Pakistan - Demographic and Health Survey 2006-2007

National Institute of Population Studies

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Sampling

Sampling Procedure

The 2006-07 PDHS is the largest-ever household based survey conducted in Pakistan. The sample is designed to provide reliable estimates for a variety of health and demographic variables for various domains of interest. The survey provides estimates at national, urban and rural, and provincial levels (each as a separate domain). One of the main objectives of the 2006-07 Pakistan Demographic and Health Survey (PDHS) is to provide a reliable estimate of the maternal mortality ratio (MMR) at the national level. In order to estimate MMR, a large sample size was required. Based on prior rough estimates of the level of maternal mortality in Pakistan, a sample of about 100,000 households was proposed to provide estimates of MMR for the whole country. For other indicators, the survey is designed to produce estimates at national, urban-rural, and provincial levels (each as a separate domain). The sample was not spread geographically in proportion to the population; rather, the smaller provinces (e.g., Balochistan and NWFP) as well as urban areas were over-sampled. As a result of these differing sample proportions, the PDHS sample is not self-weighting at the national level.

The sample for the 2006-07 PDHS represents the population of Pakistan excluding the Federally Administered Northern Areas (FANA) and restricted military and protected areas. Although the Federally Administered Tribal Areas (FATA) were initially included in the sample, due to security and political reasons, it was not possible to cover any of the sample points in the FATA.

In urban areas, cities like Karachi, Lahore, Gujranwala, Faisalbad, Rawalpindi, Multan, Sialkot, Sargodha, Bahawalpur, Hyderabad, Sukkur, Peshawar, Quetta, and Islamabad were considered as large-sized cities. Each of these cities constitutes a stratum, which has further been substratified into low, middle, and high-income groups based on the information collected during the updating of the urban sampling frame. After excluding the population of large-sized cities from the population of respective former administrative divisions, the remaining urban population within each of the former administrative divisions of the four provinces was grouped together to form a stratum.

In rural areas, each district in Punjab, Sindh, and NWFP provinces is considered as an independent stratum. In Balochistan province, each former administrative division has been treated as a stratum. The survey adopted a two-stage, stratified, random sample design. The first stage involved selecting 1,000 sample points (clusters) with probability proportional to size-390 in urban areas and 610 in rural areas. A total of 440 sample points were selected in Punjab, 260 in Sindh, 180 in NWFP, 100 in Balochistan, and 20 in FATA. In urban areas, the sample points were selected from a frame maintained by the FBS, consisting of 26,800 enumeration blocks, each including about 200-250 households. The frame for rural areas consists of the list of 50,588 villages/mouzas/dehs enumerated in the 1998 population census.

The FBS staff undertook the task of a fresh listing of the households in the selected sample points. Aside from 20 sample points in FATA, the job of listing of households could not be done in four areas of Balochistan due to inability of the FBS to provide household listings because of unrest in those areas. Another four clusters in NWFP could not be covered because of resistance and refusal of the community. In other words, the survey covered a total of 972 sample points.

The second stage of sampling involved selecting households. In each sample point, 105 households were selected by applying a systematic random sampling technique. This way, a total of 102,060 households were selected. Out of 105 sampled households, ten households in each sample point were selected using a systematic random sampling procedure to conduct interviews for the Long Household and the Women's Questionnaires. Any ever-married woman aged 12-49 years who was a usual resident of the household or a visitor in the household who stayed there the night before the survey was eligible for interview.

Response Rate

A total of 102,037 households were selected for the sample, of which 97,687 were occupied at the time of fieldwork. The main reason for the difference is that some of the dwelling units that were occupied during the household listing operation were either vacant or the household was away for an extended period at the time of interviewing. Of the occupied households, 95,441 (98 percent) were successfully interviewed.

In the 9,255 households interviewed with the Long Household Questionnaire, a total of 10,601 ever-married women aged 12-49 were identified, of whom 10,023 were successfully interviewed, yielding a response rate of 95 percent. The principal reason for non-response among eligible women was the failure to find individuals at home despite repeated visits to the household. Response rates are only slightly lower in urban areas than in rural areas.

