Galkuchi | 348 | 325,528 | 0.107 | 99.732 | |
| Chauma | 145 | 325,673 | 0.044 | 99.776 | |
| T/Kawata | 150 | 325,823 | 0.046 | 99.822 | |
| T/Chaze | 250 | 326,073 | 0.077 | 99.899 | |
| Gumin | 125 | 326,198 | 0.038 | 99.937 | |
| Kafa Madaki | 205 | 326,403 | 0.063 | 100.000 | |

Total Population = 326,403
Sampling Interval = 8,160
Random Number = 3,680

# Appendix B

## SURVEY QUESTIONNAIRE

**Suleja Community Survey**

**Part I - Mother/Household Information**



| Mother code | _____ | _____ | _____ |
|---|---|---|---|
| | Interviewer | Cluster | Mother |

Supervisor's signature _____

Date of interview _____ / _____ / _____
Day Month Year

**Write the time that the interview starts below.**
**Fill in the time that the interview ends when you have finished.**

| | | |
|---|---|---|
| Time interview starts | _____ hour | _____ min |
| Time interview ends (fill in at end) | _____ hour | _____ min |

**Find a comfortable and private place to interview the woman.**

1. We are trying to find ways to improve the health of mothers and children in Suleja. To do that, we need to know about all children born to you in the past 5 years. If you have any children from a previous marriage, we need to know about those children also. Please start with your youngest child and tell me the names of all children born to you in the past 5 years.

**Go to the next page and fill out the table as directed.**

| Mother code | Interviewer | Cluster | Mother |
|---|---|---|---|

**Interviewer: Write the name of each child, and circle the sex (M or F).**

| No. | Name | Sex M/F |
|---|---|---|
| 1 | | M F |
| 2 | | M F |
| 3 | | M F |
| 4 | | M F |
| 5 | | M F |
| 6 | | M F |

↑ **This number is the CHILD NUMBER in the child code**

Would you please now get the vaccination cards and any documents with birth dates for all of your children who are younger than five years of age.

# Suleja Community Survey

## Part II - Nutrition/Immunization Information

**Fill out a form for each child named in question 1, Part I**

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

Name of child _____

1. **Copy date of birth from card or birth certificate, if available, and jump to question 3. If not available, go to question 2.** _____ / _____ / _____ (Day / Month / Year)

2. What was the child's date of birth? _____ / _____ / _____ (Day / Month / Year)

3. What is the age of the child now?
   - ___ less than 1 year
   - ___ 1 year
   - ___ 2 years
   - ___ 3 years
   - ___ 4 years
   - ___ Don't know

****** Ask question 4 ONLY once, for the youngest child ******

4. At what age did you begin to introduce weaning foods, that is, anything other than breast milk, apart from water, to the child?
   - ___ less than 1 month
   - ___ 1-3 months
   - ___ 4-6 months
   - ___ 7-12 months
   - ___ more than 1 year

5. Has the child ever received any immunizations?
   - ___ Yes
   - ___ No **-> go to 12**
   - ___ Don't know

**Interviewer: Ask questions 6-9 BEFORE looking at vaccination card**

6. Did the child receive BCG vaccine, that is, an injection in the arm ?
   - ___ Yes
   - ___ No
   - ___ Don't know

7. How many times did the child receive DPT vaccine, that is, an injection in the thigh or buttock?
   - ___ None
   - ___ 1
   - ___ 2
   - ___ 3
   - ___ Don't know

Child code: _____ _____ _____ _____
Interviewer Cluster Mother Child

8. How many times did the child receive polio drops in the mouth?
   ___ None
   ___ 1
   ___ 2
   ___ 3
   ___ Don't know

9. Did the child receive measles vaccine, that is, an injection in the shoulder?
   ___ Yes
   ___ No
   ___ Don't know

10. **Interviewer: If original document shown to you was the vaccination card, tick <u>yes</u> here, go to question 11, and copy the vaccination dates.**

