

Review of Epidemiological Study of Nepal Demographic and Health Survey (NDHS) 2006, 2011 and 2016

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Abstract

The article aims to explore the comparative epidemiological review of three DHS of Nepal from i.e. 2006, 2011 and 2016 in terms of the basic background of the surveys, their objectives, sampling design, questionnaire design, data collection procedure as well as data processing of the DHS. This review helps for comparability of epidemiological survey designs on the key themes of socio-economic, demographic and health related issues to understand trends over time. The 2006 NDHS had applied only filled out data in paper questionnaire. But 2011 NDHS onward, tablet was used and filled out questionnaire was sent through internet to mail the questionnaire. Level of anemia among women 15-49 and among children 6-59 months was measured first time in 2006 NDHS. Domestic violence was a separate section in 2016 NDHS. Verbal autopsy for causes of under-five mortality was administered in 2006 and 2016 to all women age 15-49 for getting information on still birth and death of under five children during five year preceding the survey. As drawbacks, non-communicable diseases, injuries and some major communicable diseases are inadequately covered in the NDHS. HIV/AIDS was not measured even in the latest DHS. Most of the demographic and health indicators have been improved significantly over time.

Key Words: review, DHS, epidemiology

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Introduction

Since 1996, the 5 rounds of Nepal demographic and health surveys (NDHS) have generated a huge amount of data on demography and health in Nepal. For epidemiological study, the last 3 NDHS 2006, 2011 and 2016 have been discussed in the term paper for understanding the epidemiological design of DHS in Nepal. These national levels cross sectional survey have been conducted in many of the countries as a part of DHS program.

In Nepal, DHS have been carried out under the ageis of Ministry of Health in 2006 and 2016 but it was Ministry of Health and Population in 2011. New Era, the national research organization is the implementation agency of DHS in Nepal. The technical know-how is provided by the Macro international under Measure *DHS* project. United States Agency for International Development (USAID) funds in all 3 surveys. Thus the working institutions have remained same over time.

Different committees like steering committee, technical advisory committee, and technical subcommittees were established to accomplish the survey.

The main objective of NDHS was to deliver recent as well as reliable data on fertility, infant and child mortality, maternal and adult mortality, family planning behavior, nutritional status of children, utilization of maternal and child health (MCH) services and knowledge of HIV/AIDS.

Objectives

The objective of the article is to explore the comparative epidemiological review of three DHS of Nepal from i.e. 2006, 2011 and 2016 in terms of the basic background of the surveys, their objectives, sampling design, questionnaire design, data collection procedure as well as data processing of the DHS.

Methods

The methodologies of the three DHS of Nepal were reviewed thoroughly and the major themes were presented.

Results and Discussions

In this section, sampling design, questionnaire design, data collection procedure as well as data processing of three DHSs are analyzed as follow.

Sampling design

In both 2006 NDHS and 2011 NDHS, the proper sample designed was made for representative 13 key domains based on 3 ecological and 5 development regions. The sampling frame for 2006 NDHS was based on 2001 population census enumeration areas of Nepal. Districts were divided in village development committees (VDCs), and VDC into wards. For 2006 as well as 2011 NDHS, the primary sampling unit (PSU) in rural area is a ward, sub-ward, or group of wards; and in urban area sub-wards. In urban areas the ward is large and hard for a complete household listing. So, urban ward were further divided into sub-wards. 2011 NDHS updated sampling frame based on 2001 census for each of the 13 domains adjusting the effect of internal conflict on population. Rural urban stratification for each 13 domain was accomplished for each 13 domains. These domains did not follow the PPS model. In 2001 and 2006 NDHS, Nepal was by definition, predominantly rural. For securing reliable estimate, urban population was oversampled. So the proper weight was given for estimating the approximate figure in 13 domains and rural urban areas.

Table 1: Sampling for three NDHS 2006-2016.