Questionnaires

Overview

The following six types of questionnaires were used in the PDHS:
- Community Questionnaire
- Short Household Questionnaire
- Long Household Questionnaire
- Women's Questionnaire
- Maternal Verbal Autopsy Questionnaire
- Child Verbal Autopsy Questionnaire

The contents of the Household and Women's Questionnaires were based on model questionnaires developed by the MEASURE DHS programme, while the Verbal Autopsy Questionnaires were developed by Pakistani experts and the Community Questionnaire was patterned on the basis of one used by NIPS in previous surveys.

NIPS developed the draft questionnaires in consultation with a broad spectrum of technical experts, government agencies, and local and international organizations so as to reflect relevant issues of population, family planning, HIV/AIDS, and other health areas. A number of meetings were organized by NIPS and the inputs received in these meetings were used to finalize survey questionnaires. These questionnaires were then translated into Urdu, Punjabi, Sindhi, and Pushto languages. After the pretest, which was done in Peshawar, Rawalpindi, and Hyderabad, the questionnaires were finalized on the basis of feedback of the pretest.

The Community Questionnaire, a brief form that was filled out for each sample point in rural areas, included questions about the availability of various kinds of health and family planning facilities and services. Also, information on the availability of transportation, education, and communication facilities was recorded. The geographic coordinates were taken for each sample point using a geographic positioning system (GPS) unit.

The Short Household Questionnaire was administered in 92,340 households to list all the usual members and visitors. Likewise, the Long Household Questionnaire was used in the 9,720 households where the Women's Questionnaire was also administered. In addition to some basic information collected on characteristics like age, sex, marital status, education, and relationship to the head of the household of each person listed, another purpose of the two household questionnaires was to record births and deaths that occurred since January 2003 and, for verbal autopsies, to identify any death of child under age 5 since January 2005 and any death to a woman age 12-49 since January 2003.

In addition, the Long Household Questionnaire collected more details, e.g., current school attendance, survivorship status of parents of children under age 18, and the registration status of each person. It also identified eligible ever-married women age 12-49 for interview with the Women's Questionnaire. The Long Household Questionnaire also collected information regarding various characteristics of the dwelling unit, such as the source of water; type of toilet facilities; type of cooking fuel; materials used for the floor, roof, and walls of the house; ownership status of various durable goods; ownership of agricultural land; ownership of livestock/farm animals/poultry; and ownership and use of mosquito nets.

As mentioned above, the Women's Questionnaire collected information from ever-married women age 12-49 years on the following topics:
- Background characteristics (education, literacy, native language, marriage characteristics, etc.)
- Reproductive history
- Knowledge and use of family planning methods
- Prenatal and postnatal care
- Child immunization, health, and nutrition
- Fertility preferences
- Breastfeeding practices
- Woman's work and husband's background characteristics
- Awareness about HIV/AIDS and other sexually transmitted infections
- Other health issues (knowledge of tuberculosis and hepatitis, experience with fistula, use of clean syringes for injections).

The Verbal Autopsy Questionnaire for deaths of women was administered in households in which a death of a woman aged 12-49 was reported since 2003. The questionnaire covered details about the woman's characteristics and the symptoms and circumstances prior to her death. A verbatim history was also recorded so as to help assign a cause of death. Questions were also asked about any treatment or health care that might have been sought before her death.

The Child Verbal Autopsy Questionnaire was administered in households in which a death of a child under age five years or a

stillbirth was reported in 2005 or later. The questionnaire elicited details about the illness and causes of death from the parents and/or others who were present at the time of death of the child. Separate teams of physicians reviewed both these verbal autopsy questionnaires to assign causes of death.

Data Collection

Data Collection Dates

Start	End	Cycle
2006-09	2007-02	N/A

Data Collection Mode

Face-to-face

DATA COLLECTION NOTES

TRAINING OF FIELD STAFF

The main survey training was held during a three-week period in August and was attended by all interviewers, supervisors, quality control personnel, field coordinators, and data entry staff. The training included lectures, demonstrations, practice interviewing in small groups, and examinations. Separate training was arranged for interviewers selected for collecting information through verbal autopsies for women and children. All teams participated in three days of field practice.

