THE HEALTH PROFILE OF EGYPT: AN INTEGRATED INTERVIEW / EXAMINATION SURVEY

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Introduction:In July 1977, the Ministry of Health of Egypt and the National Center for Health Statistics of the Department of Health and Human Services of the United States of America entered into an agreement to undertake a research project entitled the "Health Profile of Egypt" (HPE). The aim of this project was to establish a survey-based, data collection system of health-related information in Egypt to satisfy the needs of health planners. The system involved 3 components : a national health interview survey (HIS), a national health examination survey (HES) and a comprehensive computerized health facilities inventory (HFI).

Field activities of the project began with the HIS and the HFI followed later by the HES survey. The HIS was based on a scientific probability sample representative of the non-institutional population of Egyptian nationals living in Egypt. Information gathered included demographic and environmental characteristics, availability and utilization of health services and measures of health status and disability. The survey collected information directly from the respondents except for children below 6 years of age for whom information was collected from mothers or other persons responsible for them.

The HFI gathered data from all public health facilities and from a sample of private health facilities. Data were collected on the availability of services, utilization of facilities, equipment and manpower. This component is now integrated in the routine activity of the Ministry of Health.

Extensive methodological development was needed for the HES. After the initial development phase, the examination survey was carried on a subsample of the HIS sample during the later phases of interviewing which covered a representative sample located in half the governorates of Egypt.

The present publication describes the methodology used in the project, difficulties encountered and lessons gained as well as the applicability of this type of national surveys to other developing countries.

The Sample Design: The HIS sample design is a multistage stratified probability sample of clusters of households in land-based segments distributed throughout Egypt. The successive elements dealt with in the process of sampling are the primary sampling unit (the governorate),the urban administrative division (kism) or its rural counterpart, (markaz), the census enumeration area, and the eligible household including the sampled persons.

The sample was essentially self-weighting. The total sample of approximately 80,000 households represents a 1-in-100 sample of the civilian non-institutional population of Egyptian nationals resident in Egypt, or about 400,000 persons. The primary objective of the survey was to produce national estimates of health-related characteristics of the Egyptian population. A secondary objective was to produce estimates for governorates and groups of governorates. Oversampling was required in 5 frontier governorates to obtain a sample of at least 500 households per governorate.

The entire survey was to be carried out over 4 cycles and was designed so that each cycle would be representative of the nation and cycles could be combined. This feature of the design permits the production of estimates for each cycle and makes it possible to combine samples of multiple cycles to produce estimates for rare conditions and to improve the accuracy of estimates in general.

The 26 governorates of Egypt are divided into 3 types: urban, urban-rural, and frontier. Through a controlled selection procedure,[1] the 26 governorates were allocated to 4 cycles in each of which, the 3 types of governorates were represented. Once each cycle sample was chosen, 1/5 of the census enumeration areas within each governorate were selected followed by 1/20 of all households of the selected enumeration areas leading to a sample of 1/100.

The census enumeration areas contain about 200 households each. A basic practice of census-taking in Egypt has been the compiling of lists of households for enumeration areas by the Central Agency for Public Mobilization and Statistics (CAPMAS). It was important to include new additions to the enumeration areas to correct for new construction, urban expansion and internal migration. This updating was an essential step due to the elapsed time between the compiling of the list for the 1966 census and drawing of the sample for the present survey (12 years). Updating required recensus of the sample enumeration areas to obtain an updated frame for selection of households.   A household was considered eligible if it included at least 1 non-

institutionalized citizen.

For the HES, the sample frame was the sample eligible for the last 2 cycles of the HIS.[2] Persons who were eligible for HIS but were not interviewed were nonetheless eligible for the HES. The HES sample was a 1/10 subsample of that frame. Both the HIS and the HES were synchronized so as to begin the examination survey within 4 weeks from the time of the interview so as to be able to link and compare data collected by the 2 surveys.

Fieldwork Operations: The conduct of the survey in any specific location was the responsibility of a Health Profile team, represented by liaison officers and their assistants who constituted a central team. They are assisted by local health authorities who supplied the local interviewers and supporting staff, as well as the examination centers which were equipped by the HPE administration. A mobile laboratory that included simple equipment such as a centrifuge, microscope, haematocrit, in addition to a Coulter counter was used for the HES laboratory investigations.[3]

- Advance Arrangements: Initial contacts with local health departments were made 1 month before the survey. A visit was arranged during which the HPE representative explained the survey plans in detail. Staff were selected, the location of the health examination survey examination centers was determined and the many logistic actions required to conduct the survey were initiated to insure the smooth running of the survey. Local authorities such as the governor and the mayor were informed of the pending activities to obtain their support and collaboration.

