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Measurement of the Personal Cost of Illness due to Some Major Water-Related Diseases in an Indian Rural Population*

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A field study, aimed at measuring the personal cost of illness from five major water-related diseases was undertaken in a rural area of Uttar Pradesh (India) in 1981-82. The diseases included in the study were—enteric fever, acute diarrhoeal diseases, infective hepatitis, conjunctivitis and scabies. The measurement of the cost of illness included information on losses in productivity and treatment costs. The annual costs of illnesses per 100 people in 1981 were Rs 7353 (US $ 525) for enteric fever, Rs 5333 (US $ 381) for acute diarrhoeal diseases, Rs 7364 (US $ 526) for conjunctivitis, Rs 1839 (US $ 131) for scabies and Rs 211 (US $ 15) for infective hepatitis. In 1982, costs for above diseases were Rs 8622 (US $ 616), Rs 5191 (US $ 371), Rs 3289 (US $ 235), Rs 7402 (US $ 529) and Rs 323 (US $ 23) respectively. The aggregate annual costs of illnesses due to the above five diseases per person ranged between Rs 221 (US$ 16) and Rs 248 (US $ 18) in the two years.

It is now well known that water, if not purified and safe, can carry dangerous diseases and consequently, cause considerable morbidity and mortality in the population. In developing countries, safe water supply is a problem and the rural population of these countries is more exposed to such risks. In Africa as well as Asia only one in five residents has access to adequate and safe water for drinking purposes. Since the inception of International Water and Sanitation Decade (1981-91), a very rapid and substantial investment in water supplies, particularly in rural areas of the developing world, has been undertaken. In countries where limited resources are available for the health sector, only low cost welfare services become possible. Cost studies related to health and water supply programmes thus, have a greater role to play in these countries and therefore, are more pertinent.

The strongest and most frequent argument put forward for investment in water supply is the improvement in the health of the people. Benefits of water supply programmes, in terms of health, are hard to measure in quantitative terms. More than 100 field studies[1] on water supply and impact on disease, over 200 publications, have been attempted in different parts of the world during the past 30 years. Whereas some of these studies have demonstrated the health benefits of water supply programmes, others have shown either inconclusive or negative results. Furthermore, the methodological deficiencies in these studies, as revealed by Blum and Feacham[2] based on their critical review of over 50 such studies raise doubts on the validity of their conclusions. To measure the health benefits of a piped water supply programme, a controlled field study was launched in 1980 in a rural area of Uttar Pradesh (India). The study is soon to conclude. Besides several other aspects, the 'economics of health' component of the programme has been investigated.

The Parent Study

This health impact study was undertaken, following the principles of controlled field trials, in two areas where different interventions constituted the study groups (Group I & II) and another similar area without any intervention which served as the control.

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(i) *Group I:* A study village (Shahjahanpur) was provided with piped water supply and appropriate health education.
(ii) *Group II:* Another study village (Tahlaur), was provided with piped water supply and the related health education, and technical know-how including motivation to the families to develop domestic drainage and waste water disposal methods.
(iii) *Group III:* Twin villages, which had no intervention, served as control.

These three groups (villages) were similar in population size and in broad demographic and socioeconomic features. The merits of the Study and details of methods involved are given in the Protocol[3] of the Study.

The Health Economics Component

The most relevant and important variable in providing primary health care or any kind of welfare service, is cost. This determines what share of national resources should be devoted to the health sector to achieve a stated goal, what financial and other resources might have to be sought from external agencies and whether a given approach is feasible within the country's existing economic constraints. For better planning of social and welfare services like the piped water supply programme in rural areas, it is essential to study the economic implications of alternative approaches. Cost studies, with some additional data, enable the investigators to undertake cost-effectiveness and cost-benefit analyses of the programmes, and also provide valuable information on health expenses which help develop a feeling of cost-consciousness and means of budgetary control within them. Such information includes expenses of curing/alleviating illnesses over time, treatment costs, patterns of health expenditure in specific settings and of seriousness of prevailing diseases in the area. Results of the health economics study, undertaken here will answer many questions related to appropriateness of the piped water supply programme in the area.