FIELDWORK

Twenty-nine teams collected the survey data. Most teams consisted of six female interviewers and a male supervisor. Data collection using the Short and Long Household Questionnaires, Women's Questionnaire, Child Verbal Autopsy Questionnaire, and Maternal Verbal Autopsy Questionnaire was assigned to different interviewers in each team. The fieldwork began in early September 2006 and was completed in February 2007. As mentioned earlier, senior DHS technical staff, field coordinators, and quality control teams visited teams regularly to review the work and monitor data quality.

FIELD PROBLEMS

A number of problems were encountered during the fieldwork. Initially, the sample design had included collecting data from the FATA. This, however, was not possible, because the FBS was unable to provide household listings for the selected clusters due to the prevailing unrest in the area. In addition, the FBS was also not able to provide household listings for four clusters in Balochistan province due to the same reasons. In NWFP, the data collection teams experienced hostilities from four communities and hence could not complete data collection or could not carry out the fieldwork in those areas. Hostility at individual households was also experienced in a few places. In all areas of NWFP, the data collection teams had to get permission from village or area elders before starting the fieldwork. This was sometimes possible after hours of deliberations (jirga) with the community leaders, especially in rural areas. However, in most of the areas and especially in rural Sindh and NWFP, teams were offered food and drinks and sometimes gifts to keep up with their traditions because the team members were visiting those households for the first time. A few members of the data collection teams got sick, were hospitalized, or were bitten by dogs. A harsh winter in parts of Balochistan and NWFP also welcomed the data collection teams and resultantly prolonged their working hours. However, the fieldwork was successfully completed in the stipulated time frame.

SUPERVISION

Ensuring high-quality data was a prime objective of the survey and was assured through regular supervision and monitoring of NIPS teams during fieldwork. NIPS designated six professional staff to act as field coordinators who visited the teams assigned to them on a regular basis. From the first week of data collection, all professional NIPS staff followed the field teams to support and facilitate them in using the questionnaires, understanding the sample selection procedures, conducting interviews in all five questionnaires, using field control sheets, assigning interviewers, editing the questionnaire, linking with FBS offices, observing team coordination, and ensuring efficient use of time. The field coordinators visited the teams at least once a month. The quality control interviewers accompanied these field coordinators. Quality control interviewers were deputed to work with various teams for three to four days to undertake several tasks: observe on-going interviews for delivery of questions, verify and validate information recorded by interviewers by revisiting and re-interviewing respondents, review completed interviews/ questionnaires, and provide on-the-job training for weaker field staff. They also edited completed questionnaires and reviewed any errors with the team members. Finally, they assisted the teams to resolve any problems. The monitoring checklist was shared with the team members and supervisors to maintain transparency and openness in the process. Close communication was maintained at all times between the NIPS, field supervisors, and interviewers during fieldwork.

Team supervisors were responsible for the performance of their teams. Team performance was judged by team cohesion and discipline, timely arrival at primary sampling units (PSUs) and visits and revisits to households to complete all 105 questionnaires, use of supervisory control sheets, and efficient use of time by team members. For supervision of each

member of a field team, the NIPS' field coordinators and quality control interviewers maintained close contact with the teams under their responsibility and with the PDHS core team.

Over the period of the survey, all teams were visited five to six times in the field. Monitoring was also undertaken by Agha Khan University colleagues in various districts to see the quality of data being recorded on child death verbal autopsies. The project director, principal investigator, and project consultant visited the field regularly and communicated to team supervisors and team members on a regular basis. A consultant from Macro visited NIPS in November 2006 to meet the PDHS core team and visit field teams across Pakistan to see their work and to review the data coding and entry processes.

A set of quality control check tables for critical indicators was produced periodically during the fieldwork using the computerized data at NIPS. Problems that appeared from review of these tables were discussed with the relevant teams and attempts made to ensure that the problems did not persist. Regular meetings of the core staff and field coordinators were held at NIPS to exchange views on progress, performance, problems, solutions, and future strategies. These meetings were helpful in resolving field problems and improving the quality of data collected from the field.

