India - National Family Health Survey 2005-2006

International Institute for Population Sciences (IIPS) - Ministry of Health and Family Welfare (MOHFW)

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Sampling

Sampling Procedure

SAMPLE SIZE

Since a large number of the key indicators to be estimated from NFHS-3 refer to ever-married women in the reproductive ages of 15-49, the target sample size for each state in NFHS-3 was estimated in terms of the number of ever-married women in the reproductive ages to be interviewed.

The initial target sample size was 4,000 completed interviews with ever-married women in states with a 2001 population of more than 30 million, 3,000 completed interviews with ever-married women in states with a 2001 population between 5 and 30 million, and 1,500 completed interviews with ever-married women in states with a population of less than 5 million. In addition, because of sample-size adjustments required to meet the need for HIV prevalence estimates for the high HIV prevalence states and Uttar Pradesh and for slum and non-slum estimates in eight selected cities, the sample size in some states was higher than that fixed by the above criteria. The target sample was increased for Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland, Tamil Nadu, and Uttar Pradesh to permit the calculation of reliable HIV prevalence estimates for each of these states. The sample size in Andhra Pradesh, Delhi, Maharashtra, Tamil Nadu, Madhya Pradesh, and West Bengal was increased to allow separate estimates for slum and non-slum populations in the cities of Chennai, Delhi, Hyderabad, Indore, Kolkata, Mumbai, Meerut, and Nagpur.

The target sample size for HIV tests was estimated on the basis of the assumed HIV prevalence rate, the design effect of the sample, and the acceptable level of precision. With an assumed level of HIV prevalence of 1.25 percent and a 15 percent relative standard error, the estimated sample size was 6,400 HIV tests each for men and women in each of the high HIV prevalence states. At the national level, the assumed level of HIV prevalence of less than 1 percent (0.92 percent) and less than a 5 percent relative standard error yielded a target of 125,000 HIV tests at the national level.

Blood was collected for HIV testing from all consenting ever-married and never married women age 15-49 and men age 15-54 in all sample households in Andhra Pradesh, Karnataka, Maharashtra, Manipur, Tamil Nadu, and Uttar Pradesh. All women age 15-49 and men age 15-54 in the sample households were eligible for interviewing in all of these states plus Nagaland. In the remaining 22 states, all ever-married and never married women age 15-49 in sample households were eligible to be interviewed. In those 22 states, men age 15-54 were eligible to be interviewed in only a subsample of households. HIV tests for women and men were carried out in only a subsample of the households that were selected for men's interviews in those 22 states. The reason for this sample design is that the required number of HIV tests is determined by the need to calculate HIV prevalence at the national level and for some states, whereas the number of individual interviews is determined by the need to provide state level estimates for attitudinal and behavioural indicators in every state. For statistical reasons, it is not possible to estimate HIV prevalence in every state from NFHS-3 as the number of tests required for estimating HIV prevalence reliably in low HIV prevalence states would have been very large.

SAMPLE DESIGN

The urban and rural samples within each state were drawn separately and, to the extent possible, unless oversampling was required to permit separate estimates for urban slum and non-slum areas, the sample within each state was allocated proportionally to the size of the state's urban and rural populations. A uniform sample design was adopted in all states. In each state, the rural sample was selected in two stages, with the selection of Primary Sampling Units (PSUs), which are villages, with probability proportional to population size (PPS) at the first stage, followed by the random selection of households within each PSU in the second stage. In urban areas, a three-stage procedure was followed. In the first stage, wards were selected with PPS sampling. In the next stage, one census enumeration block (CEB) was randomly selected from each sample ward. In the final stage, households were randomly selected within each selected CEB.

SAMPLE SELECTION IN RURAL AREAS

In rural areas, the 2001 Census list of villages served as the sampling frame. The list was stratified by a number of variables. The first level of stratification was geographic, with districts being subdivided into contiguous regions. Within each of these regions, villages were further stratified using selected variables from the following list: village size, percentage of males working in the nonagricultural sector, percentage of the population belonging to scheduled castes or scheduled tribes, and female literacy. In addition to these variables, an external estimate of HIV prevalence, i.e., 'High', 'Medium' or 'Low', as estimated for all the districts in high HIV prevalence states, was used for stratification in high HIV prevalence states. Female literacy was used for implicit stratification (i.e., villages were ordered prior to selection according to the proportion of females who were literate) in most states although literacy was an explicit stratification variable in a few states.

In every state, a mapping and household listing operation was carried out in each sample area. The listing provided the necessary frame for selecting households at the second stage. The household listing operation involved preparing up-to-date notional and layout sketch maps of each selected PSU, assigning numbers to structures, recording addresses or the location of these structures, identifying residential structures, and listing the names of the heads of all the households in residential structures in the selected PSUs. Large sample villages (with more than a specified number of households, usually 500) were segmented, and two segments were selected randomly using the PPS method. Household listing in the segmented PSUs was carried out only in the selected segments. Each household listing team comprised one lister and one mapper. Senior field staff of the concerned research organization supervised the listing operation.

The households to be interviewed were selected with equal probability from the household list in each area using systematic sampling. The interval applied for the selection was determined to obtain a self-weighting sample of households within each domain. On average, 30 households were initially targeted for selection in each selected enumeration area. To avoid extreme variations in the workload, minimum and maximum limits were put on the number of households that could be selected from any area, at 15 and 60, respectively. Each survey team supervisor was provided with the original household listing, layout sketch map, and the list of selected households for each PSU. All the households which were selected were contacted during the main survey, and no replacement was made if a selected household was absent during data collection. However, if a PSU was inaccessible, a replacement PSU with similar characteristics was selected by IIPS and provided to the research organization.