One week before the survey, an orientation course was given for the local staff followed by a period of on-the-job training. All instructions were documented in an operation manual.

Advance arrangements also involved a visit to each household by a representative of the HPE team, usually a social worker. The survey was explained to the household members and an appointment for the interview was made. In the case of the HES, arrangements were made for transportation to the examination center by the project minibus. Arrangements were made for for persons participating in the examination survey to take leave from work if it was impossible to examine them during holidays or after working hours. Monetary compensation (LE 10) was given to the head of household for time spent participating in the survey.

- The Interview Procedure: The HIS was conducted by teams of 2 interviewers, usually a male and a female social workers, in addition to a group of Health officers responsible for completion of a form which describes the en-

vironmental sanitation of the sampled city or village.

Interviewing of household members was done at home. Each respondent answered his or her own questions except for children below the age of 6 years. Whenever feasible, females were interviewed by female interviewers. Questionnaires concerning married or ever-married females were completed exclusively by the female interviewer.

Each interview team was allocated a number of households not exceeding 6 per day. After self-identification and a short introduction, the consent of the head of the households and other members to participate in the interview was requested. Arrangements were always made to complete the interview of the entire household in a single session of about 60-90 minutes. Sometimes a second visit was needed due to absence of some household members.

For each household, a questionnaire describing the physical environment was completed for the interior of the house and its surroundings. A questionnaire listing household members (viz., persons living together and sharing the same kitchen) was then completed by interviewing the head of the household. This questionnaire was used to determine the household members to be interviewed. Information concerning children below school age was obtained from the mother. For the rest of the family, information was obtained directly from the respondents describing their personal habits and health status. In addition, a nutrition survey was completed for all sampled persons aged 3 years or over. A special questionnaire was designed to cover pregnancy history, birth attendance, and contraceptive practice of ever-married women and had to be completed by the female interviewer of each team. A special questionnaire on disabled persons was administered whenever applicable; describing type, cause and sequlae of disability. Recall period varied from 1 day for the nutrition survey to 3 months for utilization of outpatient services and 1 year for inpatient services.

- Examination Procedures: Health examination was carried out in the health unit by a team consisting of 3 internists and 1 dentist assisted by local nurses trained for the survey. Laboratory analysis was carried out in the mobile laboratory by a team of 2 senior technicians and 2 assistants. Approximately 48 persons were examined each day in 2 sessions of 3 hours each, one in the morning and the other in the afternoon.

The examination covered height, weight and blood pressure measurements, medical history and a general physical examination as well as a dental examination and measurement of visual acuity.

Routine investigations namely urine and stools analysis, blood count and haematocrit value; were done in the mobile laboratory of the HES. A referral system allowed for local specialist consultation and special investigations as well as treatment of those discovered to be ill. Persons declining referral were given a statement of their condition and advised to seek medical care through their private doctors.

Data Processing: Completed questionnaires were checked for completeness by field supervisors and then sent for coding and computer processing in the National Computer Center of the CAPMAS and in the Institute of Statistical Studies and research of Cairo university. Medical diagnosis was the only item coded by the HPE staff.

Quality Control: Efforts for quality control covered all phases of the operation from updating census data, until all collected data have been coded, edited and placed on suitable media for computer use. The main goal was to assure that national estimates were obtained using data of the highest attainable accuracy and precision within the limitation imposed by reasonable resources and costs.

One type of non-sampling error that can occur in voluntary surveys like HPE was the bias introduced by non-respondents if they differ from respondents with respect to the factors under study. High response rates were achieved by adequate advance planning, by much diligent work by the HPE representatives, and by proper handling of interviewed and examined persons by the entire staff. One additional measure found to increase the response rate was to remunerate the examined persons after the examination.

Another type of non-sampling error was the measurement error that inevitably occurs during the examination procedures and interviews and includes errors resulting from the way interviewers ask the questions and conduct the interview. This was of great concern since each interviewed person represents 100 persons and each examined person represents 2,000 persons in the total population.

