

**MATERNAL AND CHILD HEALTH STATUS AND PATTERNS OF
HEALTH CARE IN URBAN SLUMS OF DELHI: PART II**

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ABSTRACT

Of the 1085 currently married women under study in four slums of Delhi, 121 (11%) women were pregnant at the time of survey with less than one-fourth of them registered for antenatal care. Sixteen per cent of them were receiving Iron and folic acid tablets and twelve per cent were protected against tetanus. Of the 221 deliveries in the previous year, seventy two per cent were conducted at home with only twenty four per cent by qualified and trained attendants. Physical examination of pregnant and lactating women revealed that twenty per cent of them were suffering from severe anaemia and an equal number with vitamin B complex deficiency. Of the 1451 children under six years protection with all the three doses was found in twenty eight per cent for polio, nineteen percent for DPT, sixty two per cent for BCG and six per cent for measles. About 2.5 per cent of the children were suffering from severe malnutrition.

The primary object of a family welfare programme is the promotion of health of mothers and children. Good health of children engenders a sense of security in the minds of parents that the children born will survive and live a healthy life, which in turn contributes greatly to the acceptance of small family norm. Hence, under basic Maternal and Child Health (MCH) care services, the mothers should be provided with much needed care during antenatal, natal and postnatal periods and infants and, pre-school children are to be monitored for their growth and development, adequate protection with immunisation, and early detection and treatment of diarrhoea and other childhood diseases.

The observations made in this survey on maternal and child health care practices form the core of this section, while the first part of the study was addressed to correlates of morbidity and patterns of mortality in slum populations. For details of study population and methodology, the first part of the study may be referred.

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OBJECTIVES

The specific objectives of the study of maternal and child health care component in the slum were:

- i. to ascertain the level of fertility and family planning practices;
- ii. to ascertain health, nutrition and immunisation status of children (0-6 years of age); and
- iii. to assess the level and sources of antenatal, intranatal and postnatal care services available to slum dwellers.

RESULTS AND DISCUSSION

Maternal Health

In order to assess the current awareness and utilisation of Maternal and Child Health (MCH) services this survey collected data on pregnancy status, antenatal care, place of delivery, attendance at delivery and the health care problems in the earlier deliveries. The following findings emerged:

Antenatal Care

(i) Registration for Antenatal Care: Of the total of 1085 currently married women, 121 (11.2%) were pregnant at the time of survey with less than one-fourth (21.4%) of them registered for antenatal care with hospitals/nursing homes, etc. Maximum registered cases were in Ballimaran (37.5%), followed by Mangolpuri (19.2%), Seelampur (13.6%) and construction site clusters (11.8%) as shown in Table 1.

(ii) Reasons for Non-registration. Those pregnant women (92), who had not registered themselves for antenatal services, were asked about the reasons for non-registration. The main reasons for non-registration reported by 92 pregnant women in the combined slums were: (i) No knowledge (17%) about any health agency; (ii) Scared of hospitals (7%); (iii) Do not feel the necessity (12%); (iv) No nearby hospital (5%); (v) Household/Domestic problems (15%); and (vi) No specific reason (28%), etc. The only valid reason to be considered is 'No nearby hospital'. All other reasons could be avoided with attitudinal changes/education, etc. The same picture was evinced more or less in all the slums.

(iii) Anaemia Prophylaxis by Iron and Folic Acid Tablets: Of the total pregnant women (121), 16.4 per cent were receiving iron and folic acid tablets. Table 1 reveals that the proportion was relatively high in Mangolpuri (61.5%), followed by a wide margin in Ballimaran (25.0%) where more women were registered, construction site clusters only (5.9%) and none in Seelampur.

(iv) Receipt of Tetanus-Toxoid: Protection against tetanus was received by twelve per cent of the pregnant women. In Mangolpuri and Ballimaran about nineteen per cent of the women were immunised with tetanus toxoid, twelve per cent in construction site squatters and only 2.3 per cent in Seelampur as indicated in Table 1.

