

## SOME ASPECTS OF MORBIDITY SURVEYS IN THE INDIAN NATIONAL SAMPLE SURVEY (NSS)

By R. P. SAHA and A. K. DE

*Indian Statistical Institute*

**SUMMARY.** Reliable health statistics are necessary for public health administration to take appropriate steps in order to improve the general health condition. In India morbidity data collected through administrative agencies are inadequate and mainly relate to the communicable and infectious diseases. In the past a few special surveys had been attempted to measure the prevalence of diseases, such as malaria, tuberculosis and leprosy but even these do not give the picture for the country as a whole. In the absence of suitable machinery for collecting morbidity statistics at a national level, attempts were made through National Sample Survey (NSS) to evolve suitable methodology for future morbidity surveys and to obtain some basic data on morbidity at national level. In this note the NSS experience on different aspects of health survey has been discussed. The suitability of different concepts and definitions of morbidity, and also the effect of probes and proxy interviews in collecting the morbidity data have been examined. The results have been presented by rural and urban sectors separately to highlight the rural-urban differential.

### 1. INTRODUCTION

1.1. Reliable health statistics are necessary for public health administration. At present the statistical data on the state of health in India collected through administrative agencies are meagre and mainly relate to the communicable diseases notifiable to the Health Authorities. In this connection, Health Survey and Development Committee, set up by the Government of India in 1943 observed in its report that 'there are considerable variations in the number of communicable diseases which are notifiable in the different provinces. There do not exist, even in large cities, adequate facilities for ensuring that some of these diseases, for example, tuberculosis, will be notified in sufficient numbers to ensure that a substantial proportion of the actual occurrence will be brought on record'. However, a few special surveys had been attempted in the past by public health organisation in selected areas to measure the prevalence of diseases such as malaria, tuberculosis, leprosy. Such local surveys are useful so far as they furnish information for improving the health conditions of these localities. To improve the general health of the population in the country, a thorough appraisal of the prevalence of diseases and availability of medical care is essential. Such an appraisal could be attempted by comprehensive analysis of hospital records, of private physicians, school records, etc. for which suitable arrangements are yet to be made. These records would not, however, give a complete picture as a large proportion of population could not afford to use the existing medical facilities specially in case of minor illness. A properly conducted general health survey by sampling method can give a reliable picture of the condition of health of the community, but before that course is adopted a great deal of exploratory studies are necessary to evolve suitable methodology for such surveys under Indian conditions.

1.2. In order to assess the extent of morbidity and health care a localised survey was carried out for the first time by the All-India Institute of Hygiene and Public Health in Singur, small rural area in West Bengal (Lal and Seal, 1949) in 1944. Data on morbidity at all-India level were collected by the National Sample Survey (NSS)<sup>1</sup>, a multi-subject permanent sample survey organisation, in its various rounds (7th round : October 1963-March 1954, 11th round : August 1956-January 1957, 12th round : February-July 1957, 13th round : September 1957-May 1958 and 17th round : September 1961-July 1962) on an exploratory basis. The Indian Statistical Institute undertook a Pilot Health Survey in West Bengal in 1955 (Poti, Raman. Biswas and Chakravorty, 1959).

1.3. In this paper the experiences obtained from the morbidity surveys conducted in different rounds of the National Sample Survey (NSS) has been described so that these may be of some use in the planning of surveys in future.

## 2. METHODOLOGY USED IN NSS

2.1. In a Health Survey the most difficult problem is to define 'health'. According to the World Health Organisation (WHO) : "Health is a state of complete physical, mental and social well-being, and not merely the absence of diseases or infirmity. Also the deviation from this ideal may be regarded as morbid condition." In the 17th round of NSS any deviation from the state of physical and mental well-being during the reference period was treated as illness or sickness. Thus, the definition in the 17th round of the NSS broadly conformed to the definition of the WHO but the question of social well-being was not taken into consideration because it is not amenable to measurement. This definition of illness or sickness may be considered to be a broad one as it did not impose any condition on the extent of deviation from the state of physical and mental well-being. But in the earlier rounds of the NSS a somewhat restricted definition of illness or sickness was adopted. In the 7th round of the NSS information on morbidity was collected for persons who,

- (i) were confined in bed for at least 24 hours during the reference period;
- or
- (ii) abstained from taking the normal diet, had to live on sick diet appropriate to the nature of sickness for at least 24 hours during the reference period;
- or
- (iii) were unable to perform normal duties and activities for at least 24 hours due to illness or injury during the reference period.

In the 11-13th rounds a person was considered sick if he abstained from normal duties and activities for at least 24 hours during the reference period owing to ailment. The cases of pregnancy, delivery, puerperium and menstruation not receiving any medical attention, handicapped condition with fixed symptoms, myopia, hypermetropia and astigmatism were excluded but injury and accident were included in these surveys.

<sup>1</sup> NSS was started in 1950. The field work is mainly carried out by the Directorate of National Sample Survey under the Department of Statistics, Government of India and the Technical work (survey design, tabulation, and reporting) is done by the Indian Statistical Institute (ISI).

## SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

In all the National Sample Surveys the particulars of sickness were collected for all those persons who died during the reference period but who could be treated as usual members of the household.

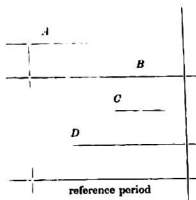
2.2. The definition adopted in the different countries in their health surveys may be of interest in this connection. In Japan, information was collected on any unusual disturbance of physical and mental well-being

- (1) treated by physicians, dentists, or other therapists or treated with medicines, drugs or some other materials
- (2) which confined the patient to bed or disabled him to work for one day; but excluding all such which were not included in the NSS.