Several procedures were relied upon to minimize this source of error. Before the data collection, the meaning of each question and the method for each examination and measurement were precisely defined and incorporated into staff instruction manuals covering all procedures. Intensive training was given to each staff member in the procedure performed by them in the surveys.

Although precise definitions and good initial training were necessary, they were generally not sufficient in lengthy surveys, both due to turnover of staff and the long duration of the survey for those who remain in service. Periodic retraining for established staff was as important as training of new ones.

The collection of replicate data was an additional valuable tool to indicate areas where retraining or re-evaluation of procedures were needed.[4]

Several measures were taken to assure completeness and consistency in the recording procedures. All questionnaires were reviewed for omissions and inconsistencies by personnel of the field management office so that errors can be corrected by another interview carried out by a senior staff member. All data gathered in the examination center were reviewed by the examination staff before the examined persons left. Diagnoses were coded by a staff member in the field and checked by another before being forwarded to headquarters.

Another source of error which was that resulting from instrumental measurements. Quality control charts were designed for daily follow-up of laboratory results.

Check of validity of HIS results was done by analysis of the results with those obtained by the HES for certain items collected by both surveys, taking advantage of the integrated HIS / HES design.

Evaluation of the Project: The number of comprehensive health surveys in developing countries was very few and limited to interviewing of households.[5] The HPE was very special in its extent of coverage, sample size, duration of fieldwork and in integration of both interview and examination in one project. A health survey was conducted in Egypt about 2 decades before the HPE but it was neither documented nor its results utilized. The HPE is thus the first documented nationwide health survey in Egypt.

Overall, the HPE was a successful experience. It lasted for 10 years, covered a sample of 1-in-100 of the Egyptian population, and led to 4 sets of publications covering the 4 HIS cycles, a series of newsletters and reports on health related topics and a final report consisting of methodological considerations, HIS and HES estimates, and information for health planners.

The success of this project can be attributed to many factors among which are the following :-

1- The perception of the need for data to be used by health planners was an important reason for success of the survey. Without this need, the money which was allocated to the survey would have been spent on any of the high priority health programs of the Ministry of Health.

2- External technical and financial assistance and collaboration provided

important help in designing the sample frame and providing financial resources without which the project would not have been feasible.

3- Interest of top health authorities was another reason for success of the survey. Successive Ministers of Health in Egypt have been personally interested in the project which always had a senior Under-Secretary of State for Health as the Principal Investigator. In addition, senior officials from within and outside the Ministry participated as members of the projects' Advisory and Steering Committees.

4- Collaboration of data users in the planning phase increased the chances of ultimate use of the collected data by the planners. The HPE multidisciplinary Advisory Committee defined the specific aims of the study and the set of data to be collected. Selection of the members of this committee was a delicate task which influenced the whole conduct of the survey and usefulness of its results.

5- A careful sample design is the backbone of a successful nationwide survey. HPE sample design was a collaborative accomplishment of the HPE team, the Institute of Statistical Studies and Research of Cairo University, the School of Public Health of Alexandria University, the CAPMAS and U.S. consultants. The availability of census data and census enumeration areas allowed updating of the selected enumeration areas and accurate definition of the sample frame. The concentration of the Egyptian population in the Nile Delta and in a narrow strip around the Nile facilitated the conduct of the study. With the exception of few areas in Sinai, near the Red Sea and in the Western Desert, almost all the population is accessible by vehicles without too much difficulty.

6- Careful and detailed advance arrangements contributed significantly to the high response rate of 98 % for the HIS and 90 % for the HES on the national level. On the governorate level, neither survey registered a response rate of less than 85 %. A high response rate was an important objective of the survey. Mass media were not utilized, and these response rates were achieved through person-to-person contacts by the HPE team as a part of the advance arrangements in each governorate. Collaboration of local officials and authorities was very helpful. For the examination survey, efforts were devoted to establish adequate examination centers which could compete with private ones. Transportation facilities were supplied to all examined persons and arrangements were made for employees to secure leave with pay to attend the examination session. Monetary compensation to households for time spent in the examination was a helpful incentive, at least for certain social classes. Nevertheless, the non-response rate was relatively high among working males in some urban areas, mainly in big cities.