TABLE 1
MATERNAL HEALTH CARE IN URBAN SLUMS OF DELHI

Indicators	Mangolpuri	Seelampur (JJ Colony)	Construction site clusters (Nehru Place)	Ballimaran	Study Area	National Average (Urban)
I Antenatal Care						
1. No. of currently married women	272	363	190	260	1085	
2. No. of pregnant at the time of survey	27	44	17	33	121	
3 Percentage registered for antenatal care	19.2	13.6	11.8	37.5	21.4	
4. Receipt of Iron and Folic Acid tablets	61.5	-	5.9	25.0	16.4	
5. Tetanus Toxoid	19.2	2.3	11.8	18.8	120	
6 Receipt of supplementary nutrition	27.0	2.3	Nil	22.0	13.0	
II. Natal Care						
7. No. of deliveries held during 1983	47	112	24	38	221	
8. Place of delivery						
-At Home	66.0	83.9	66.7	44.7	71.5	49.1*
- At Institution	34.0	16.1	33.3	55.3	28.5	50.9*
9. Type of Attendance home						
- Doctor	3.2	5.3	6.2	35.3	82	16.1+
- Dai trained	19.3	85	6.2	41.2	158	
- Dai untrained	77.5	86.2	87.6	23.5	76.0	33.0

(Except at item No. 1, 2 and 7, all figures indicate percentages)

*SRS 1978

+ Relates to Trained Medical Practitioners (SRS 1978)

Relates to Untrained Medical Practitioners (SRS 1978)

(v) **Receipt of Supplementary Nutrition:** Nearly thirteen per cent of the pregnant women in the study area reported to be receiving supplementary nutrition. As shown in Table 1, in Mangolpuri and Ballimaran, where the Integrated Nutrition Programmes are going on, twenty seven per cent and twenty two per cent of mothers reported to be receiving the supplementary nutrition. In Seelampur, two per cent of the pregnant women reported to be receiving nutrition under special nutrition programme and none in construction sites.

Intra-natal Care

(i) **Place of Delivery:** Over seventy one per cent of all deliveries during the previous year (221) in the slums took place at home. An inter-slum analysis reveals (Table 1) that as many as eighty four per cent deliveries took place at home in Seelampur (JJ Colony), while nearly sixty six per cent were conducted at home each in Mangolpuri and construction site squatters; even in Ballimaran which represents more of urban characteristics than of urban slums, forty five per cent deliveries were conducted at home.

(ii) **Type of Attendance at Delivery:** Only eight per cent of the deliveries were attended by qualified doctors in the slums as against sixteen per cent at the national level. Inter-slum analysis reveals that in the three slums leaving aside Ballimaran, seventy seven to eighty eight per cent of the deliveries were handled by untrained dais.

(iii) **Problems/Complications During Pregnancy and Post-natal Period:** Forty five per cent of the total women (221) who delivered a child during last one year reported to have had some morbidity or the other during natal/post-natal period.

The problems were in the vicinity of thirty five per cent for women of construction site clusters and Ballimaran and fifty four per cent for those of Seelampur (JJ Colony). The morbidity reported by them were: Fever in 11.3 per cent; Swelling of feet - 6.9 per cent; Palpitation - 8.2 percent; Ceasarian Section in 3.1 per cent; Anaemia 14.3 per cent; and Backache -15.7 per cent. The morbidity patterns during the pregnancy were by and large the same in all the four slums.

Physical Examination of Pregnant and Lactating Women

In order to have an idea of the type and extent of deficiencies and malnutrition among pregnant and lactating women, data were collected by carrying out general physical check-up of 255 women in regard to their examination of Hair, eyes, lips, tongue, teeth, nails, etc. Further, they were also examined for any enlargement of lymphnodes and thyroid glands. Salient findings of examination revealed that about 20 per cent of them were suffering from anaemia and Vitamin-B deficiency which manifested as pallor, cheilosis and cracked lips, pale and cracked nails. Lymphnodes were enlarged in twelve per cent and thyroid swellings were discovered in 7.8 per cent of pregnant.