In the US National Health Survey, the morbidity condition was characterised by any entry on the questionnaire which described a departure from a state of physical or mental well-being. It resulted from a positive response to one of a series of 'illness with recall' questions. In the coding and tabulating process, the conditions were selected or classified according to a number of different criteria such as whether they were medically attended; whether they resulted in disability, whether they were acute or chronic cases; or according to the type of disease, injury, impairment or symptom reported (US National Health Survey, 1959). In the Danish National Morbidity Survey of 1950 the criterion was essentially subjective. The respondents themselves were allowed to decide whether or not they felt ill: "The point was decided by the subjective judgement: if I feel ill, I am ill". In the National Health Surveys of UK and Canada, a condition was included in codes 001-795 (that is, sickness excluding injuries) of the International Statistical Classification of diseases, injuries and causes of death (WHO, 1948) which caused some disability during the period covered by the survey enquiry. By disability was meant that the person was suffering from it and was aware of its existence as something disturbing his state of health during the time (Logan and Brooke, 1957). In Philippines Health Survey (1960) sickness was considered as "any departure, subjective or objective, from a state of physical well-being, whether due to disease, injury or impairment; it included not only those temporarily sick but those who have a continuing condition such as loss of or damage to sight, hearing or limbs, or other illness, even if such a condition does not prevent the persons from fulfilling their normal activities (The Statistical Centre, University of the Philippines, 1960).

2.2. *Measure of morbidity.* One of the primary interest of collecting morbidity statistics is to have the knowledge of the dimension of the incidence and prevalence of sickness in the community during the specified reference period. The total number of cases of sickness with onset during the reference period give the incidence and those with onset either before or during the reference period give the prevalence of sickness in the reference period. For calculating the incidence and prevalence of sickness and other measures the sickness is classified into the following four categories according to the onset and termination of sickness in relation to the reference period :

- (a) with onset before the reference period and termination during the reference period (category A, say);
- (b) with onset before the reference period and termination after the period (category B, say);
- (c) with both onset and termination during the reference period (category C, say);
- (d) with onset during the reference period and termination after the reference period (category D, say). Four categories of sicknesses are shown in the following schematic diagram.



In order to compare the incidence or prevalence of morbidity between two communities or the same community at different points of time it is necessary to express the absolute number of sickness in appropriate rates which are defined below.

2.1.1. *Incidence rate.* The Expert Committee on Health Statistics of the World Health Organization recommended that the incidence rate might be defined as "the measurement of frequency of illness commencing during a defined period" and as such calculated as 1.

$$\frac{\text{Number of sickness being in the reference period } (C+D)}{\text{Average population during the survey}} \times 100.$$

It is usual to calculate the rate per average population at risk i.e. the average population between the two limits of reference period. In the NSS, however, the population as obtained on the date of survey was taken as the base for simplicity of calculation.

2.2. *Prevalence rate.* The rate was recommended by the WHO Expert Committee for the measurement of frequency of illness in existence at any time during a defined period (that is, a year, a month, a week) and is calculated as

$$\frac{\text{Number of sickness prevailing during the reference period } (A+B+C+D)}{\text{Average population during the survey (population at risk)}} \times 1000.$$

The prevalence rates in the NSS are calculated on the basis of the above formula.<sup>2</sup>

<sup>2</sup> Another prevalence rate has been in use for a long time in the US, Canada and some other countries, which is now more precisely expressed as 'point prevalence rate'. According to the WHO Expert Committee on Health Statistics, the term "Point prevalence" may be used to "describe the measurement of frequency of illness in existence, at a particular point at any time".

## SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

2.4. From earlier discussions, it is obvious that no uniform concept and definition of morbidity has yet been evolved. Incidence and prevalence rates will depend much on the concept and definition of morbidity. Generally, a broader definition, will give higher morbidity rates and a narrower definition, lower rates as is evident from Table (1) which gives the incidence and prevalence rates per 1000 persons for the different NSS rounds<sup>3</sup> based on different concepts (NSS, 1961 and NSS, 1968). Using month as a reference period, the prevalence rate in the rural sector based on the restricted definition was 44 per 1000 persons, for the 11th and 12th rounds combined. The prevalence rate was 135 per 1000 persons in the 17th round when a broad definition with probes was used. The prevalence rate was 65 per 1000 persons in 7th round and 62 per 1000 persons in the 17th round with a restricted definition as in the 7th round. Using month as a reference period, the incidence rate in the rural sector based on restricted definition was 32 per 1000 persons for the 11th and 12th rounds combined, 49 for the 7th round and 46 in the 17th round. The incidence rate with broad definition was 86 in the 17th round. Similar features were noticed in the urban sector. In view of the relatively more restricted nature of definition adopted in the 11th-12th rounds the rates obtained were the lowest.

From the above discussions, it is apparent that great care is necessary for a comparison of morbidity rates because of the difference in the concepts, definitions, etc.

2.5. *Mode of collection of morbidity data.* In India the interview method was followed for data collection as the questionnaire method was not suitable at present on account of low level of literacy of the population. In the interview method it is desirable to interview all the members of the sample households as they are the best persons to report their health conditions during the reference period excepting children about whom information may be collected from their parents or guardians. But in a large-scale survey as the NSS it is hardly possible to contact all the members even when repeated visits are made. In the 17th round of the NSS (September 1961 to July 1962) instruction was given to collect information through personal interview of all members of the household if they were present at the time of investigation. The results show that in the rural sector among the population aged 13 years and above 56% of cases were obtained through personal interview: in the case of males the percentage was 66 and in the case of females 47. In the urban sector also the percentage was the same as in the rural sector for the corresponding group of population: the percentages are 60 and 51 for males and females respectively. Taking into

---

<sup>3</sup> Sample design in different NSS rounds are given below. In the rural sector, since the 8th round (1954-55) two-stage stratified sample design was adopted for the collection of morbidity data with villages and households as first-stage and second-stage units respectively: in the 7th round the design was three-stage stratified with tahsils, villages and households as first, second and third-stage units respectively. In the urban sector the design was two-stage stratified since the 8th round with blocks and households as first and second-stage units respectively and three-stage stratified in the seventh round with towns, blocks and households as first, second and third-stage units respectively. In sample villages and urban blocks the required number of sample households were selected from the list of current households prepared by the investigators, systematically with a random start.