7- Synchronization between the 2 components of the survey, the interview and the examination, is a special feature of the HPE in that it permits aggregating the results of the 2 surveys therefore increasing the amount of information over that available from the 2 surveys separately.

8- Considerable attention was devoted to minimizing non-sampling errors. Quality control measures covered all activities related to data collection and were also extended to cover data processing and computer outputs. With very few exceptions, item non-response did not exceed 2 - 3%.

9- Access to a main frame computer located in the CAPMAS allowed for processing of the massive amount of data collected by the HIS. The Institute of Statistical Studies and Research of Cairo University assumed the responsibility of data processing of HES data. The Institute staff was trained in dealing with medical research and its computer facilities were adequate to deal with the data collected by the examination survey.

10- The availability of a number of specialists for analysis and reporting on a professional level to satisfy the needs of different levels of readers resulted in a high level of documentation of HPE methodology and results. Dissemination of information was not limited to these publications, but included seminars and conferences with different categories and levels of attendants mainly local health authorities in the governorates and central health planners.

11- The stability of the HPE staff enhanced the efficiency and adaptability of the entire effort by conserving experience gained. During the entire 12 years of the projects' duration, there were only two Principal Investigators and two Executive Directors and few if any changes in personnel were made without ensuring continuity of effort.

Difficulties and Limitations: These difficulties varied in seriousness from minor problems that complicated or made fieldwork inconvenient, to serious problems which held the potential for jeopardizing results of the entire survey. For example, a minor problem had to do with the quality of paper used for HIS questionnaires. It was initially decided to use high quality relatively heavy weight paper. The weight of envelopes to be transported and carried by interviewers was very inconvenient, however, and it was necessary to sacrifice paper quality.

Examples of more serious problems en-

countered are given below:

1- <u>Fieldwork</u> <u>Staff:</u> One of the major initial difficulties which faced the survey was the lack of personnel trained for a nationwide large-scale survey. The first approach considered was to develop and train a single survey team and maintain it for the entire survey. However, it was considered that the team would inevitably encounter difficulties in finding adequate accommodations in certain governorates, a problem which would certainly have complicated fieldwork. Furthermore, in spite of the relatively long duration of this survey, qualified personnel were reluctant to leave permanent jobs for what was regarded as a temporary position.

The alternative strategy was to depend on local teams to be developed in each governorate. This, however, would have led to unacceptable difficulties in the ability to standardize results and a serious lack of uniformity of survey techniques. This situation was resolved by having 2 groups of personnel, a permanent central team and a local team for each governorate. The central team consisted of 3 physicians working as liaison officers each assisted by a field supervisor and a coordinator. The local teams consisted of groups of male and female interviewers - usually social workers. The central team was responsible for the training and supervision of interviewers to ensure uniformity and standardization of procedures. Training courses were organized in each governorate. They were inaugurated by the principal investigator and conducted mainly by the liaison officers, assisted and supervised by the co-research administrators. Due to variability in socioeconomic status of the sampled population, most of the items in the questionnaire were not written as questions, but were formulated as topics to be discussed. Interviewers were instructed on how to ask these questions in a way which would be clearly understood by the interviewed persons. Interview techniques such as this, while deemed necessary in the Egyptian context, merit special methodological attention in future efforts of this kind.

2- <u>Updating</u> <u>the</u> <u>Sample</u> <u>Frame:</u> An initial procedure in fieldwork was the updating of the sample frame. This was initially performed by personnel from the CAPMAS together with staff from the central team of the survey, which eventually took over this responsibility. A complete recensus of households in all selected enumeration areas was carried out; a process which proved to be feasible, without the need for extensive training or sophisticated technical help.

3- <u>Examination</u> <u>Centers:</u> It was first decided to use available health centers as examination centers. It was found that many of these centers, if not all of them were inadequately equipped for the survey and it was necessary to choose one or more sites in each area to be upgraded to a level which might encourage sampled persons to participate, especially those of relatively high socioeconomic status.

4- <u>Laboratory</u> <u>and</u> <u>other</u> <u>Diagnostic</u> <u>Facilities:</u> Due to lack of diagnostic facilities in the established centers, it was essential to have a mobile laboratory unit. This limited the tests to be done to simple routine analysis of urine and stools, blood count both total and differential, haematocrit value and erythrocyte sedimentation rate. A system of referral to more specialized centers was designed. However it was difficult to wait for the results of investigations done in these centers due to the short time spent by the survey team in each area. Cases diagnosed without adequate laboratory support were registered as cases with a "provisional" clinical diagnosis.