Fertility and Family Planning Practices

The mean age at marriage of currently married women (CMW) in the study area was 16.5 years with almost universal marriage pattern. The level of crude birth rate was estimated at 38 per 1000 population; however, these numbers are too small to compute CBR. The general Marital Fertility Rate was 203.7 (National urban 143.6) which is much higher. About thirty four per cent of currently married women aged 15-44 years had four and higher order births with highest being in Ballimaran (43.0%). Average birth interval between successive births worked out to 2.4 years.

About eighty four per cent of CMW had knowledge of at least one method of family planning, while only twenty five per cent practiced one or the other method. Effective couple protection rate was computed to be twenty percent. Protection rate was only ten per cent in 15-24 years age-group and fifteen per cent in 25-34 years age-group as shown in Table 2.

Average age of wife of vasectomy and tubectomy acceptors was in the vicinity of 34 years which is much higher than the national average of 30.3 years (Table 2). They had 3.2 and 3.7 children (average number), respectively, at the time of operation. Average age of IUD/Loop/Cup-T acceptors was 31 years with 3.4 living children. Leading causes for non-acceptance of any of the family planning methods were: desire for a son (26%); in-laws/husband want more children (22%); and, method does not suit (14%), etc.

Child Health

A closer view of the current level of health, nutrition and hygiene status of the children below six years of age was obtained by collecting information on items, such as: (i) Morbidity status of children; (ii) Nutritional status and physical examination of children; (iii) Immunisation; (iv) Child feeding practices; and, (v) Age at which semisolid supplement was introduced. Analysis and discussion focusses on these aspects.

Health and Nutrition Status

Health and nutrition status of children were adjudged by their weight and general physical examination. Following observations emerged:

(i) Grades of Malnutrition: A total of 1313 children (741 males + 572 females) were grouped in four grades of malnutrition by classifying their weight for age according to accepted standards (Harvard) of expected weight for each age. Over twelve per cent of the children were found to be in various grades of malnutrition. Minimum malnutrition in Grades I, II and III (8.6 per cent) were found in Ballimaran slums and maximum in construction site squatters (17.8%). As revealed in Table 3, the percentage of Grade III and Grade IV malnutrition was highest (3.4%) in Seelampur.

(ii) Grades of Malnutrition by Sex: More females (13.2%) were suffering from various grades of malnutrition than males (11.4%) in all the slums excepting

TABLE 2
FERTILITY AND FAMILY PLANNING PRACTICES IN URBAN SLUMS OF DELHI

Characteristics	Mangol puri	Seelampur (JJ Colony)	Construction site clusters (Nehru Place)	Slums Ballimaran	Study Area (Combined Slums)	National Average (Urban 1978)
A Fertility						
1. No of currently married women	272	363	190	260	1085	
2. Average age at marriage in years	16.4	16.0	17.0	17.3	16.5	
3. Higher Birth Order Statistics						
3rd	30.6	13.3	16.7	24.3	19.3	17.9
4th +	28.6	38.0	16.7	43.3	34.5	33.04
4 Average Interval between births in years	2.6	2.0	2.5	2.6	2.4	
B. Family Planning Knowledge and Practice						
1. Percentages of women having knowledge of family planning methods	87.9	74.9	88.4	91.1	84.4	
2. Family planning practice Total acceptors	92	64	39	78	273	
3. Acceptance Rate By method (%)						
- Vasectomy	4.3	2.7	2.1	1.9	2.8	25.0
- Tubectomy	11.6	3.0	4.3	6.6	6.2	
- Loop/Cu-T/IUD	0.7	1.3	0.0	6.2	2.1	3.0
- Oral Pills	1.0	2.4	3.7	2.3	2.3	7.8 (All other methods)
- Conventional	16.2	8.2	10.4	13.0	11.8	358
4 Couples currently protected by all methods	33.8	17.6	20.5	30.0	25.2	
5 Couples effectively protected	25.3	13.2	15.6	23.3	19.5	32.3