SAMPLE SELECTION IN URBAN AREAS

The procedure adopted for the first stage of the sample design in urban areas was similar to the one followed in rural areas. The 2001 Census list of wards was arranged according to districts and within districts by the level of female literacy, and a sample of wards was selected systematically with probability proportional to size. Next, one census enumeration block, consisting of approximately 150-200 households, was selected from each selected ward using the PPS method. As in rural areas, a household listing operation was carried out in each selected census enumeration block, which provided the necessary frame for selecting households in the third stage of sample selection. On average, 30 households were targeted for selection from each census enumeration block with minimum and maximum limits from any area of 15 and 60 households.

Response Rate

A total of 109,041 households were interviewed. The household response rate, i.e., the number of households interviewed per 100 occupied households, was 98 percent for India as a whole, 97 percent in urban areas, and 99 percent in rural areas. The household response rate was 96 percent or higher in all states.

In the interviewed households, individual interviews were completed with 124,385 women out of 131,596 who stayed in the household the night before the household interview. The individual response rate, i.e., the number of completed interviews per 100 eligible women identified in the households, was 95 percent for the country as a whole (93 percent in urban areas and 96 percent in rural areas). The response rate for eligible women varied from 90 percent in Maharashtra and Meghalaya to 99 percent in Madhya Pradesh and Chhattisgarh. Individual interviews were completed with 74,369 eligible men out of 85,373 who stayed in the household the night before the household interview. The response rate for eligible men was 87 percent for the country as a whole (85 percent in urban areas and 90 percent in rural areas). The response rate for eligible men varied from 76 percent in Delhi to 98 percent in Madhya Pradesh.

Weighting

NFHS-3 is designed for self weighting at the domain level. The domains are the urban and rural areas of each state, and the slum and non-slum areas of each of the eight selected cities. This means that all households and individuals in the same domain will share a common household weight and individual weight, respectively. The design weight is the inverse of the overall sampling fraction in each domain. The overall sampling fraction is the product of the selection probabilities at each sampling stage (two stages in rural areas and three stages in urban areas). The design weight was adjusted for household non-response in the calculation of the household sampling weight. The household sampling weight was further adjusted for individual non-response to obtain the individual sampling weight. Both adjustments for non-response were done at the domain level in order to preserve the self-weighting nature of the sample within domains. The sampling weights were further normalized at the national level to obtain national standard weights and at the state level to obtain standard state weights for each of the 29 states. The national standard weights were normalized so that the total number of weighted cases equals the total number of unweighted cases at the national level. The state standard weights were calculated to ensure that the total number of weighted cases equals the total number of unweighted cases for each state. Weights for the men's

subsample, the HIV subsample, and the subsample of women selected for the domestic violence section of the questionnaire were calculated in a similar way.

SAMPLE WEIGHTS

The basic objective of weighting sample data is to try and maximize the representativeness of the sample in terms of the size, distribution, and characteristics of the study population. When sample units have been selected with differing probabilities, it is common to weight the results inversely proportional to the unit selection probabilities, i.e., the design weight, so as to reflect the actual situation in the population. In a survey sample selected from a robust frame and well implemented with high response rates, the application of the design weight is all that is required. In practice, however, the situation is more complicated because of shortcomings in the selection and implementation of the sample.

In NFHS-3, two sets of weights are in operation. One set of weights is used for generating national-level indicators and another set is used for producing state-level indicators. Each set has the following different types of weights:

1 Household weight for estimating indicators such as the proportion of female-headed households and the percentage of children age 0-4 years whose birth was registered.
2 Woman's weight for generating indicators such as the contraceptive prevalence rate and the percentage of children age 12-23 months who are fully immunized.
3 Man's weight for estimation of indicators such as the proportion of men who have heard of AIDS.
4 HIV weight for women for generating indicators such as HIV prevalence by age for women.
5 HIV weight for men for generating indicators such as HIV prevalence by age for men.
6 Domestic violence weight for estimating indicators such as the proportion of married women who have ever experienced spousal violence.

Note that children of interviewed women are assigned the weight of their mother. Some child indicators are assessed at the household level; in such cases, children are assigned the weight of the household.

CALCULATION OF SAMPLING WEIGHTS

Calculation of state and national household weights. The basic reasons for weighting primary data while estimating state-level indicators are:

a) To take care of the non-equal probability of selection in different domains, i.e., rural and urban areas and slum and non-slum areas in the seven states of Andhra Pradesh, Delhi, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, and West Bengal. In each state, the total sample size was distributed between urban and rural areas according to the proportion of urban-rural households. However, oversampling was done in urban areas in states with very small urban populations in order to have a sample large enough to yield stable estimates; oversampling was also done in the cities where slum and non-slum estimates were required in order to have large enough samples in the slum areas and the non-slum areas separately. Whatever the reason, oversampling of urban areas of some states leads to unequal probabilities of selection.

b) To take care of the differential non-response rates of household interviews in different domains, namely urban and rural areas and slum and non-slum areas of the eight cities.

Questionnaires

Overview

Each round of NFHS has had two specific goals: a) to provide essential state and national level data to monitor health and family welfare programmes and policies implemented by the Ministry of Health and Family Welfare and other ministries and agencies, and b) to provide information on important emerging health and family welfare issues.

