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SOME LESSONS LEARNED
FROM
THE PAKISTAN NATIONAL NUTRITION SURVEY
(1985–1987)

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EXECUTIVE SUMMARY

The Pakistan National Nutrition Survey confirmed the high prevalence of protein-calorie malnutrition and anaemia in at-risk groups throughout the nation. Food intake deficiencies are primarily calories and iron. Breast feeding is still very common, but its value is greatly compromised (e.g. by the bottle). There is also a marked delay in the intake of foods readily available in the household.

The results of the survey should be publicised without delay, to technicians, administrators and the general public. The survey satisfied major objectives, but at a high cost of resources and time, related to a very large sample size, irrelevant and/or inappropriate indicators and an underestimate of editing, entry and analytic requirements. Some problems and suggestions relate to anthropometric equipment and age determination; methods for recall, food intake and laboratory investigations.

Some recommendations with regards to past, current and future studies include:

A. The National Institutes of Health should consider coordinating activities, for example by standardizing approaches to planning, methods, choices of indicators, analysis and review. Microcomputers may be of value (including field use), where deemed appropriate. The Ministry of Health should be influential in major studies about to be done. For example, at least two (National Demographic/Health and Health Examination Survey) are in the mid-late planning phase. Nutrition also overlaps with agriculture (e.g. food security) and economic development.

B. A review of available nutrition-related information extending to a situational analysis, would clarify the needs and responses - current, planned and potential.

C. Some further possible analyses from the national nutrition survey might be considered: provincial-level information, body size and anaemia of school-age children and adults, incorporation of education, within-household comparisons of food intake.

D. The relevance, quality and feasibility of information collection, analysis and use applies not only to surveys but also to other approaches, such as surveillance.

SOME LESSONS LEARNED FROM THE PAKISTAN NATIONAL NUTRITION SURVEY (1985-7) *

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BACKGROUND

The National Nutrition Survey of Pakistan (NNNS) satisfied at least the major objectives (see report page 8):

1. Estimate the level of the nutritional status of the population.

Results confirmed the high prevalence of Protein-energy malnutrition in young children throughout all areas of the nation, both with regards to stunting as a reflection of child development and of wasting, which reflects more acute infections, diarrhea and inadequate food intake.

The high prevalence of anaemia and iron deficiency, both in young children and pregnant/lactating women, was also apparent.

2. Determine the feeding habits of young children and mothers.

Although 90% of children aged up to six months were breast fed, the high prevalence of bottle feeding (15-25% of infants) indicated that breast feeding was often inadequate. These problems were reflected in the high prevalence of wasting (15-20%) during this period.

There was a marked delay in the introduction of solid and semi-solid foods. Most children aged 7-9 months did not consume any food (apart from milk) even though a variety of nutritious foods were eaten by older family members in the same household (i.e. readily available).

. Ascertain recent quantitative food intake of households and their members.

The amounts of foods eaten and contributions to calorie, protein and iron intake should be of use to Planning Division.

Assessment of intake for individuals underscored the high prevalence of caloric and iron deficiencies in young children and deficiencies of all nutrients in pregnant/lactating women.

The national estimates for calories was 90% of recommended dietary allowances, 110% for protein and 120% for iron intake (49% for males and 66% for females).

Analysis collaboration funded through an
Office of Nutrition IQC by AID/Islamabad

KEY CONSIDERATIONS

The Institutions and personnel are to be commended for their efforts in the survey, particularly under difficult conditions. However, certain aspects require note.

Cost of the survey

The resources used for this survey were massive. Forty field teams (each of 6 workers) spent a total of approximately 15,000 man days for data collection (based on 4 households examined per day). Central data manual editing and entry took a further 7,500 man days (25 workers at 300 days each).

The survey from start of data collection to report took over three years. Because of time and resource constraints much of the data collected could not be analysed; additional delays negated much of the samples (e.g. blood) for laboratory analysis.