TABLE 3
IMPORTANT INDICATORS RELATING TO CHILD HEALTH IN URBAN SLUMS OF DELHI

Characteristics	Slums				Study Area (Combined Slums)
	Mangolpuri	Seelampur (JJ Colony)	Construction site cluster (Nehru Place)	Ballimaran	
1. Total number of children	277	495	180	361	1313
2. Children in GUN and IV of malnutrition (%)	2.2	34	2.8	1.1	2.5 (33)
3. Child feeding practices (0-1 age) (%)					
a. Totally breast-fed	75.0	69.0	61.9	66.7	69.3
b. Breast-fed*other feeding practices	200	27.7	28.6	27.7	26.2
c. Other feeding practices	5.0	2.7	9.5	5.6	4.5
d. Average length of breast-feeding (in months)	10.9	138	10.1	10.8	12.4
4. Status of immunisation with 3 doses(%)					
- Polio	37.1	9.2	2.1	60.1	27.8
- DPT	27.3	5.9	1.8	38.9	18.9
- BCG	88.5	39.8	28.5	87.1	61.7
- Measles	13.5	4.2	0.7	4.1	6.1
5. Children receiving supplementary nutrition' (%)	31.6	12.1	11.9	Nil	15.2
6. Mothers knowledge about ORT (%)					
a. Mothers who knew about ORT	17.5	24.2	16.3	23.7	20.2
b. Mothers who practised ORT	10.6	14.3	8.3	47.8	19.1
c. Mothers who knew about readymade ORS packets	3.5	3.4	4.4	7.7	5.9

Seelampur. The male malnutrition in various grades ranged from 7.9 per cent in Mangolpuri to 15.7 per cent in Seelampur. The females in various grades of malnutrition ranged from 7.8 per cent in Ballimaran to 25.3 per cent in construction site squatters. The degree of malnutrition was maximum in the Seelampur slum.

Physical Examination

Type and extent of malnutrition was adjudged through the physical examination of children in relation to their hair, eyes, lips, tongue, teeth and nails, revealing cheilosis (18.3%), flat nails (8.8%), infected skin lesions (7.5%), Bitot's spot in the eyes (3.2%).

Immunisation Status

The status of immunisation was found to be quite low. Table 3 reveals that immunisation with all the three doses in the study area was twenty eight per cent for polio, nineteen per cent for DPT, sixty two per cent for BCG and six per cent for measles. Ballimaran had relatively a better immunisation status (Polio 58%, DPT 38% and BCG 88%) followed by Mangolpuri (Polio 35%, DPT 26% and BCG 87%). Polio and DPT immunisation was less than ten per cent each in Seelampur and less than three per cent each in construction sites.

Vitamin-A Prophylaxis

With three doses, it was found to be very poor (0.8%).

Supplementary Nutrition

Of the 1451 children in the combined slums, 15.2 per cent (221) were receiving supplementary nutrition with 31.6 per cent in Mangolpuri and about twelve per cent each in Ballimaran and Seelampur and none in construction site squatters (no supplementary nutrition programme existed). Again, of the 15.2 per cent children receiving supplementary nutrition, five per cent were receiving for less than one year, four per cent for 1 -2 year and six per cent for two or more years as shown in Table 3.

Child Feeding Practices

Of the 220 children under the age of one year over sixty nine per cent were totally breast-fed and twenty six per cent were given feed through bottles besides breast-milk and 4.5 per cent were fed by bottle only. In age-group 1 -2 years only 4.3 years children were totally breast-fed while 23.4 per cent were given breast-feeding in addition to other feeding practices. Average length of breast-feeding was compared to 12.4 months with a maximum of 13.8 months in Seelampur slums. In case of sixty per cent of the children, semi-solid was introduced between the age of three to eight months and at the age of eight or more months in case of 37.5 per cent infants, with a maximum of 53.7 per cent in Seelampur slums.

Knowledge of Mothers about the ORS

Table 3 further reveals that a total of 20.2 per cent mothers knew about oral

rehydration (OR) and 5.9 per cent had knowledge of readymade OR packets. Maximum knowledge (24.2%) was among respondents of Seelampur followed by Ballimaran (23.7%). Nearly fifty per cent reported to have gained knowledge through private doctors. Of those who had knowledge, only 19.1 per cent practised it. Maximum practice (47.8%) was in Ballimaran.