SANKHYĀ : THE INDIAN JOURNAL OF STATISTICS : SERIES B

TABLE 1. INCIDENCE AND PREVALENCE RATES PER 1000 PERSONS FOR NSS ROUNDS : ALL-INDIA RURAL AND URBAN HOUSEHOLDS

sector	round	survey period	definition	reference period	incidence rate	prevalence rate	no. of sample households
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	rural	7th Oct 1953-March 1954	restricted	month	49.14	64.77	8,235
2.	..	11th Aug. 1950-Jan. 1957	..	month	26.39	31.66	7,161
3.	..	12th Feb. 1957-July 1957	..	month	37.38	56.73	5,544
4.	rural	11th Aug. 1956-July 1957 +12th	restricted	month	31.88*	44.20*	13,605*
5.1	rural	17th Sept. 1961-July 1962	broad	week	18.37	88.37	4,260
5.2	..	17th -do-	..	fortnight	44.99	108.36	4,260
5.3	..	17th -do-	..	month	85.60	135.04	4,260
5.4	..	17th -do-	restricted	week	8.50	37.16	4,260
5.5	..	17th -do-	..	fortnight	23.78	48.90	4,260
5.6	..	17th -do-	..	month	45.59	61.51	4,260
6.	urban	7th Oct. 1953-March 1954	restricted	month	45.58	61.75	1,720
7.	..	11th Aug. 1956-Jan. 1957	..	month	32.25	35.55	2,809
8.	..	12th Feb. 1957-July 1957	..	month	53.19	81.43	1,731
9.	urban	11th Aug. 1956-July 1957 12th	restricted	month	42.82*	58.59*	4,540
10.	urban	13th Sept. 1957-May 1958	restricted	month	34.81	42.01	11,680
11.1	..	17th Sept. 1961-July 1962	broad	week	23.95	84.95	4,474
11.2	..	17th -do-	..	fortnight	53.04	106.96	4,474
11.3	..	17th -do-	..	month	95.10	132.05	4,474
11.4	..	17th -do-	restricted	week	12.67	40.69	4,474
11.5	..	17th -do-	..	fortnight	28.97	48.79	4,474
11.6	..	17th -do-	..	month	54.89	68.93	4,474

\* mean of the two rates.

Source: NSS Report No. 49: Report on Morbidity (1961) and NSS Report No. 129: Report on Pilot Enquiry on Morbidity (1968).

**SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS**

consideration the total population the self-respondents constituted 35% in the rural as well as urban sector. Table 2 gives the percentage distribution of population by sex, age-group and type of respondents at the all-India level.

**TABLE 2. PERCENTAGE DISTRIBUTION OF POPULATION BY SEX, AGE-GROUP AND TYPE OF RESPONDENTS : ALL-INDIA : 17TH ROUND**

age-group (years)	male			female			male and female		
	self- respondents	proxy respondents	all respondents	self- respondents	proxy respondents	all respondents	self- respondents	proxy respondents	all respondents
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>(1) rural sector</i>									
1. 0-12	—	39.52	39.62	—	37.76	37.76	—	38.66	38.66
2. 13-16	2.03	5.53	7.50	1.62	4.80	6.42	1.83	5.18	7.01
3. 17-36	19.18	11.62	30.80	14.62	17.64	32.26	16.96	14.55	31.51
4. 37-46	7.85	1.36	9.21	5.74	3.98	8.72	6.82	2.64	9.46
5. 47-56	5.58	0.99	6.57	3.77	3.26	7.03	4.70	2.09	6.79
6. 57 and above	5.06	1.28	6.34	3.29	3.52	6.81	4.19	2.38	6.57
7. 13-above	39.69	20.79	60.48	29.04	33.20	62.24	34.50	26.84	61.34
8. all ages	39.69	60.31	100.00	29.04	70.96	100.00	34.50	65.50	100.00
<i>(2) urban sector</i>									
1. 0-12	—	35.25	35.25	—	38.46	38.46	—	36.78	36.78
2. 13-16	1.99	6.02	8.01	1.86	5.61	7.47	1.93	5.82	7.75
3. 17-36	19.36	13.45	32.81	17.00	14.63	31.53	18.24	13.96	32.20
4. 37-46	8.28	2.71	10.99	5.73	3.84	9.57	7.07	3.24	10.31
5. 47-56	5.27	1.77	7.04	4.14	2.67	6.81	4.74	2.19	6.93
6. 57 and above	4.12	1.78	5.90	2.83	3.33	6.16	3.61	2.82	6.03
7. 13-above	39.02	25.73	64.75	31.56	29.68	61.24	35.49	27.85	63.34
8. all ages	39.02	60.98	100.00	31.56	68.44	100.00	35.49	64.51	100.00

*Source : NSS Report No. 129 : Report on Pilot Enquiry on Morbidity (1968).*

As stated earlier, proxy-interviews were permitted for absentee-members in all the rounds of NSS. Since the state of health is a subjective matter, reporting is likely to be affected by proxy-interview, specially in the case of minor illnesses which which may not be within the knowledge of the informants.

SANKHYĀ : THE INDIAN JOURNAL OF STATISTICS : SERIES B

2.6. *Number of persons reporting sickness by respondent type.* Table 3 gives the number of persons reporting sickness expressed as percentage of corresponding population.

TABLE 3. NUMBER OF PERSONS REPORTING SICKNESS EXPRESSED AS PERCENTAGE OF CORRESPONDING POPULATION : ALL-INDIA : 17TH ROUND

age-group (years)	self			proxy			self-proxy		
	reporting		total	reporting		total	reporting		total
	sickness	no sickness		sickness	no sickness		sickness	no sickness	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) <i>rural sector</i>									
1. 0-12	—	—	—	5.92	53.11	59.03	3.88	34.78	38.66
2. 13-16	0.40	4.90	5.30	0.56	7.34	7.90	0.51	6.50	7.01
3. 17-36	7.41	41.73	49.14	2.52	19.70	22.22	4.21	27.30	31.51
4. 37-46	3.62	16.15	19.77	0.54	3.49	4.03	1.90	7.86	9.46
5. 47-56	2.98	10.65	13.63	0.52	2.67	3.19	1.36	5.43	6.79
6. 57-above	3.28	8.80	12.16	0.70	2.93	3.63	1.59	4.98	6.57
7. 13-above	17.69	82.31	100.00	4.84	36.13	40.97	9.27	52.07	61.34
8. all ages	17.69	82.31	100.00	10.76	89.24	100.00	13.15	86.85	100.00
(2) <i>urban sector</i>									
1. 0-12	—	—	—	6.09	50.91	57.00	3.93	32.85	36.78
2. 13-16	0.31	5.13	5.44	0.65	8.38	9.03	0.53	7.22	7.75
3. 17-36	7.24	44.17	51.41	2.46	19.18	21.64	4.15	28.05	32.20
4. 37-46	3.87	16.06	19.93	0.46	4.67	5.03	1.67	8.64	10.31
5. 47-56	2.77	10.57	13.34	0.61	2.79	3.40	1.38	5.55	6.93
6. 57-above	2.35	7.53	9.88	0.89	3.01	3.90	1.41	4.62	6.03
7. 13-above	16.54	83.46	100.00	5.07	37.93	43.00	9.14	25.63	34.77
8. all ages	16.54	83.46	100.00	11.16	88.84	100.00	13.07	86.93	100.00

Source: NSS Report No. 129: Report on Pilot Enquiry on Morbidity (1968).