Quality of the data analysed

This was assessed centrally, usually long after the forms were first received. Computer assistance for systematic editing was not done until 1988. Corrections were made (at least for anthropometry and food intake) for the major problems as well as excluding "outliers" prior to final analysis.

Equipment

The anthropometric equipment (for weight and length/height estimations) were unsuitable for the survey. For an added relatively small expense, appropriate scales and measuring boards should have been used. If there was a problem in carrying these, porterage would be locally available.

Training

The large number of variables on a wide variety of subjects (including clinical signs, anthropometry, demography, pregnancy and birth histories, morbidity, use of health services, feeding and child care practices, food intake) required extensive training, field testing and review. At most, two weeks (per area/team group) was provided for this, using central personnel.

Field testing

Central personnel conducted field tests prior to the onset of the main survey. However, there was no documentation as to the appropriateness and practicality of methods and indicators. In addition, it is one thing for relatively well trained central staff to conduct field testing, it is another for field workers to do the same, especially where a large number of teams (40) are scattered throughout the country.

The production of pre-printed forms makes it particularly difficult to modify design of the instrument and indicators.

Supervision and field editing

Supervision was primarily geared to fiscal accountability. A lump sum for per diems was paid to regular ministry personnel according to the amount of work done - based on households visited. Thorough field checks were done on the completeness of information and records. However, there was little or no evidence for systematic checking of specific entries (e.g. for legibility or consistency).

SOME LESSONS LEARNED

In view of the above, certain questions are considered, with a view for further studies. It is not anticipated that the Ministry nor the National Institutes of Health will conduct a survey of similar scale in the future. However, some smaller scale studies may be considered, and it is hoped that these comments are of value.

1. Sample size

An ideal sample size, in order to provide precise estimates of malnutrition, has to be balanced against what is practical. In this survey, the sample appeared much higher than availability of resources. Moreover the examination and assessment of those not at-risk (i.e. not young children not pregnant/lactating mothers) added greatly to the work load.

In general, 300 subjects are required from any particular group or area for a total sampling estimate of +/- 5% (i.e. if the sampling result is 40% prevalence, the population estimate will be 35-45%). In order to improve the precision by a factor of 2, the sample must be increased fourfold. Thus 1200 subjects per group would be required for an estimate of +/- 2.5% (i.e. the result of 40% would be narrowed to a 95% confidence interval of 37.5 to 42.5%). A high degree of precision hardly seems required, especially if balanced against resources required for minimising non-sampling errors. In addition the very nature of the cross-sectional survey does not take into account the biological variability for some indices (e.g. weight of subjects, food intake), which would distort the results no matter how high the sample size.

2. Identification consistency

There were two sets of numbers for area identification. There was no linking ID across variable sets, which created problems in data editing and entry. Such a linkage is essential when different forms are used and/or the same subjects are

examined by multiple methods/observers as was the case in this survey.

3. Choice of indicators

a. Clinical examination

Clinical signs, unless very marked, are difficult to standardize and often non-specific. It is important to focus on key signs and symptoms for specific deficiencies (Vitamin A, iodine and severe malnutrition, such as edema) paying attention to reliability of findings.

b. Anthropometry

Appropriate equipment, as indicated, is critical. In addition, the use of scales and tapes which show metric and imperial measures (e.g. Kg and pounds) create confusion. There was no indication of the appropriateness of training and field checks, if any. Formal and informal standardization exercises (see Zerfas - Manual for Anthropometry, 1986) have been developed. These allow for interactive training which maximizes measurement validity.

c. Age determination.

Precise age estimation is critical to interpret key anthropometric findings (i.e. weight-for-age and height/length-for-age). Evidence from the survey suggested that age was often estimated to the nearest year (for young children from 2 to 5 years). This created an imprecision only partially correctible with a large sample size. In addition, the direction of any bias present could not be estimated in the analysis.

The careful use of birth records (from the household, religious or other sources), calendar of events, checking with other sources such as siblings or neighbour's children. At least the method of determining age must be included to allow proper interpretation in the analysis.

d. Pregnancy, birth and mortality histories

These must be very carefully ascertained, checking for internal consistencies. Because of the problems in age determination, the validity of at least some of this section was suspect.

e. Recall questions on food habits, use of health services, morbidity and child care.