NIPS established a comprehensive system to ensure sufficient funds were transferred to team supervisors and interviewers to cover the costs of operating vehicles, communications, and per diem payments to all team members. NIPS also formed a system that ensured that the interviewing teams received necessary materials on a timely basis. Two courier services were contracted for rapid and safe delivery of material to the field and dispatch of completed questionnaires to NIPS.

Data Processing

Data Editing

The processing of the data entry of the 2006-07 PDHS questionnaires started shortly after the fieldwork commenced. Completed questionnaires were returned regularly from the field to NIPS headquarters in Islamabad, where they were edited and entered by the data processing teams who were specifically trained for this task. The NIPS computer programmer who attended a three-week training course in data entry and editing at Macro's headquarters in the United States, supervised the data processing. Other data processing personnel included an office coordinator who ensured that the expected number of questionnaires from each cluster was received, several office editors, 20 data entry operators working in two shifts, and secondary editors. A double-entry system was adopted for data entry. The concurrent processing of the data was an advantage because the senior PDHS technical staff and field coordinators were able to advise field teams of problems detected during the data entry. Copies of the verbal autopsies were promptly made and dispatched to the reviewing teams of doctors. Field check tables were timely generated and, as a result, specific feedback was given to the teams to improve performance. The data entry and editing phase of the survey was completed in April 2007.

Data Appraisal

Estimates of Sampling Error

The estimates from a sample survey are affected by two types of errors: 1) nonsampling errors, and 2) sampling errors. Nonsampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the 2006-07 Pakistan Demographic and Health Survey (PDHS) to minimize this type of error, nonsampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected in the 2006-07 PDHS is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

A sampling error is usually measured in terms of the standard error for a particular statistic (mean, percentage, etc.), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of plus or minus two times the standard error of that statistic in 95 percent of all possible samples of identical size and design.

If the sample of respondents had been selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the 2006-07 PDHS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulae. The computer software used to calculate sampling errors for the 2006-07 PDHS is the ISSA Sampling Error Module. This module used the Taylor linearization method of variance estimation for survey estimates that are means or proportions. The Jackknife repeated replication method is used for variance estimation of more complex statistics such as fertility and mortality rates.

Note: See detailed estimate of sampling error calculation in APPENDIX C of the Final Report.

Other forms of Data Appraisal

Data Quality Tables available in the Final Report:
- Household age distribution
- Age distribution of eligible and interviewed women
- Completeness of reporting
- Births by calendar years
- Reporting of age at death in days
- Reporting of age at death in months

Related Materials

Questionnaires

Demographic and Health Survey 2006-2007: Questionnaire

Title	Demographic and Health Survey 2006-2007: Questionnaire
Author(s)	National Institute of Population Studies and Macro International Inc.
Date	2006-01-01
Country	Pakistan
Language	English
Filename	Pakistan_DHS_2006_questionnaire.pdf

Reports

Demographic and Health Survey 2006-2007: Final Report

Title	Demographic and Health Survey 2006-2007: Final Report
Author(s)	National Institute of Population Studies Islamabad and Macro International Inc.
Date	2008-06-01
Country	Pakistan
Language	English
Filename	http://www.dhsprogram.com/pubs/pdf/FR200/FR200.pdf

Demographic and Health Survey 2006-2007: Key Findings

Title	Demographic and Health Survey 2006-2007: Key Findings
Author(s)	Macro International Inc.
Date	2008-06-01
Country	Pakistan
Language	English
Filename	http://www.dhsprogram.com/pubs/pdf/SR142/SR142.pdf

Demographic and Health Survey 2006-2007: Policy Briefs

Title	Demographic and Health Survey 2006-2007: Policy Briefs
Author(s)	MEASURE DHS
Date	2008-08-01
Country	Pakistan
Language	English
Filename	http://www.dhsprogram.com/pubs/pdf/PB1/Pakistan_2006-07_Briefing_Kit_all_6[PB1].pdf