From Table 3 it will be seen that percentage of sickness reported among the self-interviewed was about 18% in the population aged 13 and above for the rural areas. About 11 percent of the population interviewed by proxy was reporting sickness.



### SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

The under-reporting observed may be ascribed to the proxy-interviews. In case of urban areas also the under-reporting of sickness was observed for the proxy-interviews, the percentage of sickness reported for the self-interviewed and the proxy-interviewed being about 17% and 11% respectively.

2.7. *Use of probes.* To help recall the incidence of sickness during the reference period it is desirable to have a fixed set of suitable probing questions to ascertain the health conditions of each member. In the 17th round of NSS, a fixed set of probing questions were introduced with a view to collect better and more reliable data on morbidity. The questions were asked in the order as given below:

- (1) During the last 30 days did you have any injury or sickness ?
- (2) During the last 30 days did you have (a) anything wrong relating to skin, head, eyes, ears, nose, throat, teeth, arms ands, chest, heart, stomach, liver, kidney, bowels, legs, feet; (b) cough, cold indigestion, diarrhoea, rheumatism and infectious diseases ?
- (3) During the last 30 days did you take (a) medical treatment or (b) medicines ?
- (4) During the last 30 days did you have anything wrong in the way of women's complaints ? (All women members aged 12 years and above).

Besides the 4 probes listed above the following two probes were put to the senior most male or female members interviewed personally so as to collect particulars for those who were in-patients in hospital during the reference period and those who died during the reference period.

- (5) Was any member in a hospital as an in-patient during the last 30 days ?
- (6) Did any person die during the last 30 days who could be treated as usual member on the day of death.

The procedure adopted in collecting data on morbidity in the 17th round was to put the probes 1-4 to a member or to the informant in the order as above with a view to ascertaining the differential response to the different probes. The investigators were also asked not to correct negative response to probe against the affirmative response to the successive probes. The persons with affirmative response to any one of the probes listed above was considered to be sick. During the reference period a person may have more than one spell of sickness and the morbidity data was collected for each of the spells in the reference period.

Table 4 below gives the percentage distribution of spells by types of probes and respondent. In the rural areas 72% of the spells could be detected by probe (1) and 23% by probe (2) and 2% by probes (3) and (4); and of 3% cases nothing was reported against these probes. Thus, about 95% cases of sickness were roped in with the help of first two probes. Almost similar feature was noticed in the urban sector.

## SANKHYĀ : THE INDIAN JOURNAL OF STATISTICS : SERIES B

TABLE 4. PERCENTAGE DISTRIBUTION OF SPELLS BY TYPE OF PROBES AND RESPONDENTS : ALL-INDIA : NSS 17TH ROUND  
reference period : last month

sector	respondent type	type of probe*				not recorded	all persons	no. of sample
		1	2	3	4			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
rural	self	69.24	27.44	0.54	1.21	1.57	100.00	2089
	proxy	74.81	19.17	0.46	1.83	3.73	100.00	2608
	all	72.23	23.04	0.49	1.66	2.68	100.00	4677
urban	self	70.49	25.79	0.93	1.56	1.23	100.00	1196
	proxy	70.11	26.16	0.73	1.43	1.57	100.00	1467
	all	70.28	25.99	0.82	1.50	1.41	100.00	2663

Source : NSS Report No 129 : Report on Pilot Enquiry on Morbidity (1968).

\*Probe 1 : During the last 30 days did you have injury or sickness ?

2 : During the last 30 days did you have (a) anything wrong relating to skin, head, eyes, ears, nose, throat, teeth, arms, hands, chest, heart, stomach, liver, kidney, bowels, legs, feet; (b) cough, cold, indigestion, diarrhoea, rheumatism and infectious diseases

3 : During the last 30 days did you take (a) medical treatment or (b) medicine ?

4 : During the last 30 days did you have anything wrong in the way of women's complaints ?  
(For all women members aged 12 years and above)

2.8. *Number of spells with disability.* Sickness could be categorised into disabling and non-disabling types according to the degree of severity. In NSS sickness which involved either hospitalisation or confinement to bed or restricted diet or restricted activity was defined to be of disabling type. In Table 5 percentage distribution of sickness by different types of disability and probes have been presented.

2.9. *Weekly incidence rates.* Though the data on sickness were collected for the reference period of 30 days preceding the date of enquiry, the weekly incidence rates were calculated for each of the 4 different weeks covered in the reference period by the type of respondent adopting the broad concept discussed in para 2.1. But it was also possible to calculate the incidence rates for sicknesses with disability (hospitalisation or confinement to bed, no hospitalisation or confinement to bed, but restricted activity and on restricted diet). The rates based upon restricted definition were also given along with those calculated on the basis of broad definition in Table 6.

From Table 6 it is evident that the incidence rates for the 2nd and 3rd week were higher than those for 1st and 4th week in the rural sector and in the urban sector the rates were highest in the 2nd week. It is rather difficult to explain these features, for the rates based upon the later weeks are likely to be less than those for the 1st week because of possible recall lapses. One of the reasons for this behaviour may be that the informants might have exaggerated the duration of the illness by putting data of

SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

onset of the illness a little earlier so that some of the spells which were to be taken into consideration in the 1st week had to be considered in the 2nd week. Some of the events occurring in the 4th week might have been put in the 3rd week because of recall difficulties. This table indicates that there is some possibility of getting proportionately smaller incidence rates if the reference period is very small.