The period of recall varied from a few months to years. A long period has been shown to be unreliable in reporting. Depending on the indicator, specific and appropriate time periods require identifying. In this survey it was unclear who was the

index child in relation to recall. Approximately half of the questions were analysed manually and reported.

f. Food intake.

Even in the best of circumstances food intake, particularly food weightment is difficult to do properly, especially for individual subjects. A single day's record is usually more appropriate in reporting for groups rather than individuals.

Future studies, whether 24 hour recall and/or weightment, must pay particular attention to the following:

i. Estimates of food eaten outside the household
ii. Certain foods/components such as oils, sugar, alcohol, pulses, fruits which are often under-reported
iii. Fluid dilutions, particularly milk, lassi, etc and the contents of bottle feeding, using simple methods for estimation, such as an hydrometer for specific gravity.

It should be noted that in a survey of this type, the quantity and quality of breast milk cannot be appropriately estimated. However special studies may consider test weighing or more sophisticated methods using deuterium dilution.

g. Food samples

Approximately 800 food samples were collected during the survey. This was done to clarify nutrients in the moist prepared foods estimated. This was indeed useful for specific foods such as roti and rice. However for mixtures (e.g. curries), aliqouts were not standardized, so it is difficult to know the relative amounts of the components (meat, pulses, vegetables, fluid, etc). In future studies of this type this must be taken into consideration.

h. Laboratory specimens (blood, urine, stools)

Altogether 24,000 blood, 24,000 urine and 5,500 stool specimens were planned to be collected. This huge number obviously could not be acheived due to constraints of time, response, transport, storage and laboratory.

Bloods

Haemoglobin estimation was done on the spot and analysed for 6086 (approximately 60%) of all young children seen and 3295 (80%) of all pregnant/lactating women. The Sahli Haemoglobinometer is rather imprecise, hence the use of more recent and accurate field methods is recommended (see enclosure). Although more expensive than the Sahli, their cost is warranted in surveys of this type. An alternative is to estimate packed cell volume; the estimates are more accurate, but would require capillary tubes and a readily-available centrifuge.

Vitamin A estimation used a micro technique as there was usually insufficient serum available from the blood collected from children using finger-prick method. Unfortunately, many of the specimens were unsuitable for analysis. Preliminary laboratory analysis was begun on those perhaps suitable, although the interpretation is unclear.

Serum iron was to be estimated, however this was not possible due to a combination of specimen problems, resources and interpretation of the results. As serum ferritin is a more suitable indicator of iron deficiency, this could be considered, provided laboratory facilities and resources were available.

A more focused study which considers the relationship of anaemia (based on haemoglobin) and other laboratory tests (e.g. serum ferritin) should be considered. The same approach might be considered for serum vitamin A estimation (symptoms such as night blindness; clinical signs; special tests and serum vitamin A). The sample should be population-based, random but restricted in size according to resources, especially for the logistics of collection, transportation and storage as well as laboratory capabilities

Urine

Urine specimens were collected and analysed in the laboratory for certain vitamin estimates (e.g. B1). Results were unavailable for computer analysis at the time of the report. None are essential for the major purposes of the survey.

Stools

A total of 2438 (45% of total planned) stool specimens were examined for parasites. Analysis was done manually by area and sex, but did not separate biological groups and adults from children. Results with regards to the prevalence of hookworm is particularly important in interpreting anaemia. Overall, the prevalence was quite low (0.4% urban, 2.3% rural) even allowing for the nature of the analysis. These results have been questioned, as well as those for ascaris (6%) and giardia (6%). However, using appropriate preservatives, the ova of these parasites can remain unchanged for a long time.

The same considerations apply to stool collection as for other specimens, although transport and storage methods and timing are less critical than for blood.