    **If the original document was NOT the child's vaccination card, ask:**

    Do you have the child's vaccination card?
    ___ Yes -> **go to 11**
    ___ No -> **go to 12**

11. **Interviewer: Write in the dates the child received the following immunizations.**

| | Date from card | | |
|---|---|---|---|
| | **Day** | **Month** | **Year** |
| a. BCG vaccination ..... | _____ / | _____ / | _____ |
| b. DPT1 ..... | _____ / | _____ / | _____ |
| c. DPT2 ..... | _____ / | _____ / | _____ |
| d. DPT3 ..... | _____ / | _____ / | _____ |
| e. Polio 1 ..... | _____ / | _____ / | _____ |
| f. Polio 2 ..... | _____ / | _____ / | _____ |
| g. Polio 3 ..... | _____ / | _____ / | _____ |
| h. Measles ..... | _____ / | _____ / | _____ |

**Ask the following 3 questions only for the <u>first</u> child in each household. <u>Do NOT</u> ask for each child. For all others, jump to question 15 now.**

12. Have you seen or heard any information about immunization in the past year?
    ___ Yes -> **go to 13**
    ___ No -> **go to 14**

13. How did you learn that you should take your child for immunization?
    ___ Village health worker
    ___ Radio/Television
    ___ Poster
    ___ Told at clinic
    ___ Another mother/neighbor
    ___ Mobile van
    ___ Other (specify): _____

| Child code | Interviewer | Cluster | Mother | Child |
|---|---|---|---|---|
| | _____ | _____ | _____ | _____ |

14. How many times do you need to take your child for immunization in order for the child to be protected?

____ Number of times
**(Enter 99 for don't know)**

15. Has this child had diarrhoea in the past 2 weeks?

___ Yes -> **go to Part III <u>NOW</u>**
___ No -> **go to 16**
___ Don't know -> **go to 16**

16. Has this child had fever in the last 2 weeks?

___ Yes -> **go to Part IV**

___ No -> **go to Part II for <u>next</u> child, or, if this is the LAST child, go to Part V**

**Suleja Community Survey**

**Part III - Diarrhoea Treatment Practices Information**

**Fill out one form for each child with diarrhoea in the past 2 weeks**

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

1. How many days did the diarrhoea last?
   - ___ 1-3 days
   - ___ 4-6 days
   - ___ more than 1 week, but less than 2 weeks
   - ___ 2 or more weeks
   - ___ Don't know

2. Was there mucous in the diarrhoea?
   - ___ Yes
   - ___ No
   - ___ Don't know

3. Was there blood in the stool?
   - ___ Yes
   - ___ No
   - ___ Don't know

4. Did the child have vomiting as well as diarrhoea?
   - ___ Yes
   - ___ No
   - ___ Don't know

5. Did the child have fever as well as diarrhoea?
   - ___ Yes
   - ___ No
   - ___ Don't know

6. Was the diarrhoea severe?
   - ___ Yes -> **go to 7**
   - ___ No -> **go to 8**
   - ___ Don't know -> **go to 8**

7. How did you know it was severe?
   - ___ Child had vomiting
   - ___ Child had fever
   - ___ Mucous in stools
   - ___ Blood in stools
   - ___ Diarrhoea lasted long
   - ___ Child looked dried out
   - ___ Child was weak/tired
   - ___ Other: _____

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

**If child is under 2 years, ask question 8.**
**If child is 2 years, jump to question 10**

8. Were you breast-feeding the child when the diarrhoea started? ___ Yes ___ No -> **go to 10**

9. Did you continue breast-feeding the child during the diarrhoea? ___ Yes ___ No

10. What did you do for the child when the diarrhoea started?

**Interviewer instructions:**

* **Place a tick in column A next to the first response.**
* **Ask:** What did you do next?
  **Tick the second response in column B.**
* **For all those responses NOT ticked, prompt mother by asking:** Did you..., **and tick column C (Yes, prompted), D (No, prompted), or E (Don't know, prompted).**

| Intervention | A Did First | B Did Next | C Prompt YES | D Prompt NO | E Prompt D.K. |
|---|---|---|---|---|---|
| Continue normal fluids | | | | | |
| Increase fluids | | | | | |
| Decrease fluids | | | | | |
| Stop solid food | | | | | |
| Or anyone give an enema | | | | | |
| **Give salt sugar solution**[1] | | | | | |
| **Take to clinic/hospital**[2] | | | | | |
| Take to traditional healer | | | | | |
| Give herbs | | | | | |
| Give drugs (specify) | | | | | |