For proper utilization of health care and hospital services and enhancement of their effectiveness, it is important that both the users and providers, become health conscious and the latter develop, at an early stage, a critical attitude towards the use of medical resources. A US Study[4] on physicians' knowledge of medical costs has revealed that practising physicians were generally unaware of the costs of the diagnostic tests and procedures they used. Without awareness physicians cannot be expected to play a major role in the cost-containment. Furthermore, studies on cost-benefit and cost-effectiveness of the health programmes are now well documented all over the world, but those measuring cost of illness or of disease using primary data are rare. We extensively reviewed the existing literature on the subject from developing countries, over recent decades but failed to come across any study reporting results on cost of disease/illness, using data from primary sources. The available studies, are mainly based on secondary data and consider broad assumptions which may not be always realistic.

Studies on cost of illness due to water-related diseases were undertaken in the pre-intervention phase (ie baseline period: 1981-84) as part of our efforts to undertake cost-benefit analysis of the piped water supply programme. The total cost of illness, should obviously include: (i) cost to the people and (ii) cost to the public authority; the former usually includes costs in terms of losses in income due to illness and treatment costs, and the latter takes into account the capital as well as recurring costs of health facilities including running of health services in the area. This report, which is based on the data for 1981-82 (pre-intervention phase) provides some observations on the personal cost of illness including:

(i) personal cost due to absence from work (loss of productivity) through some major water-related diseases;
(ii) personal expenditure incurred in treatment of above illnesses, and
(iii) total cost of illness borne by the people of the area from the above diseases.

MATERIAL AND METHODS

Data in the Study were gathered by the three field teams, one stationed in each group of villages. These teams were trained beforehand on data collection methods and procedures. Each team included three Field Investigators—at least one of either sex, who were postgraduates in social sciences. A full-time epidemiologist (medical) and a social anthropologist were available in the study villages to help the field teams in the data collection, particularly on the medical and social components. The populations of all the three groups of villages were enumerated in the beginning of each year and data collected included general socio-economic and demographic characteristics of families. The village populations for 1981 by ages are shown in Table 1 and by major occupations of the households, in Table 2.

The annual income in a 20% sample of families from each group was obtained by additional family interviews. For this purpose, families were selected from each group following stratified random sampling, con-

TABLE 1 *Age and sex distribution of the population in the three groups of villages in 1981*

Age group (year)	Group I				Group II				Group III			
	Male		Female		Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<1	31	2.8	43	4.3	37	3.3	24	2.5	26	2.8	31	3.8
1–4	125	11.4	116	11.7	108	9.6	90	9.4	109	11.8	90	10.9
5–9	169	15.5	135	13.7	186	16.5	132	13.8	135	14.6	130	15.8
10–14	120	11.0	111	11.2	153	13.6	121	12.6	116	12.5	100	12.1
15–24	190	17.4	165	16.7	188	16.7	166	17.3	171	18.4	147	17.8
25–34	158	14.5	137	13.9	145	12.9	144	15.0	118	12.7	99	12.0
35–44	111	10.2	105	10.6	116	10.3	101	10.6	88	9.5	80	9.7
45–54	92	8.4	86	8.7	100	8.9	82	8.6	80	8.6	76	9.2
≥55	96	8.8	91	9.2	95	8.4	98	10.2	84	9.1	72	8.7
Total	1092	100.0	989	100.0	1128	100.0	958	100.0	927	100.0	825	100.0

sidering major family occupations as strata so that every major occupation is well represented in the sample. For computation of losses of individuals' income (productivity) due to illnesses, their daily income for each age and sex group was derived from figures available for one full year.

Each family was visited once a week and information concerning the illnesses of family members during the previous week was recorded after interviewing a senior member of the family (often, the family head), using a standardized questionnaire. Periods lost from work due to illness were recorded in days, with days of productivity lost from illness differentiated from days of illness. The illnesses which were considered in the study, are defined in the Appendix. An illness was said to end when the symptoms had been absent for at least two consecutive days. Symptoms were grouped as a single illness upon review of the household charts by the field investigators. Doubtful cases were reviewed by the field staff with the help of the epidemiologist.

As regards population migrations from the villages over the year, only individuals registered in the census and subsequent births in the families, were considered during weekly follow-ups; immigrants to the villages, if any, were considered in the following year after they were included in the next census. Emigrants from the villages who remained away for the major part of the year were excluded from the data analysis for morbidity rates but those who were away temporarily, were considered after obtaining information on illnesses during their absence, through separate enquiries from them.