NFHS-3 used three types of questionnaires: the Household Questionnaire, the Women's Questionnaire, and the Men's Questionnaire. The overall content and format of the questionnaires were determined through a series of workshops and meetings held in 2005-06. The workshops were attended by representatives of a wide range of research and development organizations in the population and health fields, officials from the Ministry of Health and Family Welfare and other government agencies, representatives from international agencies, and experts working on gender and HIV/AIDS issues. The questionnaires for each state were bilingual, with questions in both the principal language of the state and English.

a) The Household Questionnaire was used to list all usual residents in each sample household plus any visitors who stayed in the household the night before the interview. For each person listed, information was collected on age, sex, marital status, relationship to the head of the household, and education. For children age 0-4 years, information was collected on birth registration. Questions were asked about school/college attendance for children age 5-18 years, and questions were asked about the activities of children age 5-14 years. The Household Questionnaire also collected information on the main source of drinking water, type of toilet facility, source of lighting, type of cooking fuel, religion and caste/tribe of the household head, ownership of a house, ownership of agricultural land, ownership of livestock, ownership of other selected items, and whether the household had a BPL (Below Poverty Line) card. Information was also collected on health issues such as the prevalence of tuberculosis, use of private or public health facilities, and ownership of mosquito nets. In addition, a test was conducted to assess whether the household uses cooking salt fortified with iodine.

Biomarker Measurement: The Household Questionnaire also included several biomarker measurements. Two health investigators on each survey team measured the height and weight of women age 15-49, men age 15-54, and children born since January 2000 (in states where fieldwork started in 2005) or January 2001 (in states where fieldwork started in 2006) [see Table
1.2 for the month and year of fieldwork in each state]. Height and weight data are used for assessing nutritional levels of the population. The health investigators also took blood samples from women age 15-49, men age 15-54, and children age 6-59 months to measure haemoglobin levels, which indicate the prevalence of anaemia. Haemoglobin levels were measured in the field using portable HemoCue instruments that provide test results in less than one minute. All respondents were given an informational brochure about anaemia and proper nutrition. Severely anaemic adults and children were referred to local public health facilities for treatment.

HIV testing: One of the major biomarker components incorporated in NFHS-3 was the collection of Dried Blood Spots (DBS) on filter paper cards to test for HIV. This component of the survey was included in response to the urgent need to have nationally-representative data on HIV prevalence and comprehensive information on knowledge and attitudes about HIV/AIDS, high-risk sexual behaviour, and practices related to HIV testing in India. Blood spots from a finger prick were collected on filter paper cards for HIV testing. If the respondent gave consent for blood collection for both HIV and anaemia testing, the standard protocol was to first collect 3-5 blood spots on the filter paper card for HIV testing, and then to collect an additional drop of blood from the same finger prick in a microcuvette for anaemia testing. The blood spots on filter paper cards were dried overnight in special drying boxes. The packaged filter paper cards were delivered to SRL Ranbaxy blood collections centres throughout the country, and they were shipped by courier from the blood collection centres to the SRL Ranbaxy laboratory in Mumbai for HIV testing. DBS were collected from consenting women age 15-49 and men age 15-54 to provide HIV prevalence estimates at the national level and for each of the six high HIV prevalence states identified by the National AIDS Control Organization (NACO), namely Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland, and Tamil Nadu. However, blood for HIV testing and anaemia testing could not be collected in Nagaland due to local opposition. It was also decided to provide estimates of HIV prevalence for one low HIV prevalence state, Uttar Pradesh.

The HIV testing was anonymous. No names or other contact information were recorded on the DBS samples. Instead, a bar code label with randomly generated numbers was pasted on the filter paper sample and on the questionnaires. Respondents were not given the HIV test results since the protocol design made it impossible for the survey staff to know the HIV status of individual participants. All of the information obtained from the household and individual interviews, however, can be linked to the HIV test results through the bar codes. In order to preserve the anonymity of the results, the original cluster and household identifiers were replaced in the data set by randomly generated cluster and household numbers. All individuals who were eligible for testing in the survey, whether they accepted the testing or not, received referrals for free HIV counseling and testing at a local health facility.

b) The Women's Questionnaire was employed to interview all women (ever-married and never-married) age 15-49 who were usual residents of the sample household or visitors who stayed in the sample household the night before the survey. The questionnaire covered the following topics:
- Background characteristics: age, marital status, caste/tribe, religion, education, employment status, exposure to mass media, place of residence, and husband's background.
- Reproductive behaviour and intentions: dates and survival status of all births, current pregnancy status, pregnancy losses, use of ultrasound for recent pregnancies, and future childbearing intentions.
- Marriage and cohabitation: duration of marriage and cohabitation, number of times married.
- Knowledge and use of contraception: knowledge and use of specific contraceptive methods, source of family planning methods, and reasons for non-use of contraception and intentions not to use contraception in the future.
- Quality of care and contacts with health personnel: quality of family planning and health services.
- Antenatal, delivery, and postnatal care: antenatal and postnatal care, antenatal services received, place of delivery, attendance at delivery, and complications during pregnancy for recent births.
- General health: smoking, alcohol use, injections, tuberculosis, asthma, diabetes, and thyroid disorders.
- Child immunizations, child health, and child feeding practices: immunization coverage, breastfeeding and feeding practices, and recent occurrences of diarrhoea, fever, and cough for young children.
- Women's and children's nutrition: food intake and nutrition-related practices for women and children.
- Utilization of ICDS Services: utilization of various services of the Integrated Child Development Services (ICDS) Scheme for women and children.
- Status of women and spousal violence: women's autonomy, gender relations, men's involvement in health care for women, and various forms of physical and sexual violence experienced by women.
- Sexual life: sexual intercourse (first and recent intercourse), high-risk sexual behaviour, number of sexual partners, age difference between partners, and duration of sexual relationships.
- HIV/AIDS and other sexually transmitted infections: knowledge of AIDS and the sources of knowledge, knowledge of ways to avoid getting HIV/AIDS, prior HIV testing, knowledge of places for HIV testing and medications for HIV/AIDS, perceptions and stigma related to HIV infected persons, attitudes about family life education for children, and knowledge and prevalence of other sexually transmitted infections.