[1]If mother gave **SSS**, go to question 11.

[2]If mother took child to **clinic or hospital**, and did not use SSS, jump to 18.

If she did **NOT** give SSS **OR** take to clinic or hospital, jump to 21.

| Child code | Interviewer | Cluster | Mother | Child |
|---|---|---|---|---|
| | ____ | ____ | ____ | ____ |

11. You said that you used a salt sugar solution to treat the child's diarrhoea. How did you learn to prepare it?

___ Village health worker
___ Gov't clinic/hospital
___ Private practitioner
___ Chemist
___ Other mothers/neighbors
___ Television/radio
___ Other (specify): _____

12. How much water did you use to prepare it?

___ Correct*
___ Incorrect

*** Correct response: 2 mineral bottles, OR 1 beer bottle OR 600 mls.**

**Interviewer: show mother a tray containing salt, sugar, and 3 spoons.**

13. Please show me how much salt you used to prepare it.

___ Correct*
___ Incorrect

*** Correct response: 1 level 3 ml. spoonful**

14. Please show me how much sugar you used.

___ Correct*
___ Incorrect

***Correct response: 10 level 3 ml. spoonfuls OR 5 cubes**

15. On what day of the diarrhoea did you first give this salt sugar solution to the child?

_____ **(enter 99 for don't know)**

16. On the first day that you gave this solution to the child, how much did you give each time?

___ 1-3 spoons
___ 4-6 spoons
___ 7-12 spoons
___ 13-20 spoons
___ More than 20 spoons
___ About a cup
___ More than a cup

17. How often did you give it?

___ 10 or more times
___ 6-9 times
___ 2-5 times
___ Don't know

**If mother says she took child to a clinic or hospital for treatment, go 18, otherwise. go to 21.**

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

18. On which day of diarrhoea did you take the child to the clinic or hospital for treatment? _____ **Enter 99 for don't know**

19. Did your child receive oral fluids to drink at the clinic?
    ___ Yes
    ___ No
    ___ Don't know

20. What was done for your child when you went to the clinic for treatment? **(More than one answer possible; wait for response, then prompt)**

| | Yes | No | Don't know |
|---|---|---|---|
| Child received antibiotics | ____ | ____ | ____ |
| Child received vitamins | ____ | ____ | ____ |
| Child received IV/injection | ____ | ____ | ____ |
| Child received other drugs | ____ | ____ | ____ |
| Child admitted to hospital | ____ | ____ | ____ |

Other (specify) _____

21. What do you think may be the reason that the child had diarrhoea?
    ___ Teething
    ___ Contaminated water
    ___ Other: _____
    ___ Don't know

22. When do you think any diarrhoea is serious enough to need treatment at a health facility? **(Multiple answers possible; Wait for spontaneous response, then prompt.)**

| | Yes | No | Don't know |
|---|---|---|---|
| Sunken eyes | ____ | ____ | ____ |
| Vomiting | ____ | ____ | ____ |
| Fever | ____ | ____ | ____ |
| Blood in stool | ____ | ____ | ____ |
| Diarrhoea continues after giving SSS | ____ | ____ | ____ |
| Child appears dried out/weak/tired | ____ | ____ | ____ |
| Other _____ | ____ | | |

23. During the past year, did you hear or see any information about diarrhoea in children?
    ___ Yes -> **go to 24**
    ___ No -> **go to 25**
    ___ Don't know -> **go to 25**