TABLE 6. ESTIMATED NUMBER OF SPELLS WITH DIFFERENT TYPES OF DISABILITY EXPRESSED AS PERCENTAGE OF TOTAL NUMBER OF SPELLS FOR DIFFERENT PROBES AND RESPONDENTS: ALL-INDIA: NSS 17TH ROUND

probes	respondent	hospitali- sation or confinement to bed	hospitali- sation or confinement to bed but restricted activities	on sick diet	all disability	no disability	total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>rural sector</i>							
1	self	31.83	15.06	5.51	52.40	47.60	100.00
	proxy	32.37	9.70	6.62	48.69	51.31	100.00
2	self	18.53	14.39	1.40	34.32	65.68	100.00
	proxy	15.80	15.76	6.10	37.66	62.34	100.00
3	self		22.05	8.18	30.23	69.77	100.00
	proxy	17.65			17.65	82.35	100.00
4	self	14.88	4.13	9.83	19.84	80.16	100.00
	proxy	1.27	20.12	—	24.39	75.61	100.00
all probes	self	27.38	14.35	4.30	46.23	53.77	100.00
	proxy	27.84	10.66	6.17	44.67	55.33	100.00
<i>urban sector</i>							
1	self	90.67	17.84	7.74	56.25	43.75	100.00
	proxy	41.57	13.36	7.32	62.25	37.75	100.00
2	self	16.37	11.69	9.11	36.07	63.93	100.00
	proxy	11.77	18.20	5.67	35.64	64.36	100.00
3	self	53.55	—	—	53.55	46.45	100.00
	proxy	36.27	18.93	—	55.20	44.80	100.00
4	self	2.14	27.86	—	30.00	70.00	100.00
	proxy	13.27	2.10	6.29	21.66	78.32	100.00
all probes	self	26.14	16.02	7.80	49.96	50.04	100.00
	proxy	33.07	14.27	6.74	54.02	45.98	100.00

Source: NSS Report No. 129: Report on Pilot Enquiry on Morbidity (1968).

## SANKHYĀ : THE INDIAN JOURNAL OF STATISTICS : SERIES B

TABLE 6. INCIDENCE RATE BY RESPONDENT TYPE FOR DIFFERENT WEEKS PRIOR TO SURVEY CORRESPONDING TO (i) BROAD DEFINITION AND (ii) RESTRICTED DEFINITION : ALL-INDIA : NBS 17TH ROUND

type of respondent	sub-sample	week prior to survey								
		broad definition				restricted definition				
		1	2	3	4	1	2	3	4	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(1) rural sector										
self	1	24.38	35.40	24.30	25.71	11.03	19.34	17.20	12.74	
	2	22.37	34.41	27.77	15.75	11.87	20.23	20.58	10.27	
	3	22.20	34.00	32.32	30.47	8.63	22.92	18.80	12.57	
	C	23.04	34.63	25.34	23.87	10.63	20.77	18.14	11.85	
proxy	1	16.61	22.58	20.72	11.20	7.53	10.67	8.46	4.76	
	2	16.49	22.60	20.34	14.93	6.45	10.78	11.08	8.02	
	3	14.60	21.93	15.46	20.84	8.37	13.06	10.24	9.93	
	C	15.91	22.40	18.86	15.64	7.44	12.38	9.94	7.57	
all respondents	1	19.39	27.16	22.03	16.39	8.78	13.78	11.58	7.62	
	2	18.50	26.09	22.88	15.21	8.30	13.73	13.61	8.79	
	3	17.17	25.99	21.46	24.08	8.42	16.38	13.12	10.82	
	C	18.37	26.62	22.13	18.48	8.50	15.28	12.76	9.05	
(2) urban sector										
self	1	31.54	26.88	27.89	25.87	15.87	15.05	17.93	17.22	
	2	21.61	35.41	35.38	22.09	12.02	21.25	27.62	13.11	
	3	23.77	38.65	25.73	20.70	6.79	14.02	19.48	10.94	
	C	25.66	33.56	29.78	22.93	11.66	17.15	19.40	13.81	
proxy	1	22.01	25.55	16.06	13.90	13.45	15.70	9.37	7.52	
	2	24.57	33.40	25.51	16.11	14.52	21.61	16.86	8.85	
	3	22.57	21.62	19.35	17.63	11.77	10.27	12.08	10.03	
	C	23.01	26.64	20.31	15.89	13.23	15.84	12.77	9.14	
all respondents	1	25.44	26.03	20.31	18.21	14.31	15.41	12.44	11.01	
	2	23.40	34.13	29.09	18.27	13.80	21.48	18.95	11.03	
	3	22.92	27.04	21.53	18.68	10.07	11.86	18.93	10.34	
	C	23.95	29.09	23.67	18.39	12.67	16.30	15.12	10.80	

Source : NBS Report No. 129 : Report on Pilot Enquiry on Morbidity (1968).

SOME ASPECTS OF MORBIDITY SURVEYS IN THE N88

2.10. *Weekly prevalence rates.* Prevalence rates for different weeks corresponding to broad and restricted definition are given for different respondents type in Table 7.

TABLE 7. PREVALENCE RATE BY RESPONDENT TYPE FOR DIFFERENT WEEKS PRIOR TO SURVEY CORRESPONDING TO (i) BROAD DEFINITION AND (ii) RESTRICTED DEFINITION : ALL-INDIA: N88 17TH ROUND