RECOMMENDATIONS - FUTURE STUDIES

The first set of recommendations are more general and apply to coordination of activities which consider the National Institutes of Health, Ministry of Health and other Ministries. Although the focus is on surveys, other study methods should also be considered - surveillance, follow-up or longitudinal, case control and intervention-type approaches.

A. COORDINATION OF ACTIVITIES

1. WITHIN NATIONAL INSTITUTES OF HEALTH

Several divisions within NIH require surveys for baseline, monitoring and evaluation of programs. Although the indicators vary, the basic methodology is similar (e.g. sampling, administration, logistics, broad editing procedures, computer entry and analysis). At times there is an overlap of indicators (health, demographic, social, economic, anthropometric). Hence informal and formal mechanisms should be considered in order to coordinate procedures, even minimally in sharing of experiences.

Certain aspects are so specific that standardizing of approaches might be possible to benefit the Institute. One example is anthropometry, which is being increasingly used as a health and development index as well as nutritional. Standardizing equipment, methods (training, field, supervisory), editing and analysis would institutionalize procedures so that the problems for example of the recent survey would not be repeated.

The use of microcomputers in editing, entry and analysis is becoming more standard for surveys. Again, standardization of approaches in this aspect might be useful, particularly in the use of computer package programs. A major problem in the recent survey was the long duration for data entry. This could be minimised by increasing the availability of micro computers and appropriate staff for entry even on a temporary basis. Even apart from survey analysis, microcomputers greatly increase the efficiency of word processing as well as for the use of spreadsheets (for projections) and data bases.

One special consideration is in the use of battery operated portable computers for field work. The initial investment has been shown to be well worthwhile in terms of quality of data, efficiency and rapidity of results (see enclosed article by Frerichs and Tar, 1989).

2. WITHIN THE MINISTRY OF HEALTH

Coordination of activities within the Ministry is a reflection of contacts, procedures and common objectives (or the lack of same). This relates to central and provincial, as well as allied organizations (international, voluntary agencies,

universities, etc). A relevant example with regards to nutrition and health is presented.

Currently at least two national surveys are in the mid-late planning phase. One (Demographic Health Survey) will be conducted by NIPS and the Federal Bureau of Statistics in collaboration with the Institute for Resource Development, Westinghouse (supported by AID/Washington). Although primarily focused on family planning and demography indicators such as social, economic, health and nutrition will be examined. (Some of the issues in relation to the recent national nutrition survey, were included in a recent memo to AID/Islamabad).

Another survey is a Health Examination Survey (HES) to be conducted through the Pakistan Council of Medical Research and other Pakistan organizations in collaboration with the National Center for Health Statistics, USA. Whereas the NIPS survey is primarily based on interviews, the HES involves a comprehensive clinical examination using ancillary tests (laboratory, anthropometry and special physical/biologics). This will be more time consuming, but answers to serum Vitamin A and ferritin, stools and other health/nutrition-related tests would be forthcoming. In addition the HES examines all groups in the population, unlike the DHS which focuses on women of child-bearing age and young children.

At this stage the Ministry is in a position to influence the types of information to be derived or at least be aware of them. Other surveys and studies relevant to policy and planning - in immunization, oral rehydration, communication in health, etc are probably being planned or conducted.

There is a need for a nutrition and/or health cell which can best utilize the overlapping types of information already or potentially available. This should result in a great increase in efficiency of use of information and prevent unnecessary studies or indicators in the future.

3. BETWEEN MINISTRIES

Examples in terms of nutrition relate to food rather than health. One is the recently conducted evaluation of the Food Supplementation program (in collaboration with World Food Program). Another are the studies in relation to food security, poverty and nutrition in various parts of the country. The relevance of undernutrition, economics and development is becoming of greater concern, particularly in view of the recent findings of the national nutrition survey, where high rates of malnutrition are occurring in spite of an apparently adequate food availability and national economic growth.

B. REVIEW OF AVAILABLE INFORMATION

As a precursor or concurrent with the above coordination of future studies, all relevant available information pertaining to nutrition should be assembled and used with the results of the recent national survey in order to enhance planning and policy decisions. A methodologic approach similar to that suggested by Beghin and colleagues might be considered. It is important that the ministry play a key role in this exercise.