CONCLUSIONS/RECOMMENDATIONS

All available data on health and nutrition status of women and children and the level of MCH services indicate the poor health of women and children and low level of services. This situation has continued in spite of considerable economic development in the country and the availability of low cost health technology which is capable of improving the health status of this group of population significantly. The importance of mother's and children's health development and its crucial role in improving the quality of our human resources has been repeatedly stressed and for major thrusts of all welfare programmes have been designed or directed towards the health of mothers and children, emphasising preventive, promotive and educational aspects of MCH services. The reasons are deep-rooted and include cultural and social factors related to poor status of women, and the major brunt of which has to be borne by these women, dwelling in slums.

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दिल्ली के चार स्लम क्षेत्रों में संचालित अध्ययन के अर्न्तगत 1085 विवाहित महिलाओं में से 121 महिलाएं (11 प्रतिशत महिलाएं) सर्वेक्षण के समय गर्भवती पाई गई थीं, जिनमें से एक चौथाई से भी कम महिलाओं ने ही प्रसवपूर्व परिचर्या सेवाओं के लिए पंजीकरण करवाया हुआ था। उनमें से सोलह प्रतिशत महिलाओं को आयरन तथा फालिक एसिड की गोलियां प्राप्त हो रही थी और बारह प्रतिशत महिलाओं को टेढ़नेस से बचाव के लिए चिकित्सकीय संरक्षण प्राप्त हो रहा था। पिछले वर्ष की अवधि में हुए 221 प्रसव के केसों में से बहत्तर प्रतिशत केसों में प्रसव घर पर ही करवाये गए थे, जिनमें से केवल चौबीस प्रतिशत केसों में प्रसव सुयोग्य तथा प्रशिक्षित दाइयों द्वारा करवाए गए थे। गर्भवती तथा स्तनपान कराने वाली महिलाओं की शारीरिक जांच करने पर यह पाया गया कि उनमें से बीस प्रतिशत महिलाएं अत्यन्त रक्ताल्पता से ग्रस्त थी और इतनी ही संख्या में विटामिन बी काम्पलेक्स की कमी से पीड़ित थीं। छः वर्ष से कम आयु वर्ग के 1451 शिशुओं में से केवल अट्ठाइस प्रतिशत बच्चे ही ऐसे थे जिन्हें पोलियो से बचाव के लिए पूरी तीनों खुराकें दी गई थी, उन्नीस प्रतिशत को डी टी पी की खुराक दी गई थी, बासठ प्रतिशत बच्चों को बी सी जी से बचाव के रोगरोधक उपचार किया गया था तथा केवल छः प्रतिशत बच्चों को खसरे से बचाव के लिए संरक्षण प्रदान किया गया था।

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DIARRHOEA MANAGEMENT TRAINING PROVIDED TO ANGANWADI WORKERS - SOME FACTS

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ABSTRACT

Since the efficiency of Anganwadi Workers to manage diarrhoeal diseases depends on the training provided to them, an attempt has been made in this study to assess the quality of training provided to them through a sample of 18 Anganwadi Workers. Training centres in and around Delhi, Bangalore, Lucknow and Guwahati have been studied. The findings revealed that nearly all the Anganwadi Workers were unaware of their exact role in the management of diarrhoea. They consider that their role is just to refer the child to the physician in severe condition or to restrict suffering child's diet. Further, it was also found that trainers themselves do not have the clear concept of certain important aspects of the disease.

The diarrhoeal diseases today remain an enormous health problem. They continue to be associated with about one-third of all deaths in children under five years of age in the developing countries. In India, it is estimated that about 20 per cent deaths in children upto five years of age can be attributed to diarrhoeal diseases alone. Since, diarrhoeal deaths are most frequent in children under five years of age anganwadi workers can play an important role in reducing diarrhoeal deaths, if they are trained in the management of diarrhoea using oral rehydration solution. To substantiate this hypothesis, this study was carried out with the following objectives:

- i.to evaluate the knowledge of Anganwadi Workers in respect of diarrhoeal diseases after their training: and
- ii.to identify the gaps in Anganwadi Worker's Training in diarrhoeal management.