type of respondent	sub-sample	week prior to survey								
		broad definition				restricted definition				
		1	2	3	4	1	2	3	4	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(1) <i>rural sector</i>										
self	1	120.90	118.28	101.95	86.10	46.72	50.26	43.87	30.66	
	2	121.24	109.24	86.00	65.30	55.62	65.29	52.74	39.02	
	3	125.68	123.97	112.10	88.82	47.55	57.74	48.99	33.97	
	C	123.50	117.04	99.79	79.98	49.96	57.66	48.45	34.51	
proxy	1	67.94	68.84	55.96	40.63	25.60	26.91	20.37	13.74	
	2	71.61	60.55	49.05	32.49	28.82	31.98	25.75	16.82	
	3	72.00	69.40	57.90	48.48	32.30	36.05	29.42	21.89	
	C	70.36	66.20	54.36	40.44	29.03	31.31	25.30	17.47	
all respondents	1	86.88	86.50	72.39	56.87	33.14	55.25	28.76	19.78	
	2	88.25	77.17	61.66	43.69	37.96	45.35	34.96	24.40	
	3	90.04	87.73	76.11	62.03	37.70	44.67	35.99	25.94	
	C	88.37	83.74	69.96	54.07	37.16	40.40	33.21	23.34	
(2) <i>urban sector</i>										
self	1	109.88	101.23	88.95	72.79	54.35	53.73	46.43	34.95	
	2	108.08	93.72	80.87	57.21	50.92	56.45	48.98	19.37	
	3	110.41	104.98	80.30	61.92	45.54	53.16	45.21	33.28	
	C	109.42	99.84	83.42	63.97	50.80	54.49	46.91	34.72	
proxy	1	67.93	64.63	48.65	37.90	33.44	32.65	26.50	16.27	
	2	80.65	75.16	57.30	35.51	43.14	48.05	34.95	21.38	
	3	66.60	55.14	45.60	34.49	28.73	25.26	23.25	16.66	
	C	71.52	64.07	50.49	35.97	35.09	36.28	28.89	18.11	
all respondents	1	83.02	77.74	63.15	50.46	40.97	40.24	30.24	23.00	
	2	90.60	81.80	65.85	43.39	45.96	51.11	40.17	26.63	
	3	81.16	72.31	57.45	43.87	34.74	34.79	30.76	21.87	
	C	84.95	77.34	62.17	45.90	40.59	42.09	35.47	24.00	

Note : Rates given in col. (3) are in some cases different for those given in draft Report No. 129 : "Report on Pilot Enquiries on Morbidity" (1968).

From Table 7 it would be seen that the prevalence rate was always highest for the 1st week when a broad definition was adopted. In the case of restricted definition the rate was almost at the same level for the 1st two weeks and then it showed a steady decline. The trend of incidence rates is somewhat different from the prevalence rates. It is rather difficult to reconcile the difference in trend on incidence and prevalence rates over different weeks. Further studies are necessary to ascertain the cause of difference in trends for incidence rates and different rates over different periods. Further from Table 7 it is noticed that the prevalence rates based on longer period than a fortnight are likely to be underestimates.

SANKHYĀ : THE INDIAN JOURNAL OF STATISTICS : SERIES B

2.11. *Reference period.* In morbidity survey the reference period plays an important role as all the rates are dependent on reference period. It is therefore interesting to study how prevalence rates vary by increasing the reference period. Table 8 gives the prevalence rates by type of respondent for different periods of survey corresponding to broad definition and restricted definition based on the data collected in the NSS 17th round.

TABLE 8. PREVALENCE RATES BY TYPE OF RESPONDENT FOR DIFFERENT PERIODS OF SURVEY CORRESPONDING TO (i) BROAD DEFINITION AND (ii) RESTRICTED DEFINITION : NSS 17th ROUND

		all-India								
type of respondents	sub-sample	reference period last								
		broad definition				restricted definition				
		7 days	11 days	21 days	30 days	7 days	11 days	21 days	30 days	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
(1) rural sector										
self	1	120.96	142.48	161.26	171.70	46.72	60.31	64.00	70.66	
	2	121.24	155.98	167.06	176.69	55.62	78.71	84.83	90.14	
	3	125.68	155.51	178.43	195.38	47.55	71.48	80.43	84.53	
	C	122.50	151.06	168.56	183.12	49.96	68.68	79.63	84.62	
proxy	1	67.94	84.67	93.95	113.44	25.00	34.43	38.46	43.36	
	2	71.10	86.87	98.30	103.17	28.82	38.54	45.81	47.95	
	3	72.00	85.94	96.42	113.66	32.30	43.41	50.75	55.71	
	C	70.36	85.83	96.12	109.63	29.03	38.78	44.99	48.97	
all respondents	1	86.88	105.33	118.00	136.75	35.14	44.04	51.16	56.82	
	2	33.25	110.46	121.77	128.23	37.96	52.26	59.06	62.36	
	3	90.04	109.32	123.09	140.40	37.70	56.98	60.80	65.40	
	C	88.37	108.36	121.21	135.04	37.16	51.09	56.95	61.51	
(2) urban sector										
self	1	109.88	132.77	147.88	166.53	54.35	69.58	77.31	85.68	
	2	108.08	134.02	156.68	171.76	50.02	68.10	81.93	91.70	
	3	110.41	135.89	149.91	165.89	45.54	60.88	67.69	73.94	
	C	109.42	134.10	151.34	168.12	50.60	66.22	75.85	84.02	
proxy	1	67.93	86.54	96.21	104.63	33.44	46.09	51.45	55.86	
	2	80.65	107.83	123.75	128.53	43.14	62.61	69.85	74.63	
	3	66.00	81.74	92.78	104.61	28.73	36.96	45.23	51.51	
	C	71.82	92.01	104.23	112.24	35.00	48.61	56.05	60.64	
all respondents	1	83.02	103.17	115.61	126.89	40.97	54.55	60.77	66.59	
	2	90.60	117.32	135.65	144.20	45.06	64.62	75.30	80.81	
	3	81.16	100.23	112.28	124.87	34.74	46.02	52.90	59.16	
	C	84.95	106.96	120.02	132.05	40.59	48.79	63.06	68.93	

There is considerable variation in the prevalence rates based on self and proxy-respondent. The latter rates always were much less than the corresponding rates for self-respondents. The overall rate was 88 for a reference period of last week and it was 135 for the reference period covering the last 30 days in the rural sector. Almost

## SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

similar feature was noticed in the urban sector. If a restricted definition is adopted the rates would be found to be 37 for the reference of last 7 days and it was 61 for the reference period last 30 days in the rural sector : the rates for the urban sector ranged from 41 with week as a reference period and 69 with month as a reference period. Tables 1 and 2 in the Appendix give prevalence rates by type of respondents and type of disability for different reference periods for the rural and urban sector respectively.