The Study Protocol[3] included illness from diseases, namely enteric fever, acute diarrhoeal diseases (diarrhoea, dysentery and gastro-enteritis), infective hepatitis, trachoma, conjunctivitis and scabies, which are known to be connected with water in some way or other. There are many others but these were included in view of their appropriateness in health impact studies of water supply programmes, after reviewing series of studies on the subject. The Study Protocol[3] was designed by us (RNS) in collaboration with a World

TABLE 2 *Population by main family occupation in three groups of villages in 1981*

Main family occupation	Group I		Group II		Group III	
	No.	%	No.	%	No.	%
Agriculture	317	15.2	309	14.8	269	15.4
Labour	186	9.0	199	9.6	154	8.9
Business	33	1.5	20	0.9	6	0.3
Service	35	1.7	26	1.2	14	0.8
Artisan (skilled profession)	45	2.2	22	1.0	13	0.7
Family heads/housewife	466	22.4	476	22.8	558	31.8
Child/student	827	39.7	820	39.4	713	40.7
Others	172	8.3	214	10.3	25	1.4
Total	2081	100.0	2086	100.0	1752	100.0

Bank/WHO Panel which had visited the study area more than once before the study was actually launched. Trachoma was excluded from regular weekly follow-ups due to its chronic nature. Data on trachoma were recorded through a separate yearly prevalence survey. The analysis of data relating to cost presented here, is thus limited to only five diseases.

Computation of Cost of Illness

Losses in productivity on account of incapacitation due to illnesses were computed by multiplying daily income of the individuals by the total number of days lost to them due to water-related illness in a year, for each group of villages separately. The total treatment expenses incurred, which included, besides the cost of medicines, the doctors' fee, cost of laboratory and X-ray investigations and money spent on other items, such as travelling etc were also studied for every patient. The total cost of illness was finally computed by considering losses in productivity and expenditures incurred.

As the three groups of villages were almost identical to each other and since these observations relate to the pre-intervention phase of the study only, the data from the three groups have been pooled.

RESULTS

The data gathered on daily income, episodes of illness due to water-related diseases and on days lost due to incapacitation, made it possible to estimate annual losses in productivity owing to illness, annual expenses incurred on treatment and, therefore, the total annual costs of illnesses to the people from water related disease.

Table 3 gives the number of days lost, on an average, in one episode of illness from all the five diseases separately in each of the three groups and mean daily income of the individuals in the area. Analysis showed that the incapacitating effect of an episode was highest for infective hepatitis (19 days), acute diarrhoeal diseases (eight days) and enteric fever (six days). The income data revealed that per day per capita income of an individual was highest in study Group II (Rs 5.15), followed by Group III (Rs 4.17) and Group I (Rs 3.74). These differences however, are marginal and clearly indicate that the study groups were socioeconomically poor. In fact, the study district, Jhansi, belongs to a most backward region of Uttar Pradesh.

Total episodes of the considered diseases per 100 people were 196 in 1981 against 191 in the following year, thus, revealing annual occurrence of two episodes of these diseases per person in the area (Table 4). Episodes were highest for enteric fever (71 and 80 episodes per 100 people in 1981 and 1982 respectively) and lowest for infective hepatitis (0.6 and one episode). Thus, though episodes of infective hepatitis lasted longest (19 days, Table 3), the total episodes of this disease in a year were the least, compared to other diseases. In 1982 acute diarrhoeal diseases took second place (47 episodes per 100 people), followed by conjunctivitis (29 episodes) but this order was reversed in the previous year (Table 4). There were 7 and 34 episodes of scabies per 100 people in 1981 and 1982 respectively.

Total days lost per 100 people from the monitored water-related diseases were 1529 in 1981 and 1544 in 1982, indicating that an individual of the area lost, on an average, 15 productive days owing to illness from these diseases in a year. These losses per 100 people in both years respectively were 423 and 479 days for enteric fever, 389 and 375 for acute diarrhoeal diseases and 12 and 20 days for infective hepatitis. As episodes of conjunctivitis and scabies varied greatly and were elevated between years so too were days lost by individuals (Table 5).