c) The Men's Questionnaire was employed to interview men age 15-54 who were usual residents of the sample household or visitors who stayed in the sample household the night before the survey. The Men's Questionnaire contains a subset of questions that are covered in the Women's Questionnaire, plus some additional questions only administered to men. The questionnaire covered the following topics:
- Background characteristics: age, marital status, caste/tribe, religion, education, employment status, exposure to mass media, and place of residence.
- Reproductive behaviour and intentions: number of children, number of surviving children, fertility preferences, and future intentions to have children.
- Knowledge and use of contraception: knowledge and use of specific contraceptive methods, and sources of family planning methods.
- Male involvement in health care: men's involvement in health care for their child and the mother of their children, and quality of health services obtained by men.
- Sexual life: sexual intercourse (first and recent intercourse), high-risk sexual behaviour, number of sexual partners, age difference between partners, and duration of sexual relationships.
- Health and nutrition: food intake, smoking, alcohol use, injections, tuberculosis, asthma, diabetes, and thyroid disorders.
- Attitude toward gender roles: attitude about gender roles, attitude about spousal violence, and men's perception of wife's involvement in decision making.
- HIV/AIDS and other sexually transmitted infections: knowledge of AIDS and the sources of knowledge, knowledge of ways to avoid getting HIV/AIDS, prior HIV testing, knowledge of places for HIV testing and medications for HIV/AIDS, perceptions and stigma related to HIV-infected persons, knowledge and prevalence of other sexually transmitted infections, and attitudes about family life education for children.

Data Collection

Data Collection Dates

Start	End	Cycle
2005-11	2006-08	N/A

Data Collection Mode

Face-to-face

DATA COLLECTION NOTES

SURVEY MANUALS

To maintain standardized survey procedures across states and to minimize non-sampling errors, eight different manuals were prepared for various training programmes. These manuals were the manual for household listing and mapping, the interviewer's manual, the supervisor's and editor's manual, the health investigator's manual, the manual on household relations, training guidelines, the manual for data entry coordinators, and a project director's manual.

The manual for household listing and mapping describes the procedures for drawing location and layout maps of sampled areas, listing households, and selecting households for the survey. This manual also describes the roles and responsibilities of mappers and listers. The interviewer's manual describes standard interviewing techniques and procedures for completing questionnaires. The manual also includes a discussion on individual questions in all three questionnaires and an explanation of all fieldwork procedures. The supervisor's and editor's manual describes the roles and responsibilities of supervisors and editors, including the preparation, organization, and monitoring of fieldwork. The manual on household relations is an addendum to the interviewer's manual. Domestic violence is a sensitive issue and some women may be reluctant to disclose experiences of violence; thus, the training guidelines are geared to develop the necessary awareness and skills for facilitating disclosure without placing respondents or staff at risk.

The health investigator's manual describes all the field procedures to be followed in the process of measurement of biomarkers, including illustrative diagrams and photographs. The steps to be followed in the measurement of height, weight, and haemoglobin content in the blood of children and adults are discussed in detail. Comprehensive procedures for blood collection, creating Dried Blood Spots (DBS), and transporting DBS to the collection centres of the central laboratory for HIV testing are described. Ethical issues, including informed consent procedures, are covered. The protocol for disposal of biohazardous waste is also described. The training guidelines provide standards for all organizations involved in implementing NFHS-3 fieldwork. The manual covers important aspects of the organization and implementation of the training programme for field staff. The manual for data entry coordinators describes methods for data entry and secondary editing. The project director's manual provides a list of all the activities and protocols involved in NFHS-3. This manual is designed for the Project Director and other senior staff in the central office who are in charge of NFHS-3 in each state. In addition, several laboratory manuals covered all laboratory protocols and procedures.

TRAINING

Many organizations were involved in NFHS-3 and a large number of individuals with various skills were required to successfully implement all stages of the survey. Centralized training workshops were held to train representatives of each of the 18 field organizations, as well as personnel at IIPS who assisted with supervision and monitoring of all NFHS-3 activities. Persons who were trained in each workshop subsequently trained the staff in each state according to the standard procedures discussed in the Training Workshops. The purpose of these workshops was to ensure uniformity in data collection procedures in different states.

The following five types of training workshops were held for personnel involved in NFHS-3 project implementation:
- Health Coordinator Training: A training workshop for health coordinators was conducted in June 2005 for two weeks at IIPS, Mumbai. Eight health coordinators, who had some medical background, were employed by IIPS for the supervision of data collection for biomarkers. They were trained in methods of blood collection, haemoglobin measurement, height/weight measurement, ethical requirements, and biohazard waste disposal. Biomarker specialists from Macro International served as resource persons. The training involved classroom teaching, practice sessions in the classroom, and practice sessions at health centres and in the community.
- Household Listing and Mapping Workshops: Two household listing and mapping workshops of three days' duration were organized at IIPS, one for each phase of fieldwork. The workshop for the states participating in the first phase of fieldwork was held on 8-10 September 2005, and for the second-phase states the training workshop was held on 15-18 January 2006. Two persons responsible for coordinating mapping and household listing from each Research Organization were trained in mapping and household listing operations. The training involved classroom sessions and field practice in rural and urban