NDHS Survey	Rural		Urban	
	EA	HH	EA	HH
1. NDHS 2006	178	36	82	30
2. NDHS 2011	194	40	95	35
3. NDHS 2016	199	30	184	30

After the inception of Nepal's constitution 2015, Nepal has been newly restructured with newly reclassified local units of 263 urban locations called *Nagarpalika* and 481 rural locations known as *Gaonpalika*, 77 districts and 7 provinces were introduced, so the sampling frame have been changed in this survey. Its urban areas were reclassified so that urban population increased from 17.2 percent in 2011 census and 59 percent in 2015. In rural area the sample design was stratified into 2 stages sampling in rural areas and 3 stages sampling in urban areas. In the first stage, 383 wards (rural- 199 and urban- 184 , similarly Province 1- 57, Province 2-56, Province 3 - 58, Province 4 - 52, Province 5 - 56, Province 6- 52, Province 7- 52) were selected as primary sampling unit (PSUs) with probability proportional to the ward size from all provinces. Thus each province was stratified into urban rural areas with 14 sampling strata. As the urban ward are large, for selection of second stage sample, one enumeration area (EA) was randomly selected from each of the sample urban wards and the lists of households would be the sampling frame for next stage sampling. So, 2016 NDHS cluster was either a ward (PSU), an EA, or a segment of a ward or EA. In last stage, 30 households per cluster were selected from household listing.

Table 2 shows the sampling of household, women and men and their response rate over three surveys. The sample of household increased in 2011 but is more or less same in 2016. The household response rate has almost crossed the level of 99 percent and the response rate of women is nearly 98 percent which is more than men response rate which ranges between 95-96 percent in three DHS of Nepal.

Table 2: Selected household, women and men and their response rates for three NDHS, 2006-2016.

NDHS Survey	Household Sample	Occupied HH	HH response (Rate)	Women sample	Women response (Rate)	Men Sample	Men response (Rate)
1. NDHS 2006	8742	8,742	8,707	10,973	10,793	4,582	4,397
			(99.6)		(98.4)		(96.0)
2. NDHS 2011	11,353	10,888	10,826	12,918	12,674	4,323	4,121
			(99.4)		(98.1)		(95.3)
3. NDHS 2016	11,473	11,203	11,080	13,089	12,862	4,235	4,063
			(98.9)		(98.3)		(95.9)

Questionnaire design

In all NDHS, 3 types of questionnaires related to household, women and men were administered for gaining the information related to issues on population and health. A series of

meeting and workshops were held at the central level including the national and international representative, donor agencies, and technical support agencies to finalize each of the questions. The questionnaires were prepared into the three major languages on Nepali, Bhojpuri and Maithili.

The household questionnaire incorporates the list of all usual members and visitors in the household, identify eligible women and men, basic information of all individuals called age, sex, education, and household head's relationship; household amenities such as drinking water, toilet availability, floor materials and durable goods etc.

Additionally, anthropometric measurement like height and weight, hemoglobin test of women of reproductive age and children age 6-59 months are also included in household questionnaire. At first, 2006 NDHS have incorporated anemia testing at household level for identifying anemia prevalence. Similarly, blood pressure of adult women and men of age 15 years and above was first incorporated in 2016.

The women's questionnaire for women 15-49 years includes background, reproduction, pregnancy and maternal care, child immunization, child health and nutrition, marriage and sexual activity, fertility preference, husband background and women's work, STDs, other health issues, adult and maternal mortality, domestic violence etc.

Men's questionnaire for age 15-59 which was applied for every second household had much of the identical information as that in women's questionnaire except pregnancy history and MCH and nutrition issues.

Domestic violence which was newly recognized as component of reproductive health had a separate section in 2016 NDHS. The 3 measurement of blood pressure at the interval of 5 minutes were taken from Men and women of age 15 and above using UA-767F/FAC blood pressure monitor.

In addition, the verbal autopsy was applied for DHS in 2006 and 2016 to find out the under-five mortality from women of age 15-45 who report the still birth and under five mortality for five year preceding the survey.

1. Data collection procedure Listing

Listing was carried out in the selected clusters. The questionnaire was translate in to three languages Nepali, Maithili and Bhojpuri and were pretested them in both rural and urban area and further refined the questionnaire.

In 2006 NDHS, 53 persons were involved as the listers and mappers. In 2011 NDHS, 52 listers and mappers (26 teams with 1 lister and 1 mapper) were involved. But it is not clearly stated the number of listers and mappers in 2016 NDHS.

Training

The training was conducted for interviewers, supervisors and other required manpower. Only questionnaire in Nepali language was used for training, but the Bhojpuri and Maithili questionnaire

were also changed accordingly. Trainees did several days of field practice for better interview. Staff of New Era conducted the training session for interviewer. Interviewers were selected on the basis of free competition. There was special extended training for the supervisors and field editors. Selected male and female trainees were trained for anthropometric measurements and hemoglobin testing and blood pressure. Specialized training for a supervisor and female interviewer in each team was given for conducting verbal autopsies for the years 2006 and 2016.