Estimated Cost of Illness

Individual productivity losses were estimated by multiplying total days lost to illness in a year by daily per capita income. Estimated productivity losses per 100 people (income) and expenditures incurred by them on treatment during these illnesses are shown in Table 6. In 1981, loss of income per 100 people was highest (Rs 6873 or US $ 491) for conjunctivitis, followed by enteric fever (Rs 5663 or US $ 405) and acute diarrhoeal diseases (Rs 4846 or US $ 346). In 1982, loss of income was highest (Rs 6667 or US $ 476) for enteric fever, followed by scabies (Rs 5287 or US $ 378) and acute diarrhoeal diseases (Rs 4704 or US $ 336). Losses were least for infective hepatitis in both years (Rs 163 or US $ 12 in 1981 and Rs 239 or US $ 17 in 1982). Furthermore, these five diseases caused annual losses of Rs 18 622 (US $ 1330) and Rs 19 969 (US $ 1426) in the years 1981 and 1982 respectively.

Although conjunctivitis in 1981 and enteric fever in 1982, had the highest number of episodes and consequently, showed highest losses in productivity, treatment expenditures were in line with this. Enteric fever (Rs 1690 or US $ 121) in 1981 and scabies (Rs 2115 or US $ 151) in 1982 showed highest treatment expenses per 100 people. Considering these expenses in 1981, the second place was taken by scabies, followed by acute diarrhoeal diseases and then, conjunctivitis. In 1982 however, the second place was occupied by the enteric fever, followed by a similar pattern to that of the previous year. These five diseases, jointly caused

TABLE 3 *Mean number of days lost in an episode and daily per capita individual income (based on data for 1981 and 1982)*

Disease	Study group I	II	III	Mean of the three groups
Enteric fever	7	6	7	6
Acute diarrhoeal diseases	4	12	6	8
Infective hepatitis	22	19	15	19
Conjunctivitis	8	13	5	9
Scabies	10	20	7	12
Individual income Per-day per-capita (in Indian rupees)*	3.74	5.15	4.17	

* 1 US$ = 14 Indian rupees

annual expenditures of Rs 3478 (US $ 248) and Rs 4858 (US $ 347) on treatment per 100 people in the two years respectively.

Total costs of illness to people for the different diseases considered here was worked out considering losses in productivity due to illnesses and treatment expenses as shown in Table 6. The total costs of illnesses due to five diseases were Rs 22 100 (US $ 1579) and Rs 22 827 (US $ 1773) per 100 people in 1981 and 1982 respectively. In the first year, highest cost per 100 people was caused by conjunctivitis (Rs 7364 or US $ 526), followed in order by enteric fever (Rs 7353 or US $ 525), acute diarrhoeal diseases (Rs 5333 or US $ 381) and scabies (Rs 1839 or US $ 131). In 1982, total cost was highest for enteric fever (Rs 8622 or US $ 616), followed by scabies (Rs 7402 or US $ 529), acute diarrhoeal diseases (Rs 5191 or US $ 371) and then conjunctivitis (Rs 3289 or US $ 235). Total cost of illness due to infective hepatitis was Rs 211 or US $ 15 per 100 people in 1981 and Rs 323 or US $ 23 per 100 people in 1982.

DISCUSSION

Relating diseases to water is a difficult process, but it is now widely accepted that a significant proportion of disease is transmitted via drinking water and removal of pathogens from drinking water has a significant impact on the incidence of diseases.[1] Some diseases accordingly, have been recognized as 'water borne', while the others are 'water-washed', 'water-contact' and 'water-based' diseases. As the Protocol[3] of the present study considered diseases from two or more of the above categories, a common term—'water-related diseases' has been preferred here. Furthermore, the methodology of the parent study was designed by us (RNS) to be free from many methodological deficiencies which have been common to such studies.[2]

It is difficult to compute cost of disease in communities very precisely due to involvement of large number of variables and difficulties in measuring some costs, eg costs of diagnoses, continuing treatments and of rehabilitation. Further, there are obvious problems in measuring losses due to mortality in financial terms. As indicated earlier, in India, health care services to the masses are provided by public health personnel from government institutions and private medical doctors. As the present study does not consider cost of variables related to public authorities and utilizes data only on financial losses to the people owing to their illnesses from the above diseases and expenditures on their treatments, it virtually reports results on only one aspect of the cost of the above diseases giving information on cost of illness to the people only and not on cost of some diseases related to water in the area. Furthermore, the financial losses in productivity were estimated under the assumption that people worked in a similar manner every day throughout the year. As described in the Appendix, for the purpose of the present study, all pyrexias excluding malaria, were suspected to be enteric fevers; though attempts were also made to isolate causative organisms through stool cultures. Thus, our clinical definition of enteric fever was