areas. IIPS coordinators and a consultant from Macro International imparted the training.
- Training of Trainers (ToT) Workshops: Two training workshops were conducted to train the trainers who would in turn train the field investigators in each state. At least two trainers for each state were trained in the training of interviewers, supervisors, and editors. The ToT for the first-phase states was held from 16 September to 5 October 2005 in Goa, and the ToT for the second-phase states was held from 30 January to 15 February 2006 in Ooty. The training involved field procedures, the content of questionnaires, guest lectures on HIV/AIDS, domestic violence, and family planning methods, and classroom and field practice. NFHS-3 coordinators from IIPS and Macro International consultants imparted the training.
- Health Investigator Training: Two centralized training courses of two weeks' duration were organized at IIPS for all the health investigators, separately for Phase 1 and Phase 2 states. Health investigator training was not held at the state level. The training programme was conducted on 7-19 November 2005 for the first-phase states and on 10-23 March 2006 for the second-phase states. More than 250 health investigators participated in each training workshop. IIPS health coordinators and Macro International consultants served as resource persons. Training included classroom lectures, demonstrations, classroom practice, and practice in public hospitals and in the community.
- Data Processing Training: Two data coordinators from each Research Organization were trained at IIPS in office editing of questionnaires and in use of the data entry and editing software (CSPro). A separate training course of two weeks' duration was conducted at IIPS for each phase of data collection. The training for first-phase states was conducted from 28 November to 9 December 2005 and the training for second-phase states was conducted from 3-14 April 2006. Consultants from Macro International imparted the training.

FIELDWORK

The fieldwork in each state was carried out by a number of interviewing teams, each team consisting of one field supervisor, one female field editor, four interviewers, and two health investigators. In the states in which all sample households were eligible for the men's interviews, two of the interviewers were males and the other two were females. In the remaining states, each team included three female interviewers and one male interviewer. The number of interviewing teams in each state varied according to the sample size. In each state, interviewers were hired by the Research Organizations specifically for NFHS-3, taking into consideration their educational background, experience, and other relevant qualifications. Male and female interviewers were assigned respondents of the same sex to ensure that respondents felt comfortable talking about topics that they may find somewhat sensitive. Assignment of Primary Sampling Units (PSUs) to the teams and various logistical decisions were made by the survey coordinators from each Research Organization. Each interviewer was required to make a minimum of three callbacks if no suitable informant was available for the household interview or if an eligible woman or man in the household was not present at the time of the interviewer's visit.

The main responsibility of the field editor was to examine questionnaires for completeness, consistency, and legibility of the information collected, and to ensure that all necessary corrections and clarifications were made while still in the field. Special attention was paid to missing information, skip instructions, filter questions, age information, and completeness of the birth history and the health section. If major problems were detected, such as discrepancies between the birth history and the health section, the interviewers were required to revisit the respondent to rectify the inconsistencies. An additional duty of the field editor was to observe ongoing interviews and verify the accuracy of the method of asking questions, recording answers, and following skip instructions.

Data Collectors

Name	Abbreviation	Affiliation
International Institute for Population Sciences	IIPS	
Administrative Staff College of India	ASCI	
Centre for Research in Rural and Industrial Development	CRRID	
Institute of Economic Growth	IEG	
Centre for Operations Research and Training	CORT	
Population Research Centre Dharwad		
Population Research Centre Kerala		
Institute for Social and Economic Change	ISEC	
Population Research Centre, Dharwad		
Development and Research Services	DRS	
ORG Centre for Social Research		

Name	Abbreviation	Affiliation
Indian Institute of Health Management Research		
Society for Applied Research in Humanities	SARH	
Economic Information Technology	EIT	
Research and Development Initiative Pvt. Ltd.	RDI	
TNS India Pvt. Ltd., New Delhi		
State Institute of Health and Family Welfare	SIHFW	
Institute of Rural Health and Family Welfare Trust	GIRHFWT	
TALEEM Research Foundation		
MODE Services Pvt. Ltd., New		

SUPERVISION

The field supervisor was responsible for the overall management of the field team. In addition, the field supervisor conducted spot-checks to verify the accuracy of key information, particularly with respect to the eligibility of respondents. IIPS also appointed one or more research officers in each state for monitoring and supervision throughout the training and fieldwork period to ensure that correct survey procedures were followed and that data quality was maintained. Project directors and other senior staff from the Research Organizations, project coordinators from IIPS, senior research officers, and technical consultants from Macro International also visited the field sites to monitor data collection operations. Health coordinators appointed by IIPS and a medical consultant from Macro International monitored the biomarker component of the survey. Field data were quickly entered into microcomputers, and field-check tables were produced on a regular basis to identify certain types of errors that might have occurred in eliciting information and filling out questionnaires. Information from the field-check tables was fed back to the interviewing teams and their supervisors during the fieldwork so that their performance could be improved, if required.

Data Processing

Data Editing

NFHS-3 data processing involved office editing, data entry using CSPro software, verification of data entry, and secondary editing by the research organizations. Final data cleaning and recoding of the data into a standard structure and variable naming conventions was done at IIPS.