MATERIALS AND METHOD

The study was conducted in the selected Anganwadi Workers Training Centres in and around four regions (NIPCCD Headquarters and Regional Centres) viz. Delhi, Bangalore, Lucknow and Guwahati. From each region five Anganwadi Training Centres were selected by simple random sampling. Since, there are only three Anganwadi Workers Training Centres in Delhi, the study covered all the Anganwadi Workers Training Centres of Delhi. Thus, a total of 18 Anganwadi Workers Training Centres were selected for the study.

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One session of Anganwadi Worker's Training Course for Diarrhoea Management was assessed in each Anganwadi Workers Training Centre and a maximum of 55 Anganwadi Workers were interviewed from each centre.

The assessment of Diarrhoea Management Training provided to Anganwadi Workers has been done in the present study from three angles, viz., (i) assessment of the performance of Anganwadi Workers after their training; (ii) knowledge of trainers related to diarrhoea management; and (iii) observation of training in the classroom situation.

An initial contact-with the principals of the selected Anganwadi Workers Training Centres was made to explain to them the purpose of the project. After consulting, the health week schedule of the Anganwadi Workers' Training, the date and time of the Diarrhoea Management sessions were communicated by the principal of the training centre to the project incharge of each region (data in respect of Lucknow, Guwahati and Bangalore were collected by the faculty of the three respective Regional Centres of NIPCCD). After receiving the information the research team visited the Anganwadi Workers Training Centres on scheduled date and time.

An observational study, in the class-room situation .on a structured schedule was done to keep record of the areas covered on the topic- of Diarrhoea Management during the class-room teaching and also in the-practical sessions. After the sessions, all the anganwadi workers trainees as well as the trainers were given the structured schedule in their local language to assess their knowledge. A total of- 650 anganwadi. workers were interviewed and eighteen diarrhoea management sessions were observed and also the number of trainers interviewed was eighteen.

RESULTS AND DISCUSSION

Assessment of the Knowledge of the Trainers

General Characteristics of the Trainers: In all, 18 trainers were observed, out of which three were from Delhi and five each from Bangalore, Lucknow and Guwahati. The age of the trainers ranged from 20 years to 65 years, the average age was 38.8 years.

A majority of the trainers (11) were MBBS doctors and the rest were from various backgrounds like nursing (1), M.Sc. Home Science (2), M.A. Economics and Sociology (2) and B.A. Home Science (2). The work experience of trainers in ICDS ranged from none in case of two trainers (11.1 per cent) to more than three years in case of four (22.2 per cent) trainers.

Knowledge of the Trainers about Preparation of ORS: In order to test the knowledge of the trainers about the preparation of ORS, they were asked to give the ingredients, their measures, the process of preparation and test, if any, of the ORS.

An astonishing observation was that as many as 16 out of 18 trainers (88.9 per cent) interviewed, did not have the correct knowledge about the preparation of ORS.

The two trainers (11.1 per cent) who gave the correct response belonged to Lucknow. Both the correct responses were given in terms of pinch and scoop method. Except for one response from Delhi and three from Lucknow all other 12 incorrect responses were given in terms of exact grams. The check test to know whether the ORS prepared was correct or not was known only to the trainers from Delhi. The test mentioned was that the prepared ORS before adding sugar should have a taste similar to the taste of tears. The trainers from Bangalore and Guwahati did not mention any test and the trainers from Lucknow mentioned that if the solution was palatable, then it was prepared correctly. From the results, it was evident that training of trainers either through courses or standard training manual needs to have uniformity in training of grassroot level workers for any national programme like ICDS,

Assessment of the Knowledge of Anganwadi Workers: Assessment of the knowledge of Anganwadi Workers regarding various aspects of diarrhoea management was done with the help of the interview schedule administered to them after their training on the subject. The observations and findings thus obtained are presented below.