5- <u>Selection</u> <u>and</u> <u>Length</u> <u>Bias:</u> Due to the nature of the HES sample and the limited duration of the survey in each locality, diseases with short duration and those requiring hospitalization have a higher probability of being under represented in the results, a point which should be carefully considered in the interpretation of the relative frequency and prevalence of diagnosed morbid states.

6- <u>Examination</u> <u>Teams:</u> For considerations of standardization, it was impossible to rely on local HES teams to be developed in each governorate similar to the HIS local teams. A central team of examiners and laboratory technicians was developed and moved from one area to another assisted by local supporting staff of nurses and administrators. In overcoming problems of standardization, difficulties were created in accommodating the central team in a number of governorates.

7- <u>Scope</u> <u>of</u> <u>the</u> <u>Survey:</u> Despite all efforts to resist the temptation of inclusion of a broad spectrum of questions, the final survey instrument included a large number of items which might satisfy the general nature of the survey at the expense of sufficient information for specialized studies in specific topics. Nevertheless, these data constitute a base-line for more specialized studies in the future.

8- <u>Continuity</u> <u>of</u> <u>HPE</u> <u>Activities:</u> As a research project, the HPE had a fixed date to terminate its activities, and it was of utmost importance to find a way of continuity of its activities, making use of the infrastructure developed for the survey and the experience gained over its 12-year activity. This was successfully achieved for the HFI com-

ponent but was still under study for the HIS and HES. The problem is mainly financial and will hopefully be solved.

Recommendations for similar surveys: The Egyptian experience with a national health survey has confirmed the feasibility of conducting similar large-scale surveys in developing countries once facilities and resources were available. In the light of this experience, it is felt that certain recommendations ought to be considered by those dealing with or considering carrying out similar surveys:

1- Methodology should be carefully designed and logistics should be thoroughly studied.

2- Objectives should be clearly defined from the start and the temptation to collect information which "might be useful later on" should be avoided. The analytical plan should be drawn up at an early stage so that it influences procedures and questionnaire content rather than vice versa.

3- An optimum sample size should be always used. The Egyptian sample of 1-in-100 was too big and estimates could have been obtained with reasonable precision with a smaller sample. The choice of a smaller sample is not automatic, however, for statistical reliability for sub-national units may have to be sacrificed. This may be unacceptable if estimates for small areas or rare events is the goal. Oversampling might be needed as was the case in 5 governorates of Egypt.

4- A series of well planned small surveys with closely defined objectives and specific aims might be easier to conduct and permit more in-depth attention to specific problems.

5- Every effort should be made to avoid delays in reporting of results. Data processing is usually a time consuming process and it is advisable to begin preparing or securing the necessary computer software as early as possible. Whenever possible, it is recommended that data processing be an integral part of the responsibilities of the survey team rather than contracting this important responsibility to an external agency. This builds up expertise among the survey staff and by placing data processing under more direct control should speed data processing.

6- People usually support systems which they share in developing, and it is a wise policy to involve key-persons in the planning phase and to keep them involved throughout all phases of the survey.

7- Specific aims of the examination survey should be clearly defined from the start and all diagnostic facilities should be made available to support physicians' clinical diagnoses. An examination survey designed to detect all possible morbid states might under- or overestimate important health problems.

8- The team of specialists reporting on survey findings should be carefully selected and should work in complete harmony with professional medical statisticians and epidemiologists of the survey.

9- Dissemination of information must be an aggressive process aiming to reach all those interested in survey results. Interest should be built up in all potential users through publications, newsletters, press releases, seminars and conferences.

10- Resources spent in building the infrastructure of a survey is too valuable to be lost at the end of the survey. Such surveys should be planned as part of a continuing activity which should not disappear at the end of the project. What might appear to be the inexpensive option of a one-time survey may, in reality, be a very expensive waste of hard-won experience.

Conclusion: The collection of data for health planning using both interview and examination surveys, is a need which should be met in all countries irrespective of their degree of development. The Egyptian experience has shown that this is feasible and within the reach of developing countries. With adequate planning, it can be achieved on a cost-effective basis in spite of the many constraints and limited resources of these countries.

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