All completed questionnaires were sent to the office of the concerned Research Organization for editing and data processing (including office editing, coding, data entry, and machine editing). Although field editors examined every completed questionnaire in the field, the questionnaires were re-edited at the research organization headquarters by specially trained office editors. The office editors checked all skip sequences, response codes that were circled, and information recorded in filter questions. Special attention was paid to the consistency of responses to age questions and the accurate completion of the birth history. In the second stage of office editing, appropriate codes were assigned for open-ended responses on occupation. For each state, the data were processed with microcomputers using the CSPro data entry and editing software. The data were entered directly from the precoded questionnaires, usually starting within one week of the receipt of the first set of completed questionnaires. Data entry and editing operations were usually completed a few days after the end of fieldwork in each state. Computer-based checks were used to clean the data, and inconsistencies were resolved on the basis of information recorded in the questionnaires. All completed data sets were sent to IIPS for final processing. At this stage, secondary editing programs were run again to detect any remaining errors and inconsistencies. Age imputation was also completed at this stage for records that did not have complete age information. Age variables such as the woman's current age and the year and month of birth of all of her children were imputed for those cases in which information was missing or incorrect entries were detected. Another major activity at this stage was the manual review of all responses that were recorded verbatim in the 'other' response categories. There were more than 100,000 such responses. Some of these responses were added to the coding scheme if a large number of cases had the same response, other responses were recoded into an existing category if appropriate, and the remaining responses were left as recorded on the questionnaire.

Other Processing

Fact sheets presenting key indicators were prepared for each state and India as a whole within three months of the end of data collection in the last state. These fact sheets have been widely distributed to policymakers and programme administrators responsible for appropriate interventions in health and family welfare programmes and to other key stakeholders.

The current publication is the first volume of the NFHS-3 national report, which was prepared by IIPS in collaboration with Macro International. The second volume of the national report provides additional information on sampling and on standard errors of key indicators, as well as the questionnaires used in NFHS-3. An additional report on key findings from NFHS-3 has been prepared as a companion volume to the comprehensive national report. Short state reports will also be produced with a summary discussion on major population, health, and nutrition indicators, and selected state-level tables. Several specialized subject reports on key topics will also be published.

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 third National Family Health Survey 2005-06 (NFHS-3) 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 NFHS-3 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 NFHS-3 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 NFHS-3 is programmed in SAS. This procedure uses the Taylor linearization method for 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 total fertility rate and child mortality rates.

The Jackknife repeated replication method derives estimates of complex rates from each of several replications of the parent sample, and calculates standard errors for these estimates using simple formulae. Each replication considers all but one clusters in the calculation of the estimates. Pseudo-independent replications are thus created. In the NFHS-3 sample, there were 3850 non-empty clusters. Hence, 3850 replications were created.

In addition to the standard error, the design effect (DEFT) for each estimate is also computed, which is defined as the ratio between the standard error using the given sample design and the standard error that would result if a simple random sample had been used. A DEFT value of 1.0 indicates that the sample design is as efficient as a simple random sample, while a value greater than 1.0 indicates the increase in the sampling error due to the use of a more complex and less statistically efficient design. Relative standard error (SE/R) and confidence limits (R2SE) for each estimate are also computed.

Sampling errors for NFHS-3 are calculated for selected variables considered to be of primary interest for woman's survey and for man's surveys, respectively. The results are presented in an appendix to the Final Report for the country as a whole, and for the urban and rural areas. For each variable, the type of statistic (mean, proportion, or rate) and the base population are given in Table D.1. Table D.2 presents the value of the statistic (R), its standard error (SE), the number of unweighted (N) and weighted (WN) cases, the design effect (DEFT), the relative standard error (SE/R), and the 95 percent confidence limits (R2SE), for each variable. The DEFT is considered undefined when the standard error for a simple random sample is zero (when the estimate is close to 0 or 1). In the case of the total fertility rate, the number of unweighted cases is not relevant, as there is no known unweighted value for woman-years of exposure to childbearing.

Related Materials

Questionnaires

National Family Health Survey - Household Questionnaire

Title	National Family Health Survey - Household Questionnaire
Author(s)	International Institute for Population Sciences (IIPS)
Date	2005-11-01
Country	India
Language	English
Contributor(s)	Macro International Inc.

The Household Questionnaire was used to list all usual residents in each sample household plus any visitors who stayed in the household the night before the interview. For each person listed, information was collected on age, sex, marital status, relationship to the head of the household, and education. For children age 0-4 years, information was collected on birth registration. Questions were asked about school/college attendance for children age 5-18 years, and questions were asked about the activities of children age 5-14 years. The Household Questionnaire also collected information on the main source of drinking water, type of toilet facility, source of lighting, type of cooking fuel, religion and caste/tribe of the household head, ownership of a house, ownership of agricultural land, ownership of livestock, ownership of other selected items, and whether the household had a BPL (Below Poverty Line) card. Information was also collected on health issues such as the prevalence of tuberculosis, use of private or public health facilities, and ownership of mosquito nets. In addition, a test was conducted to assess whether the household uses cooking salt fortified with iodine.

Biomarker Measurement: The Household Questionnaire also included several biomarker measurements. Two health investigators on each survey team measured the height and weight of women age 15-49, men age 15-54, and children born since January 2000 (in states where fieldwork started in 2005) or January 2001 (in states where fieldwork started in 2006) [see Table
1.2 for the month and year of fieldwork in each state]. Height and weight data are used for assessing nutritional levels of the population. The health investigators also took blood samples from women age 15-49, men age 15-54, and children age 6-59 months to measure haemoglobin levels, which indicate the prevalence of anaemia. Haemoglobin levels were measured in the field using portable HemoCue instruments that provide test results in less than one minute. All respondents were given an informational brochure about anaemia and proper nutrition. Severely anaemic adults and children were referred to local public health facilities for treatment.