Characteristics of Anganwadi Worker's Age: A total of 650 Anganwadi Workers were interviewed of which 78 (11.9 per cent) were from Delhi. 252 (38.8 per cent) from Bangalore. 146 (22.5 per cent) from Lucknow, and 174 (26.8 per cent) from Guwahati. Their ages ranged from 15 years to 42 years. However, 96.3 percent were below 35 years of age and only 3.7 per cent were above this age range. The mean age of the Anganwadi Workers was found to be 22.4 years. Most of the Anganwadi Worker (54 per cent) in the youngest age group of 15 to 19 years were from Bangalore.

Type of the ICDS Projects where Anganwadi Workers were Posted: Out of the 650 Anganwadi Workers interviewed, as many as 74.6 percent were posted in rural ICDS projects; 21.7 per cent were working in tribal projects and only 3.7 per cent were posted in urban projects. Most of the workers (62.5 per cent) posted in urban projects in the sample belonged to Delhi, whereas none of 174 workers¹ interviewed from Guwahati was posted in an urban ICDS project. Most of the workers (98.6 per cent) posted in tribal projects were from Guwahati, while in the Bangalore group no Anganwadi Workers was working in a tribal project as has been shown in Table 1.

Educational Status: The educational background of the workers in the study varied from being just literate to high school and above. A large majority (71.4 per cent) of the workers' had educational status of high school or above. Only 2 Anganwadi Workers, both from Bangalore had the lowest educational status of being Just literate as has been depicted in Table-2.

Knowledge of Anganwadi Workers Regarding Diarrhoea Management: Most of the Anganwadi Workers (71.7 percent) in the sample knew that breast-feeding prevented diarrhea yet 2.8 per cent gave no response and 25.5 percent were of the view that breastfeeding did not prevent diarrhoea. In Guwahati 39.1 per cent of the workers viewed that breastfeeding does not prevent diarrhoea as has been shown in Table 3.

TABLE 1
ICDS PROJECTS IN WHICH THE ANGANWADI WORKERS WERE POSTED

ICDS Projects	Number of Anganwadi Workers				
	Delhi No. (Per cent)	Bangalore No. (Per cent)	Lucknow No. (Per cent)	Guwahati No. (Per cent)	Total No. (Per cent)
Urban	15(19.2)	6(2.4)	3(2.1)	0(0.0)	24(3.7)
Rural	62(79.5)	246(97.6)	142(97.3)	35(20.1)	485(74.6)
Tribal	1(1.3)	0(0.0)	1(0.6)	139(79.9)	141(21.7)
Total	78(100.0)	252(100.0)	146(100)	174(100.0)	650(100.0)

TABLE 2
EDUCATIONAL STATUS OF THE ANGANWADI WORKERS

Educational Status	Number of Anganwadi Workers				
	Delhi No. (Per cent)	Bangalore No, (Per cent)	Lucknow No. (Per cent)	Guwahati No. (Per cent)	Total No. (Per cent)
Just					
Literate	0(0.0)	2(0.8)	0(0.0)	0(0.0)	2(0.3)
Primary	0(0.0)	16(6.4)	13(8.9)	2(1.2)	31(4.8)
Middle	3(3.8)	31(12.3)	70(47.9)	49(28.2)	153(23.5)
High school and above	75(96.2)	203(80.5)	63(43.2)	123(70.6)	464(71.4)
Total	78(100.0)	252(100.0)	146(100.0)	174(100.0)	650(100.0)