The training in general was of 1 month for each NDHS. In 2006 NDHS, there was 1 month training on paper questionnaire and biomarkers. In 2011, training for paper based questionnaire and bio marker was arranged for 3 weeks and 2 week's training was conducted for employees of DHS Measure to handle tablet. In 2016, 2 weeks training on paper questionnaire and 1 week training on first time launched computer-assisted personal interviewing (CAPI) were arranged to the interviewer. For biomarker information, special training was given to selected participants during fourth week. Supervisors as well as selected enumerators were trained for conducting verbal autopsy survey.

Table 3: Manpower involved in three NDHS 2006-2016

Task	2006 NDHS	2011 NDHS	2016 NDHS
Pretesting	14 interviewer	12 interviewers	12 interviewers
Training	86 trainees for paper questionnaire	96 trainees on paper questionnaires and tablet PC's use.	101 trainees selected on the basis of written test, computerized test and a personal interview, 5 were core staff of New Era.
Data collection	6 quality control staff, 12 male supervisors, 12 female field editors, 48 interviewers (36 female, 12 males)	6 quality control teams (1 male, 1 female.) 16 supervisors 2 field coordinators 64 interviewers (48 females, 16 males)	16 supervisors 64 enumerators (48 females, 16 males)
Team composition	12 field teams: each with 1 male supervisor, 1 female field editor, 1 male interviewer and 3 female interviewers.	16 field teams: each with 1 male supervisor, 1 male interviewer and 3 female interviewers.	16 field teams: each with 1 supervisor, 1 male interviewer, and 3 female Interviewers

Field work

Data collection is performed by a group of field teams each consisting of both men and women interviewers and supervisors. Moreover field editors were also involved in 2006 before applying tablet system. Fieldwork supervision was coordinated by New ERA. There was regular field visits by the senior staff, members of the committees and experts from Macro International.

Tentative duration of fieldwork was 6 and half months in 2006 NDHS which decreased to nearly 4 and half months in 2011 and but increased to nearly 7 and half months in 2016. During 2016, they first completed in Kathmandu and dispatched others area. There was good monitoring of field work by core team. Effect of massive earthquake 2015 was also felt during increased field work duration.

Data processing

Data processing was simultaneous with data collection. In 2006 the filled out questionnaire was sent periodically to the data processing centre located in Kathmandu. The data entry and edit were done there. 2011 onward, the data of certain cluster was sent to the centre electronically after end of the collection of digital data and concurrency was maintained. The feedback from the centre was given to the members of the team for betterment of data collection of data. Internet File Streaming System (IFSS) was maintained for data transfer.

There were 11 data entry operators, 4 office editors, a questionnaire administrator and a supervisor involved in data processing in 2006. But after using tablet in 2011 onward, it was not clearly mentioned about the personnel involved in data processing. Data processing took tentative 7 months in 2006, 4 and half months in 2011 and 8 and half months in 2016.

Conclusion

As the country was restructured in terms of its administrative unit after the promulgation of new constitution of Nepal 2015, the sample design was also changed in 2016 NDHS. The 2006 NDHS had applied only filled out data in paper questionnaire. But 2011 NDHS onward, tablet was used and filled out questionnaire was sent through internet to mail the questionnaire. Level of anemia among women 15-49 and among children 6-59 months was measured first in 2006 NDHS. Domestic violence was a separate section in 2016 NDHS. The questionnaires are in general slightly modified over time. Verbal autopsy for causes of under-five mortality was administered in 2006 and 2016 to all women age 15-49 for getting information on still birth and death of under five children during five year preceding the survey.

While discussing some of the major shortcomings, non-communicable diseases, injuries and some major communicable diseases are inadequately covered in the NDHS. HIV AIDS was not measured even in the latest DHS also while many countries like India has measured HIV/AIDS of the adult males and females and estimated the national prevalence of HIV AIDS of the country. As strength, this review helps for comparability of epidemiological survey designs on the key themes of socio-economic, demographic and health related issues to understand trends over time. Many of the demographic and health indicators have been improved significantly over time for which the data obtained from the DHS might play role on policy implications.

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