2.12. *Cause of sickness.* Information on causes of sickness was collected in NSS but it is observed that excepting sickness with clearly marked symptoms like small pox, reliable information on the causes of sickness is difficult to obtain. Even with medical investigators and detailed probes but without clinical and laboratory examinations, it has been seen from the "Validity Survey" carried out by the Indian Statistical Institute in 1955 that a high proportion of cases (57 per cent) was misclassified as compared to the actual hospital records; for the lay-investigators as high as 63 per cent of the sickness were misclassified; of all cases of sickness, 6 per cent were not recorded at all by medical investigators and 12 per cent by lay-investigators (Poti, Raman, Biswas and Chakravorty, 1959). In the 7th round of NSS, information on causes of sickness was collected according to the following 23 groups : malaria, kalazar, typhoid, other fevers diagnosed, other fevers undiagnosed, tuberculosis, small pox, plague, cholera, diptheria, communicable disease, stomach troubles, cancer, respiratory disease, heart disease, rickets, mental deformity, complications of child birth, snake-bite, accidents, old age, other diseases diagnosed and other diseases undiagnosed. A large proportion of causes, about 60 per cent in rural areas and 88 per cent in urban areas, were reported under the heterogeneous and undefined groups—'other fevers diagnosed', 'other fevers undiagnosed', 'stomach troubles', 'other diseases diagnosed' and 'other diseases undiagnosed'. It is felt that a diagnostic survey with fully equipped team is required for clinical and laboratory examination to supply information on causes of sickness—this method is being currently followed in the U.S. National Health Survey.

2.13. *Medical graduates as lay-investigators.* On a priori considerations one would prefer medical graduates to lay-investigators in a general health survey. But the results of the 'validity survey' carried out by the Indian Statistical Institute in 1956 in Calcutta, showed that there was no significant difference between the two teams of investigators.

---

\* Names of patients with addresses were collected from the Medical Out-patients Department of the R. G. Kar Medical Hospital, Calcutta. Investigators were sent to contact the respective households and prepare a list of the head of the household along with names of all the members of the household including those who were treated in the Out-patient Department of the R. G. Kar Hospitals. This list was split up into two and both the medical and non-medical enumerators were given such a list and were required to collect details about all illness occurring to the members of the household within a reference of one month. The non-medical investigators were instructed to record the cause of diseases as stated by the informants and also details of signs, symptoms etc., of the disease if possible. Medical investigators were given freedom to interrogate the head of the households or the patients themselves for their views on the disease. After the collection of the information, the returns were compared with the hospital diagnosis.

## Appendix

TABLE 1. PREVALENCE RATES BY TYPE OF DISABILITY AND RESPONDENTS FOR DIFFERENT REFERENCE PERIOD  
ALL-INDIA (RURAL)

NSS 17th Round : September 1961-July 1962

type of disability	sub- sample	reference period—last																
		self-respondent						proxy respondents						all respondents				
		7 days	14 days	21 days	30 days	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1. hospitalisation or confinement to bed		1	20.36	38.50	45.50	50.31	13.17	19.13	20.75	24.00	18.96	26.06	29.77	33.40	21.17	29.89	34.30	37.04
		2	29.09	43.85	47.13	49.76	17.06	22.66	27.96	31.17	23.46	32.92	36.70	42.01	21.17	29.89	34.30	37.04
		3	30.10	39.26	48.29	50.48	20.14	29.71	35.06	37.72	23.46	32.92	36.70	42.01	21.17	29.89	34.30	37.04
		C	29.49	40.52	47.23	50.16	16.78	23.81	27.92	30.53	21.17	29.89	34.30	37.04	21.17	29.89	34.30	37.04
2. no hospitalisation or confinement to bed but on restricted activity		1	10.06	15.12	19.86	20.84	7.76	9.61	10.90	12.14	8.58	11.58	14.10	15.25	11.07	16.66	17.08	17.91
		2	19.91	26.69	28.75	30.97	7.40	9.95	11.04	11.13	10.68	13.40	15.56	17.42	10.01	13.56	15.09	16.85
		3	14.52	22.44	26.28	26.50	7.83	8.82	10.13	11.80	10.01	13.56	15.09	16.85	10.01	13.56	15.09	16.85
		C	14.76	21.30	24.86	26.65	7.66	9.48	10.70	11.68	10.01	13.56	15.09	16.85	10.01	13.56	15.09	16.85
3. on restricted diet—		1	7.29	7.67	8.21	8.49	4.66	5.00	6.77	7.22	5.60	6.40	7.29	7.67	5.13	6.70	7.47	7.74
		2	6.83	8.18	8.90	9.41	4.35	5.94	6.71	6.88	4.14	4.77	5.64	5.97	4.97	5.77	6.78	7.16
		3	2.93	4.65	5.20	5.55	4.75	4.88	5.66	6.18	4.14	4.77	5.64	5.97	4.97	5.77	6.78	7.16
		C	5.69	6.86	7.53	7.86	4.58	5.51	6.38	6.63	4.97	5.77	6.78	7.16	4.97	5.77	6.78	7.16
4. no disability		1	74.24	81.18	87.29	99.04	42.34	50.24	55.49	70.08	53.74	61.29	66.84	80.43	50.29	58.20	62.71	66.88
		2	65.62	77.27	82.23	88.45	42.34	48.33	52.59	55.22	52.34	58.23	63.19	76.00	51.21	59.25	64.29	73.73
		3	78.13	84.03	98.00	110.85	39.70	42.53	46.67	50.85	53.74	61.29	66.84	80.43	50.29	58.20	62.71	66.88
		C	72.64	82.38	88.93	98.50	41.33	47.05	51.24	60.66	51.21	59.25	64.29	73.73	51.21	59.25	64.29	73.73
5. all*		1	120.95	142.48	161.26	178.70	67.94	84.67	93.95	113.44	86.88	100.33	118.00	136.76	88.25	110.46	121.27	128.23
		2	121.24	155.98	167.06	176.69	71.16	86.87	98.30	103.17	90.04	109.32	123.99	140.40	88.37	108.36	121.21	135.04
		3	125.68	155.98	178.43	195.38	72.00	85.94	96.42	112.66	90.04	109.32	123.99	140.40	88.37	108.36	121.21	135.04
		C	122.60	161.06	168.66	183.12	70.36	85.83	96.23	109.03	88.37	108.36	121.21	135.04	88.37	108.36	121.21	135.04

\* The rates under different types of disability do not add up to the overall rates because of rounding of figures.