24. How did you learn about treating diarrhoea?
    ___ Village health worker
    ___ Radio/television
    ___ Poster
    ___ Told at clinic
    ___ Other mother/neighbor
    ___ Other: _____

25. Has this child had fever in the last 2 weeks?
    ___ Yes -> **go to Part IV**
    ___ No -> **go to Part II for <u>next</u> child, or, if this is the LAST child, go to Part V**

# Suleja Community Survey

## Part IV - Fever/Malaria Information

**Fill out a form for each child who had fever in the last 2 weeks**

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

1. When the child had fever, what other symptoms were present in addition to the fever? **(More than one answer possible; wait for spontaneous answers, then prompt).**

| | Yes | No | Don't know |
|---|---|---|---|
| a. Shivering / shaking | _____ | _____ | _____ |
| b. Diarrhoea | _____ | _____ | _____ |
| c. Vomiting | _____ | _____ | _____ |
| d. Cough, rapid breathing | _____ | _____ | _____ |
| e. Confusion / convulsions | _____ | _____ | _____ |
| f. Skin rash | _____ | _____ | _____ |

2. Was the fever severe?

___ Yes -> go to 3
___ No -> go to 4
___ Don't know -> go to 4

3. How did you know it was severe? **(tick first response given)**

___ Child was shaking
___ Child had convulsions
___ Child wouldn't eat
___ Fever lasted long time
___ Child had diarrhea
___ Other: _____
___ Don't know

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |



4. What did you do for your child when he (she) had this fever?

* **Place a tick in column A next to the first response.**

* **Ask: What did you do next?**
  **Tick the second spontaneous response in column B.**

* **For all those responses NOT ticked, ask mother Did you....., and tick column C (Yes, prompted), D (No, prompted), or E (Don't know, prompted).**

| Intervention | A Did First | B Did Next | C Prompt YES | D Prompt NO | E Prompt D.K. |
|---|---|---|---|---|---|
| Give child plenty to drink | | | | | |
| Give child a sponge bath | | | | | |
| Remove child's clothing | | | | | |
| Take to traditional healer | | | | | |
| Take to clinic/hospital/doctor* | | | | | |
| Give an antimalarial* | | | | | |
| Give an antibiotic | | | | | |
| Give paracetamol | | | | | |
| Give herbs | | | | | |

* If mother DID take the child to clinic or hospital, jump to question 5
  If she DID NOT take for treatment, but DID give an antimalarial jump to question 8
  If she DID NOT give an antimalarial OR take for treatment, jump to question 11

5. On which day of fever did you take your child to the clinic or hospital? _____ (Enter 99 for don't know)

6. What did they say was wrong with the child? (More than one possible answer)

| | Yes | No |
|---|---|---|
| a. Malaria | _____ | _____ |
| b. Diarrhoea | _____ | _____ |
| c. Chest infection | _____ | _____ |
| d. Throat infection | _____ | _____ |
| e. Don't know | _____ | _____ |
| e. Other | _____ | |

| Child code | Interviewer | Cluster | Mother | Child |
|---|---|---|---|---|
| | _____ | _____ | _____ | _____ |

7. What was done for your child at the health center? (More than one possible answer)

| | Yes | No | Don't know |
|---|---|---|---|
| Received antimalarials (oral) | _____ | _____ | _____ |
| Received antimalarial (injection) | _____ | _____ | _____ |
| Received antibiotics (oral) | _____ | _____ | _____ |
| Received antibiotics (injection) | _____ | _____ | _____ |
| Received paracetamol | _____ | _____ | _____ |
| Received drug (unknown type)* | _____ | _____ | _____ |
| Admitted to hospital | _____ | _____ | _____ |

* Ask to see drug, if available
If child received an oral antimalarial, either at home or at the health center, go to question 8, if NOT, jump to question 12.