TABLE 4 *Episodes of illnesses from water-related diseases in 1981 and 1982*

Disease	1981 Annual total no. of episodes	1981 No. of episodes per 100 people in a year	1982 Annual total no. of episodes	1982 No. of episodes per 100 people in a year
Enteric fever	4250	71	4911	80
Acute diarrhoeal diseases	2928	49	2886	47
Infective hepatitis	39	0.6	64	1
Conjunctivitis	4188	70	1799	29
Scabies	400	7	2091	34
All diseases	11 805	196	11 751	191
Mid-year population	6026		6158	

TABLE 5 *Days lost due to illness from water-related diseases in 1981 and 1982*

Disease	Annual no. of days lost		Days lost per 100 people in a year	
	1981	1982	1981	1982
Enteric fever	25 500	29 466	423	479
Acute diarrhoeal diseases	23 424	23 088	389	375
Infective hepatitis	741	1 216	12	20
Conjunctivitis	37 692	16 191	626	263
Scabies	4800	25 092	80	408
All diseases	92 157	95 053	1529	1544

somewhat 'loose' and thus, there is a possibility that other cases of fever were included which were not actually enteric diseases. Days actually lost in one episode of enteric fever have been fewer than expected from the usual course of illness, due to the 'loose' definition of the disease used here. These points need to be taken into consideration while comparing and interpreting the present results with other similar studies. However, despite weaknesses in definitions of illnesses, conceptual problems in establishing relationships between variables and difficulties in data collection, this study has shown several important and useful results. We believe that in a health impact study like this one, some of the above errors are unavoidable.

Episodes of conjunctivitis and days of productivity lost due to illness (70 episodes and 626 loss of days) were much higher in 1981 than those in the following year (29 episodes and 263 loss of days). The same was true for scabies but the order was reversed in the two years—there were 34 episodes and 408 loss of days in 1982 against only seven episodes and 80 loss of days in the preceding year. This could be easily explained. Major areas of the State of Uttar Pradesh including the entire Jhansi district where the present study was undertaken, experienced epidemics of viral conjunctivitis in 1981 and of scabies in 1982. These epidemics must have contributed additional cases of the diseases in the respective years. Due to this, losses in productivity and so also, the total costs owing to illness from these two diseases in corresponding years would have been certainly inflated. Not only this, the aggregate results in respect of annual losses in productivity and total costs of illnesses in the two years, have also been under the influence of the above epidemics in the area.

The study was undertaken in a rural area of low socioeconomic status[5] as evident from mean daily per capita income of the individuals of the area, shown in Table 3. According to the methodology adopted, the costs of illness estimated, have heavily depended on daily income of the people which, in turn, has a strong relationship with their socioeconomic status. The losses in productivity estimated here (Table 6) are thus likely to be significantly lower than would be usual. In any other community with families belonging to high social status such losses would obviously be considerably higher. Furthermore, the estimated aggregate

TABLE 6 *Estimated total cost* of illness to the people from water-related diseases in 1981 and 1982*

Disease	Estimated annual loss of income (per 100 people) in:				Estimated expenditure (per 100 people) on treatment				Estimated total cost of illness (per 100 people)			
	1981		1982		1981		1982		1981		1982	
	Indian rupees	US dollars	Indian rupees	US dollars	Indian rupees	US dollars	Indian rupees	US dollars	Indian rupees	US dollars	Indian rupees	US dollars
Enteric fever	5663	405	6667	476	1690	121	1955	140	7353	525	8622	616
Acute diarrhoeal diseases	4846	346	4704	336	486	35	487	35	5333	381	5191	371
Infective hepatitis	163	12	239	17	48	3	83	6	211	15	323	23
Conjunctivitis	6873	491	3072	219	491	35	217	16	7364	526	3289	235
Scabies	1076	77	5287	378	763	55	2115	151	1839	131	7402	529
All diseases	18 622	1330	19 969	1426	3478	248	4858	347	22 100	1579	24 827	1773

* 1 US $ = 14 Indian rupees

annual expenditures incurred on the treatments from these five diseases, have been Rs 39 and Rs 49 per person in 1981 and 1982 respectively. These expenses also seem to be low and two possible explanations could be offered in this regard. Affected individuals, owing to their low economic background could not afford costly treatments. Consequently, some of the illnesses might have resulted in deaths which have not been considered here. Secondly in India, health care to the masses is provided by the government establishments free of cost as well as by private doctors on a paid basis. As the costs of free medical advice and treatments received by the people from government agencies are not included here, the computed figures have been on the low side. Thus, our results on costs, set out in Table 6, somewhat under-estimate the actual costs of illnesses.