Description

HIV testing: One of the major biomarker components incorporated in NFHS-3 was the collection of Dried Blood Spots (DBS) on filter paper cards to test for HIV. This component of the survey was included in response to the urgent need to have nationally-representative data on HIV prevalence and comprehensive information on knowledge and attitudes about HIV/AIDS, high-risk sexual behaviour, and practices related to HIV testing in India. Blood spots from a finger prick were collected on filter paper cards for HIV testing. If the respondent gave consent for blood collection for both HIV and anaemia testing, the standard protocol was to first collect 3-5 blood spots on the filter paper card for HIV testing, and then to collect an additional drop of blood from the same finger prick in a microcuvette for anaemia testing. The blood spots on filter paper cards were dried overnight in special drying boxes. The packaged filter paper cards were delivered to SRL Ranbaxy blood collections centres throughout the country, and they were shipped by courier from the blood collection centres to the SRL Ranbaxy laboratory in Mumbai for HIV testing. DBS were collected from consenting women age 15-49 and men age 15-54 to provide HIV prevalence estimates at the national level and for each of the six high HIV prevalence states identified by the National AIDS Control Organization (NACO), namely Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland, and Tamil Nadu. However, blood for HIV testing and anaemia testing could not be collected in Nagaland due to local opposition. It was also decided to provide estimates of HIV prevalence for one low HIV prevalence state, Uttar Pradesh.

The HIV testing was anonymous. No names or other contact information were recorded on the DBS samples. Instead, a bar code label with randomly generated numbers was pasted on the filter paper sample and on the questionnaires. Respondents were not given the HIV test results since the protocol design made it impossible for the survey staff to know the HIV status of individual participants. All of the information obtained from the household and individual interviews, however, can be linked to the HIV test results through the bar codes. In order to preserve the anonymity of the results, the original cluster and household identifiers were replaced in the data set by randomly generated cluster and household numbers. All individuals who were eligible for testing in the survey, whether they accepted the testing or not, received referrals for free HIV counseling and testing at a local health facility.

Filename IND_DHS_2005_Questionnaire_Household_En.pdf

National Family Health Survey - Woman's Questionnaire

Title	National Family Health Survey - Woman's Questionnaire
Author(s)	International Institute for Population Sciences (IIPS)
Date	2005-11-01
Country	India
Language	English
Contributor(s)	Macro International Inc.

Description	b) The Women's Questionnaire was employed to interview all women (ever-married and never-married) age 15-49 who were usual residents of the sample household or visitors who stayed in the sample household the night before the survey. The questionnaire covered the following topics: - Background characteristics: age, marital status, caste/tribe, religion, education, employment status, exposure to mass media, place of residence, and husband's background. - Reproductive behaviour and intentions: dates and survival status of all births, current pregnancy status, pregnancy losses, use of ultrasound for recent pregnancies, and future childbearing intentions. - Marriage and cohabitation: duration of marriage and cohabitation, number of times married. - Knowledge and use of contraception: knowledge and use of specific contraceptive methods, source of family planning methods, and reasons for non-use of contraception and intentions not to use contraception in the future. - Quality of care and contacts with health personnel: quality of family planning and health services. - Antenatal, delivery, and postnatal care: antenatal and postnatal care, antenatal services received, place of delivery, attendance at delivery, and complications during pregnancy for recent births. - General health: smoking, alcohol use, injections, tuberculosis, asthma, diabetes, and thyroid disorders. - Child immunizations, child health, and child feeding practices: immunization coverage, breastfeeding and feeding practices, and recent occurrences of diarrhoea, fever, and cough for young children. - Women's and children's nutrition: food intake and nutrition-related practices for women and children. - Utilization of ICDS Services: utilization of various services of the Integrated Child Development Services (ICDS) Scheme for women and children. - Status of women and spousal violence: women's autonomy, gender relations, men's involvement in health care for women, and various forms of physical and sexual violence experienced by women. - Sexual life: sexual intercourse (first and recent intercourse), high-risk sexual behaviour, number of sexual partners, age difference between partners, and duration of sexual relationships. - HIV/AIDS and other sexually transmitted infections: knowledge of AIDS and the sources of knowledge, knowledge of ways to avoid getting HIV/AIDS, prior HIV testing, knowledge of places for HIV testing and medications for HIV/AIDS, perceptions and stigma related to HIV infected persons, attitudes about family life education for children, and knowledge and prevalence of other sexually transmitted infections.
Filename	IND_DHS_2005_Questionnaire_Woman_En.pdf

National Family Health Survey - Man's Questionnaire

Title	National Family Health Survey - Man's Questionnaire
Author(s)	International Institute for Population Sciences (IIPS)
Date	2005-11-01
Country	India
Language	English
Contributor(s)	Macro International Inc.
Description	The Men's Questionnaire was employed to interview men age 15-54 who were usual residents of the sample household or visitors who stayed in the sample household the night before the survey. The Men's Questionnaire contains a subset of questions that are covered in the Women's Questionnaire, plus some additional questions only administered to men. The questionnaire covered the following topics: - Background characteristics: age, marital status, caste/tribe, religion, education, employment status, exposure to mass media, and place of residence. - Reproductive behaviour and intentions: number of children, number of surviving children, fertility preferences, and future intentions to have children. - Knowledge and use of contraception: knowledge and use of specific contraceptive methods, and sources of family planning methods. - Male involvement in health care: men's involvement in health care for their child and the mother of their children, and quality of health services obtained by men. - Sexual life: sexual intercourse (first and recent intercourse), high-risk sexual behaviour, number of sexual partners, age difference between partners, and duration of sexual relationships. - Health and nutrition: food intake, smoking, alcohol use, injections, tuberculosis, asthma, diabetes, and thyroid disorders. - Attitude toward gender roles: attitude about gender roles, attitude about spousal violence, and men's perception of wife's involvement in decision making. - HIV/AIDS and other sexually transmitted infections: knowledge of AIDS and the sources of knowledge, knowledge of ways to avoid getting HIV/AIDS, prior HIV testing, knowledge of places for HIV testing and medications for HIV/AIDS, perceptions and stigma related to HIV-infected persons, knowledge and prevalence of other sexually transmitted infections, and attitudes about family life education for children.
Filename	IND_DHS_2005_Questionnaire_Man_En.pdf