This information could be used as part of a nutrition situational analysis, to include projects, programs and activities in Pakistan, relevant to nutrition as well as guidelines for improvements. This has been done recently for certain African countries by the International Nutrition Unit under an IQC from REDSO/AID.

C. FURTHER ANALYSES FOR THE NATIONAL NUTRITION SURVEY

Because of the great level of effort for required for the survey results and report, it is unclear how valuable further data entry/analyses/reporting would be worthwhile, given the available resources. Some of the following might be considered:

1. More detailed information at the province level

Obvious benefits would be to help provinces derive a clearer insight with regards to priority areas. Information value would be limited by sample sizes, hence more appropriate for Punjab and Sind which had relatively higher sizes. The food intake section has within-province identification; the anthropometry and haemoglobin does not (apart from rural, urban, city). Hence the latter two might require the addition of such identifiers for each enumeration area. Because of the lack of any household ID on the code sheets, recourse for this would require re-entry using the original data sheets, clearly a huge task.

Estimated time for re-rentry (at-risk, by area) 10-20 man days
Analysis/report : 10-30 man days (depending on depth)

2. Anthropometry and haemoglobin of non at-risk subjects (n=20,000 approx.)

The major reason for considering this is its uniqueness, not only for Pakistan but also for the South Asia area. In addition, relatively minor errors of measurement are less likely to influence the results for adults and school age children as compared with young children. A clearer picture of the relative status of women would arise. More stable estimates (such as stature) would allow a baseline for future progress such as for secular trends. In order to make comparisons between biological groups, at least areal ID's should be included.

Inclusion of stratification by broad ethnic groups might be considered (this would be possible for some areas, but not others such as Karachi, which is multi-ethnic). This would greatly assist the interpretation of results.

All the data has been entered (apart from ID's) and one third requires editing. Preliminary analyses are being done.

Est. time entry (with ID's) 15 man days
Analysis/report : 10-20 man days

3. Food intake

Within household comparisons

Approximately 40% of food intake data was computer entered and analysed. In the design, 1/4 households had all members estimated, however entry favored at-risk groups. Currently, data has been entered for about 1000 complete households, hence further entry might be required.

Within household comparisons would provide a much clearer insight into the intra-family distribution of food particularly with regards to communication-education focus.

Est. time coding : (for added 1000 households) 20-40 man days
Entry : 10-15 man days
Analysis/report : 20-40 man days

4. Inclusion of social/economic indicators

Educational level of the subject might be considered as a basic index, particularly as the levels are known to vary greatly throughout the population. Within women, particularly in rural areas, variation may be more limited because school attendance is consistently low.

Est time entry : 10 man days

5. Other indicators

At this stage it is unclear with regards to resources about the status of certain indicators, particularly those relating to laboratory tests.

FEASABILITY FOR CONDUCTING FURTHER ANALYSES

Because of other outstanding duties, it is uncertain how much resources are available within the Nutrition Division. Other institutes within Pakistan, particularly Universities might be considered. Because the only copy of the original forms are located in the Division, I assume they would remain there. However, arrangements might be considered for data entry to be done in the Division by the acceptable investigator or colleague.

FUTURE INFORMATION REQUIREMENTS

This would be clarified during the review of existing information and of studies being conducted or planned (some of these are already outlined). Clearly the sequence of women's health, pregnancy, childbirth, lactation and child health is required for a more complete picture of the causes of health and nutrition problems both in mothers and children. A modified study or series of studies involving follow-up of the same subjects might be considered.

Information derived from regular programs is one key to useful surveillance. Some of the factors regarding the relevance, quality and feasibility of collection, analysis and reporting have been discussed.