SOME ASPECTS OF MORBIDITY SURVEYS IN THE NSS

TABLE 2. PREVALENCE RATES BY TYPE OF DISABILITY AND RESPONDENTS FOR DIFFERENT REFERENCE PERIOD  
ALL-INDIA (URBAN)

NSS 17th Round : September 1961 - July 1962

type of disability	sub- sample	reference period—last												
		self-respondent			proxy respondent			all respondents						
		7 days	14 days	30 days	7 days	14 days	30 days	7 days	14 days	30 days	7 days	14 days	30 days	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
1. hospitalisation or confinement to bed	1	23.90	34.02	39.65	44.55	22.57	30.34	34.99	36.44	23.05	31.46	35.98	39.36	
	2	23.48	33.44	39.63	47.34	26.22	38.82	44.13	46.90	25.04	36.17	42.50	46.42	
	3	22.65	30.01	35.27	39.08	17.84	22.12	26.12	28.84	19.48	25.02	29.25	32.64	
	C	23.18	32.07	38.22	43.96	22.10	30.30	34.72	37.02	22.54	30.96	35.95	39.49	
2. no hospitalisation or confinement to bed but on restricted activity	1	16.70	18.68	19.70	22.38	8.00	12.10	12.73	12.96	11.12	14.46	15.23	16.34	
	2	20.07	26.09	30.79	31.35	13.01	18.88	22.20	22.70	16.67	21.59	25.32	26.84	
	3	17.63	23.23	25.62	27.01	4.64	6.08	13.24	14.01	8.97	11.93	15.10	17.46	
	C	18.12	22.96	25.37	26.93	8.40	12.33	14.86	16.05	11.91	16.02	18.59	19.91	
3. on restricted diet	1	13.76	16.88	18.09	18.75	2.88	3.67	4.75	6.47	6.79	8.42	9.55	10.59	
	2	7.87	10.31	11.50	13.01	3.91	4.99	5.20	6.02	5.35	6.86	7.84	8.56	
	3	6.16	6.72	6.91	7.25	0.35	8.75	9.40	10.15	6.28	8.06	8.65	9.16	
	C	9.32	11.39	11.28	13.12	4.30	5.79	6.47	7.56	6.14	7.63	8.52	9.53	
4. no disability	1	55.63	63.19	70.07	80.85	34.49	40.45	44.75	48.77	42.05	48.62	53.84	60.30	
	2	56.16	65.86	74.65	80.66	37.51	45.22	52.21	53.90	44.64	52.70	60.35	63.39	
	3	64.67	75.34	82.22	91.95	37.27	44.78	47.65	52.10	46.42	55.21	59.38	65.71	
	C	58.82	67.97	75.49	84.10	36.43	43.50	48.18	51.60	44.36	52.17	57.86	63.12	
5. all*	1	109.86	132.77	147.38	166.53	67.93	86.54	96.21	104.63	93.02	103.17	114.61	126.80	
	2	108.08	134.02	156.56	171.76	60.65	107.83	123.76	128.63	99.60	117.32	135.65	144.20	
	3	110.41	135.89	149.51	165.89	90.00	81.74	92.78	103.61	81.16	100.23	112.28	124.87	
	C	109.42	134.19	151.51	168.12	71.62	92.01	104.23	112.24	84.95	106.96	120.92	132.05	

\*The rates under different types of disability do not add up to the overall rates because of rounding of figures.

## 3. CONCLUDING REMARKS

3.1. The concept and definitions of sickness to be adopted in the morbidity survey would largely depend on the objective of the survey. The use of fixed set of probing questions with a broad definition appears to be the plausible approach in Indian condition. The fixed set of probing questions would not only help to recall the events of sickness but also would minimise the investigator's bias. The aim is to sweep in occurrences of all types of illness and then to separate the illness of disabling type. In morbidity survey in the NSS proxy-interviews were permitted and this, by all tokens, resulted in under-reporting. In interview method with household as a sampling unit it is difficult to catch all the persons. The de-facto approach rather than de-jure may be adopted to minimise the proxy. In the NSS 17th round, in fact, visitors present in the household were included.

The reference period is very important in the case of morbidity survey as few people remember the date of occurrence of illness, specially, minor illness. The pattern of incidence rate over the week prior to the survey is entirely different from that of the prevalence rate and, therefore, it is difficult to draw any definite conclusion. The somewhat higher incidence rates for second and third weeks indicate the risk of using a very short reference period. Probably, a reference period of two weeks may be suitable for Indian conditions. But, for this purpose studies are necessary to determine the optimum reference period.

## REFERENCES

- GOVERNMENT OF INDIA (1946): Report of the Health Survey and Development Committee.
- LAL R. B. and SEAL S. C. (1949): General Health Survey in Singur Health Centre, 1944. Government of India.
- POTI, S. J., RAMAN, M. V., BISWAS S. and CHAKRABORTY B. (1959): Pilot health survey in West Bengal, 1953, *Sankhyā*, 21, 141-204.
- SPIEGELEMAN, M. (1956): *Introduction to Demography*, 107.
- U'S NATIONAL HEALTH SURVEY (1958): Health Statistics: Selected Survey Topics, United States, July 1957-June 1958. Series 5.
- LINDBARDT M. (1959): The Danish National Morbidity Survey of 1950, International Population Conference, Vienna, 1959.
- WORLD HEALTH ORGANISATION (1948): Sixth Revision of the International List.
- LOGAN W. P. D. and BROOKE E. M. (1957): The Survey of Sickness, 1943-52, Studies on Medical and Population Subjects, No. 12, General Register Office, London.
- THE STATISTICAL CENTRE, UNIVERSITY OF THE PHILIPPINES, MANILA (1960): Demographic and Health Survey, 1960.
- GOVERNMENT OF INDIA (1961): National Sample Survey Report No. 49, *Report on Morbidity*.
- GOVERNMENT OF INDIA (1968): National Sample Survey Report No. 129, *Report on the Pilot Enquiry on Morbidity*.

*Paper received : September, 1970.*