8. Where did you obtain the malaria medicine that you gave the child?

___ Friend or relative
___ Street or market vendor
___ Chemist
___ Clinic/hospital/doctor
___ Had it at home
___ Other: _____
___ Don't know

9. On what day of the fever did you first start giving the malaria medicine to the child? _____ Enter 99 for don't know

10. Ask how many days she gave the antimalarial to the child. For each day, ask how many doses were given, and how much was given each time.

| | Number of doses | Amount each dose | |
|---|---|---|---|
| Day 1 | ____ No. of doses<br>____ Unknown | ___ ¼ tablet<br>___ ½ tablet<br>___ 1 tablet | ___ ½ teaspoon<br>___ 1 teaspoon<br>___ 1½ teaspoon<br>___ Unknown |
| Day 2 | ____ No. of doses<br>____ Unknown | ___ ¼ tablet<br>___ ½ tablet<br>___ 1 tablet | ___ ½ teaspoon<br>___ 1 teaspoon<br>___ 1½ teaspoon<br>___ Unknown |
| Day 3 | ____ No. of doses<br>____ Unknown | ___ ¼ tablet<br>___ ½ tablet<br>___ 1 tablet | ___ ½ teaspoon<br>___ 1 teaspoon<br>___ 1½ teaspoon<br>___ Unknown |

| Child code | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| | Interviewer | Cluster | Mother | Child |

11. During the past year, did you hear or see any information about malaria in children?
    ___ Yes -> **go to 12**
    ___ No -> **go to 13**
    ___ Don't know -> **go to 13**

12. How did you learn about malaria?
    ___ Village health worker
    ___ Radio/television
    ___ Poster
    ___ Told at clinic
    ___ Other: _____

13. Do you know of anything that can be done to prevent children from getting malaria? **(more than one answer is possible; wait for spontaneous response, do not prompt).**

| | Yes | No | Don't know |
|---|---|---|---|
| Take prophylaxis | _____ | _____ | _____ |
| Remove standing water | _____ | _____ | _____ |
| Use bednets | _____ | _____ | _____ |
| Apply insect repellant | _____ | _____ | _____ |
| Spray living quarters | _____ | _____ | _____ |
| Wear protective clothing | _____ | _____ | _____ |
| Stay indoors at night | _____ | _____ | _____ |

**his is the end of Part IV.**
**o to part II for the next child; if this is the last child, go to Part V.**

**Suleja Community Survey**

**Part V - Mother Tetanus Toxoid History Information**

**Fill out a form for each MOTHER.**

| Mother code | _____ | _____ | _____ |
|---|---|---|---|
| | Interviewer | Cluster | Mother |

---

Now I am going to ask you some questions about yourself and your pregnancies.

1. How old are you?
   ___ less than 15
   ___ 15-29 years
   ___ 30 or more

---

2. When were you last pregnant?
   ___ Pregnant now
   ___ Within last 12 months
   ___ Less than 2 years ago
   ___ 2-5 years ago
   ___ More than 5 years ago
   ___ Don't know

---

3. During your most recent pregnancy, did you go to a clinic, a hospital, or a community health worker to check on the progress of your pregnancy?
   ___ Yes -> go to 4
   ___ No -> go to 8
   ___ Don't know -> go to 8

---

4. How many of these antenatal visits did you have during that pregnancy?
   _____ **(Enter 99 for don't know)**

---

5. Did you ever buy or receive an antenatal health card or book?
   ___ Yes -> go to 6
   ___ No -> jump to 8
   ___ Don't know -> jump to 8

---

6. Do you still have it?
   ___ Yes -> go to 7
   ___ Lost -> go to 8
   ___ Kept by hospital after delivery -> go to 8

---

| Mother code | _____ | _____ | _____ |
|---|---|---|---|
| | Interviewer | Cluster | Mother |

7. **Interviewer: Ask to see the card, and copy the dates of tetanus toxoid doses recorded on the card. Then jump to question 11.**

| | Day | Month | Year | |
|---|---|---|---|---|
| Date of 1st dose | _____ / | _____ / | _____ | |
| Date of 2nd dose | _____ / | _____ / | _____ | |
| Date of 3rd dose | _____ / | _____ / | _____ | |
| Date of 4th dose | _____ / | _____ / | _____ | |
| Date of 5th dose | _____ / | _____ / | _____ | **-> go to 11** |