Table 2.8 Some colorimetric methods for measuring haemoglobin (*Stoner* et al. *1983*)

Method	Pipetting necessary	Light source	Approximate cost to buy in US$ (1983)	Special equipment
Dare Haemoglobinometer	No	Battery (C size)	119	Lancet, etc. Model with disposable chamber needs replacements
Lovibond comparator	Yes	Daylight	64	Lancet, etc. Concentrated ammonia, distilled water
Sahli	Yes	Daylight	45	Lancet, etc. Hydrochloric acid
A.O. Spencer haemoglobinometer	No	Battery (C size)	123	Lancet, etc. Saponin sticks needed for haemolysing blood
Swizzle Stick technique	Simplified	Integral battery		Lancet, etc. Drabkin's reagent and cuvettes
Cyanmethaemoglobin	Yes	Mains or car battery	300 (minimum)	Lancet, etc. Diluting fluids
Cirib haemoglobin comparator	No	Daylight	20 (estimate)	Lancet, etc. Saponin sticks needed for haemolysing blood

Table 2.9 Methods for assessing anaemia not based on laboratory colorimetry (*Stoner* et al. *1983*)

Method	What is measured	Light source	Equipment
Observation of tongue, lower lip, and nails	Paleness	Any	Colour chart
Talqvist	Colour of dried blood	Any	Lancet, etc. Blotting paper, colour chart
Copper sulphate	Specific gravity of blood	Any	Lancet, etc. Copper sulphate solutions at cut-off points desired
Erythrocyte volume fraction (packed cell volume or PCV; haematocrit)	Volumetric proportion of whole blood made up by cells	Any	Lancet, etc. Capillary tube, centrifuge

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Computer-Assisted Rapid Surveys in Developing Countries

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Tearsheet requests to Dr. Ralph R. Frerichs, Professor of Epidemiology, UCLA School of Public Health, Los Angeles, CA 90024-1772.

Synopsis

Health surveys are an important source of population-based data in much of the developing world. Unfortunately, sample surveys often take more time to plan, process, and analyze than is practical, given the information needs of the local decision-makers. Rapid survey methodology (RSM) has been developed to permit health professionals to answer quickly questions about the health status and activities of people at the community level. These answers may be necessary for determining program priorities or for monitoring program activities. Rapid surveys are meant to supplement, rather than replace, information derived from existing sources of vital and health statistics data. RSM combines sample survey methods with contemporary software used in portable, battery-powered microcomputers. The ability to do rapid surveys in developing countries also requires knowledge of how to use appropriate computer hardware and software and how to apply cluster sampling theory in the local environment.

RSM was used for the first time in Hlegu Township, Burma, to conduct a health survey of young children. The survey team started the field work on May 4, 1987. Four days later, while still in the field, the data were processed and rapidly analyzed by portable microcomputers for presentation to the local township medical officer and his staff. Within 10 days of starting the field work, we issued a detailed 50-page report of the study findings.

This paper provides (a) a description of the components of rapid survey methodology, including the sample survey method, computer hardware, and computer software; (b) the general requirements for portable computer hardware in less developed regions of the world; (c) the procedures for doing a rapid survey; and (d) a summary of our experiences with RSM in Burma.

Discussion

Rapid surveys are not meant to replace existing health information systems. Nor are they meant to replace large surveys based on a national sample of the population. Instead, they provide decision-makers in developing countries with an effective tool for finding out quickly what is occurring at the community level in geographic regions of immediate interest. We define quickly as within 1 week of the interview-examination team's arrival in the field. Rapid surveys should only be used to answer a limited number of questions; we suggest an interview or examination form no longer than 2-3 pages. The interview questions should be straightforward so that people can answer them without much thought. Mainly, these are questions of a descriptive rather than reflective nature. Fewer variables mean fewer tables and graphs; thus the analysis can be done rapidly. By use of a computer, variance estimates can be easily derived for the main parameters of interest. Most of our variables were attributes which could be coded or recoded as 0 or 1. For these variables, we used laptop computers and a specially designed spreadsheet program to derive confidence intervals quickly (see accompanying article; *1*).