Reports

National Family Health Survey (NFHS-3) 2005–06 - Final Report

Title	National Family Health Survey (NFHS-3) 2005–06 - Final Report
Author(s)	International Institute for Population Sciences (IIPS)
Date	2007-09-01
Country	India
Language	English
Contributor(s)	Macro International Inc.
Description	The third National Family Health Survey (NFHS-3), coordinated by the International Institute for Population Sciences (IIPS) under the aegis of the Government of India, was conducted in 2005-06. As did NFHS-1 (1992-93) and NFHS-2 (1998-99), NFHS-3 provides information on fertility, mortality, family planning, HIV-related knowledge, and important aspects of nutrition, health, and health care. Unlike the earlier surveys, however, NFHS-3 interviewed men age 15-54 and never married women age 15-49, as well as ever-married women, and included questions on several emerging issues such as perinatal mortality, male involvement in maternal health care, adolescent reproductive health, higher-risk sexual behaviour, family life education, safe injections, and knowledge about tuberculosis. In addition, NFHS-3 carried out blood testing for HIV to provide, for the first time in India, population-based data on HIV prevalence. NFHS-3 collected information from a nationally representative sample of 109,041 households, 124,385 women age 15-49, and 74,369 men age 15-54. The NFHS-3 sample covers 99 percent of India's population living in all 29 states. From among all the women and men interviewed nationwide, 102,946 were tested for HIV. NFHS-3 provides estimates of HIV prevalence for adult women and men at the national level, for Uttar Pradesh and for five high HIV prevalence states (Andhra Pradesh, Karnataka, Maharashtra, Manipur, and Tamil Nadu). Additionally, health investigators tested blood haemoglobin levels of women and men and of children age 6-59 months to assess the prevalence of anaemia. NFHS-3 also collected information on population and health indicators for slum and non-slum populations in eight cities, namely Chennai, Delhi, Hyderabad, Indore, Kolkata, Meerut, Mumbai, and Nagpur. Fieldwork for NFHS-3 was conducted in two phases from November 2005 to August 2006. Eighteen research organizations, including six Population Research Centres, collected the data and conducted data entry and editing operations. The HIV testing of blood samples was done by SRL Ranbaxy, Mumbai. External quality control for the HIV testing of blood samples was done by the National AIDS Research Institute (NARI), Pune.
Filename	http://www.dhsprogram.com/pubs/pdf/FRIND3/FRIND3-Vol1AndVol2.pdf

National Family Health Survey (NFHS-3) 2005–06 - Summary Report

Title	National Family Health Survey (NFHS-3) 2005–06 - Summary Report
Author(s)	International Institute for Population Sciences (IIPS)
Date	2007-09-01
Country	India
Language	English
Contributor(s)	Macro International Inc.

Description	The third National Family Health Survey (NFHS-3), coordinated by the International Institute for Population Sciences (IIPS) under the aegis of the Government of India, was conducted in 2005-06. As did NFHS-1 (1992-93) and NFHS-2 (1998-99), NFHS-3 provides information on fertility, mortality, family planning, HIV-related knowledge, and important aspects of nutrition, health, and health care. Unlike the earlier surveys, however, NFHS-3 interviewed men age 15-54 and never married women age 15-49, as well as ever-married women, and included questions on several emerging issues such as perinatal mortality, male involvement in maternal health care, adolescent reproductive health, higher-risk sexual behaviour, family life education, safe injections, and knowledge about tuberculosis. In addition, NFHS-3 carried out blood testing for HIV to provide, for the first time in India, population-based data on HIV prevalence. NFHS-3 collected information from a nationally representative sample of 109,041 households, 124,385 women age 15-49, and 74,369 men age 15-54. The NFHS-3 sample covers 99 percent of India's population living in all 29 states. From among all the women and men interviewed nationwide, 102,946 were tested for HIV. NFHS-3 provides estimates of HIV prevalence for adult women and men at the national level, for Uttar Pradesh and for five high HIV prevalence states (Andhra Pradesh, Karnataka, Maharashtra, Manipur, and Tamil Nadu). Additionally, health investigators tested blood haemoglobin levels of women and men and of children age 6-59 months to assess the prevalence of anaemia. NFHS-3 also collected information on population and health indicators for slum and non-slum populations in eight cities, namely Chennai, Delhi, Hyderabad, Indore, Kolkata, Meerut, Mumbai, and Nagpur. Fieldwork for NFHS-3 was conducted in two phases from November 2005 to August 2006. Eighteen research organizations, including six Population Research Centres, collected the data and conducted data entry and editing operations. The HIV testing of blood samples was done by SRL Ranbaxy, Mumbai. External quality control for the HIV testing of blood samples was done by the National AIDS Research Institute (NARI), Pune.
Filename	http://www.dhsprogram.com/pubs/pdf/SR128/SR128.pdf