8. **If the woman has shown you vaccination cards for the children under age 5, check for any documentation of tetanus toxoid given to the mother. Write in all dates of TT that you see, from all the cards. If there is not documentation of TT on all the cards, ask question 9 after writing in the dates that are available.**

| | Day | Month | Year |
|---|---|---|---|
| Date of 1st dose | _____ / | _____ / | _____ |
| Date of 2nd dose | _____ / | _____ / | _____ |
| Date of 3rd dose | _____ / | _____ / | _____ |
| Date of 4th dose | _____ / | _____ / | _____ |
| Date of 5th dose | _____ / | _____ / | _____ |

**If dates are available for each pregnancy, or if there are at least 5 doses, go to 11.**

**If not, go to 9.**

9. Did you receive any injections during your most recent pregnancy to prevent the baby from getting tetanus, that is, stiff body with inability to suck?
   - ___ Yes
   - ___ No **-> go to 11***
   - ___ Don't know **-> go to 11***

***Unless this is first pregnancy, then STOP here. Go to Part VI.**

10. How many times did you receive these injections in your most recent pregnancy? ____ (Number of doses) **(Enter 99 if unknown)**

**** If this is the first pregnancy, STOP. Go to Part VI. ****

11. Did you receive any injections against tetanus during any previous pregnancies?
    - ___ Yes **-> go to 12**
    - ___ No **-> go to Part VI**
    - ___ Don't know **-> go to Part VI**

12. How many total injections against tetanus did you receive in all your previous pregnancies? ____ (Number of doses) **(Enter 99 if unknown)**

***** This is the end of Part V. Go to Part VI. *****

## APPENDIX C
## LIST OF INTERVIEWERS AND SUPERVISORS

### A. INTERVIEWERS

| Nº | Name | Title and Locatiion |
|---|---|---|
| 1. | Nelly Zakka | Student, SHT, Minna |
| 2. | Alhassan Barde | Student, SHT, Minna |
| 3. | Habiba Abdulazeez | Student, SHT, Minna |
| 4. | Lami Sabo | Student, SHT, Minna |
| 5. | Bose Bello | Student, SHT, Minna |
| 6. | Juliana Sabo | Student, SHT, Minna |
| 7. | Gloria Alazhizhi | Student, SHT, Minna |
| 8. | Mary Jatau | Student, SHT, Minna |
| 9. | Barmani Alhassan | Student, SHT, Minna |
| 10. | Hadiza Barau | Student, SHT, Minna |
| 11. | Mohammed Salisu | Student, SHT, Minna |
| 12. | Comfort Gara | Student, SHT, Minna |
| 13. | Fatima Suleiman | LGA Health Department, Suleja |
| 14. | Yusuf Adamu | LGA Health Department, Suleja |
| 15. | Lawal Adamu | LGA Health Department, Suleja |
| 16. | Asabe Aliyu | LGA Health Department, Suleja |
| 17. | Mary Chawa | LGA Health Department, Suleja |
| 18. | Hussaina Umaru | LGA Health Department, Suleja |
| 19. | Jumai Bello | Zonal Health Office, Suleja |
| 20. | Yusuf Gwam | M & E Officer, Health Office, Suleja |

### B. SUPERVISORS

| Nº | Name | Title and Locatiion |
|---|---|---|
| 1. | Mallam Kudu Aliyu | Senior Tutor, SHT, Minna |
| 2. | Mrs. R. Sanaje | Zonal MCH/FP Coordinator, Suleja |
| 3. | Aminu Aliyu | LGA Health Educator, Suleja |
| 4. | Takwa Abdullahi | Zonal EPI/CDD Coordinator, Suleja |
| 5. | Gawu Muhammad | Zonal PHC Coordinator, Suleja |