Microcomputers are becoming increasingly common in developing countries (*7*). In earlier experiences in Bangladesh (*8,9*), we learned that health professionals with no prior exposure to computers can become computer literate in a short time. In Burma, all phases of the survey, with the exception of the final report, were done by Burmese health professionals; seven of them were physicians and two were statisticians. Two 1-week workshops had been given by RRF to train the Burmese. The first, conducted in August 1986, during an earlier visit, focused on the use of computers for processing and analyzing data. The second, given in April 1987 shortly before going into the field, focused on rapid survey methodology. Since then, RRF has conducted a similar workshop lasting 2 weeks in Thailand. Included in this workshop were 22 participants from Thailand, Bangladesh, Indonesia, and the United States. The first week was spent learning about RSM and the necessary computer software. During the second week, we went into

the field and simultaneously did two rapid surveys. One focused on antenatal care and the second on family planning. Similar to the survey in Burma, the surveys in Thailand were completed in 3 days, followed by 1 day of analysis and then a formal presentation of the findings on the fifth day. A 70-page report on the two Thai surveys with 12 tables and 17 figures was printed 5 days later. The most recent survey was done by the Burmese in May 1988, using the same methods. Included in this survey were 429 births during the prior 3 years to residents of Hmawbi Township, Rangoon Division. Thus we have now had experience with four rapid surveys in developing countries; all were done in a "quick and clean" manner.

Although we have been able to complete surveys in a very short time, not all sample surveys can be done so fast. It usually takes some while to agree on the questions to be asked, write the procedures to be followed, and train the interviewers or examiners. Thereafter, a small pilot or feasibility study is usually done to ensure that questions are understood and that the computer processing and analysis of the data go as intended. Although it is possible to do all of these steps in less than 2 weeks, more likely it will take 3-4 weeks unless standard questions are being asked or if the same forms are being used in multiple sites. Examples of standard questions used in other developing countries are symptom-specific questions on diarrhea or respiratory illnesses, ones addressing functional health status such as restricted-activity days or bed-disability days, and self-diagnosable conditions such as accidents or injuries (*10,11*). Other possibilities for this list might be a series of standard questions being formulated by the World Health Organization to help countries reach their goal of health for all by the year 2000 (*12*).

Conclusions

Rapid survey methodology presents administrators and other decision-makers in developing countries with another option for learning about the health status of a population. Although RSM relies on new technology, neither the cost nor the complexity of the procedure is overly high. As was the case with initially expensive television receivers and video cassette recorders, the price of portable computers is coming down quickly to an affordable level. When these are coupled with the use of appropriate software and an understanding of cluster sampling methods described here and elsewhere (*1,4,5*), health professionals in developing countries could use portable computers to gather quickly population-based data for determining the impact that disease has on the community and to monitor and evaluate intervention or prevention strategies.

Simple Analytic Procedures for Rapid Microcomputer-Assisted Cluster Surveys in Developing Countries

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Synopsis

Surveys are often deemed necessary in developing countries when routine sources of data are not considered adequate to answer important policy-related questions. Although field work often goes smoothly, many surveys become bogged down in the analysis stage. With the availability of microcomputers and contemporary software, investigators in developing countries can use rapid survey methodology (RSM) to process, analyze, and report survey findings more quickly than ever before.

Presented in this paper are three simple analytic procedures for planning and doing two-stage, rapid cluster surveys. All were successfully used in three rapid surveys in rural regions of Burma and Thailand. By use of a spreadsheet and graphics software package, the three procedures (a) derive the first-stage selection of 30 cluster sites with probability proportionate to size, (b) calculate variance estimates and confidence limits for the parameters of interest and graphically present the findings as 90, 95, and 99 percent confidence intervals, and (c) estimate the necessary sample size for planning two-stage, rapid cluster surveys. The procedures can be used both in the field and in teaching workshops or courses on survey methods. Examples are given from three rapid surveys conducted in Hlegu Township, Burma, and Sisaket Province, Thailand. In both countries, local health professionals were first taught the methods in a 1-week workshop before they used the procedure for conducting the rapid computer-assisted surveys.

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