In recent decades, not only has the role of economics in health been stressed but collaborative studies between epidemiologists and health economists have been advocated.[6] In view of health economics' relevance to clinical medicine and epidemiological research particularly in developing countries where resources are limited for the health sector, Williams[7] has advocated that health economics, be accorded the status of a discipline. At the same time he has recommended[8] clinicians' training in health economics. In advanced countries, as a consequence of the above, health economics has grown stronger in clinical medicine as well as in health care programmes in recent years with a large number of studies on the subject. Against this, cost studies and cost-benefit and cost-effectiveness analyses of health programmes in developing countries have been very few. In India for instance, we could not find any study wherein estimates of cost of illnesses relating to diseases under reference here, have been made. Only in one study, Verma[9] in 1975 computed costs of a cholera case and of some of the health programmes in an Indian context. Using Grundy and Reinke's[10] estimates regarding treatment costs of a cholera case, he concluded that a cholera case in India would cost somewhere between Rs 465 and Rs 565. His estimates of costs of diseases including mortality, however, are based on secondary data, rendering them incomparable with those presented here.

In the present study, if we eliminate the effect of two epidemics—of conjunctivitis in 1981 and of scabies in 1982, from the annual total costs of illnesses in respective years, it is possible to rank different diseases, in order of their importance solely on cost basis. Thus, considering the costs of illnesses alone in the two years, first was enteric fever, followed by acute diarrhoeal diseases, conjunctivitis, scabies and then infective hepatitis. Such findings could be the basis for budgetary allocation in control and preventive programmes on water-related diseases in the area. Our results, despite limitations, on annual episodes of diseases, income losses owing to illness and expenses incurred on treatment during such illness are of great value to the health professionals. We feel strongly that such cost studies, in a country like India, need to be undertaken for other diseases in different community groups for providing valuable informations to the planners, and other health professionals.

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APPENDIX

Definition of Morbidity Conditions

1. *Enteric fever:* Any pyrexia of unknown origin was suspected to be enteric infection. However, positive cases of malaria, confirmed by blood smear examination were excluded. The confirmation of enteric fever was done through stool culture examination, as far as possible.
2. *Diarrhoea:* Any illness that the patient and/or the informant (mother, in case of small children) recognized as an abnormal state of health related to an increased number of or change in the consistency of stools. Further, a case of mild diarrhoea meant up to five loose motions per day (24 hours) with few or no associated symptoms like weakness, slight pain in abdomen etc. while severe diarrhoea meant more than five loose motions per day (24 hours) with at least two or more associated symptoms such as weakness, dehydration, loss of weight, nausea, vomiting, fever, convulsions, and blood in the stools. Attempts were made, as far as possible, to isolate causative organisms from the stools through culture.
3. *Dysentery:* People having loose motions with mucous and/or blood in their stools were taken as

cases of dysentery. Attempts were also made to isolate the causative organisms from the stools through culture.

4. *Gastro-enteritis/cholera:* Illness with loose motions necessarily associated with vomiting was considered as gastro-enteritis. Attempts were also made to isolate the causative organisms from stools through culture.
5. *Infective hepatitis:* Any person with the following presenting signs and symptoms was taken as a case of infective hepatitis:
   (i) dark yellow or mustard oil coloured urine,
   (ii) yellow colouration of the conjunctiva,
   (iii) fever of short duration,
   (iv) pain, discomfort or tenderness in the right hypochondrium,
   (v) nausea with or without vomiting,
   (vi) weakness,
   (vii) decreased appetite.
6. *Trachoma and conjunctivitis:* Trachoma and conjunctivitis were diagnosed on clinical grounds. Redness of conjunctiva with pain and discharge from the eyes were taken as indicative of conjunctivitis. Trachoma was assessed according to the intensity of upper tarsal inflammatory disease and disabling lesions. (Field teams were provided coloured photographs for necessary comparison to reach the correct diagnosis of trachoma.)
7. *Scabies:* The diagnosis of scabies was based on the cardinal symptoms of itching—worst at night, accompanied by skin lesions in form of burrows appearing as grey or skin coloured ridges 5-15 mm long and often curved or S-shaped. Usual sites looked for were upper part of the wrist and between the fingers, though other parts of the body were examined as well. Demonstration of the mite was taken to be definite proof of the diagnosis.

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