TABLE 3
RESPONSES OF ANGANWADI WORKERS TO THE STATEMENTS REGARDING
NUTRITION, HYGIENE, SANITATION AND ORS

Statement	Response	Number of Anganwadi Workers				
		Delhi No. (Percent)	Bangalore No. (Percent)	Lucknow No. (Percent)	Guwahati No. (Percent)	Total No. (Percent)
Breast-feeding prevents diarrhoea	Correct	63(80.8)	192(76.2)	105(71.9)	106(60.9)	466(71.7)
	Incorrect	12(15.4)	45(17.9)	41(28.1)	68(39.1)	166(25.5)
	No Response	3(3.8)	15(5.9)	0(0.0)	0(0.0)	16(2.8)
Diarrhoea can be caused by unsafe	Correct,	75(96.2)	242(96.0)	144(98.6)	170(97.7)	631(97.1)
	Incorrect	1(1.2)	4(1.6)	2(1.4)	4(2.3)	11(1.7)
	No Response	2(2.6)	6(2.4)	0(0.0)	0(0.0)	8(1.2)
Undernutrition makes the child susceptible to diarrhoea	Correct	65(8.3)	222(88.1)	114(78.1)	159(91.4)	560(86.2)
	Incorrect	7(9.0)	17(6.8)	32(21.9)	15(8.6)	71(10.9)
	No Response	6(7.7)	13(5.2)	0(0.0)	0(0.0)	19(2.9)
Stop giving food to the child if suffering from diarrhoea	Correct	49(62.3)	207(82.1)	128(87.7)	151(86.7)	535(82.3)
	Incorrect	25(32.1)	39(15.5)	18(12.3)	22(12.7)	104(16.0)
	No Response	4(5.1)	6(2.4)	0(0.0)	1(0.6)	11(1.7)
A child suffering from diarrhoea dies mostly due to dehydration	Correct	73(93.6)	222(88.1)	143(97.9)	165(94.8)	603(92.8)
	Incorrect	3(3.9)	16(6.4)	3(2.1)	8(4.6)	30(4.6)
	No Response	2(2.6)	14(5.5)	0(0.0)	1(0.6)	17(2.6)
Oral rehydration therapy is the best treatment of diarrhoea irrespective of its cause	Correct	76(97.4)	207(82.1)	146(100.0)	149(85.6)	578(88.9)
	Incorrect	0(0.0)	29(11.5)	0(0.0)	21(12.1)	50(7.7)
	No Response	2(2.6)	16(6.4)	0(0.0)	4(2.3)	22(3.4)
A child suffering from diarrhoea always needs drugs	Correct	54(69.2)	87(34.5)	39(26.7)	102(58.6)	282(43.4)
	Incorrect	22(28.2)	148(58.7)	107(73.3)	70(40.2)	347(53.4)
	No Response	2(2.6)	17(6.8)	0(0.0)	2(1.2)	21(3.2)

Most (86.2 per cent) of the Anganwadi Workers were aware of the fact that under-nutrition makes the child susceptible to diarrhoea. The inadequacy of the training is highlighted by the fact that 16 per cent of the trained Anganwadi Workers interviewed had the wrong concept that they should stop giving food to the child if he is suffering from diarrhoea. Out of the 535 workers (82.3 per cent) who had the right concept, only 2.1 per cent workers could give correct reasons for not stopping the food given to a child suffering from diarrhoea. The reason given was that due to diarrhoea the child becomes weak and will lose resistance to fight against disease if food is stopped. None of the Anganwadi Workers from Bangalore or Lucknow could give the correct reason.

A child suffering from diarrhoea dies mostly due to dehydration. The responses of the Anganwadi Workers to this statement indicated that 92.8 per cent of the workers knew that dehydration is the most common cause of death in children suffering from diarrhoea, whereas 4.6 per cent workers found the statement was wrong and the rest gave no response. Of the total number of incorrect responses and no responses to this statement the largest (53.3 per cent and 82.4 per cent respectively) were obtained from the workers from Bangalore.

In majority of the cases, diarrhoea can be managed by the use of ORS without the help of drugs. However, 53.4 per cent of the trained Anganwadi Workers in the study were of the view that a child suffering from diarrhoea always needs drugs. Out of 282 (43.4 per cent) Anganwadi Workers who were of the correct view only 42 (14.9 per cent) could give correct reasons to support their view. The reasons given were: (i) proper hygiene and oral rehydration therapy can improve diarrhoea; and (ii) management of dehydration can protect the child suffering from diarrhoea.

Knowledge of Anganwadi Workers about Preparation of ORS: In order to assess the knowledge of Anganwadi Workers about the preparation of ORS, they were required to give the ingredients and procedure for the preparation of ORS by home-made method and using ORS packets. The findings revealed that only 46.6 per cent of the workers knew the correct procedure of preparing ORS by homemade method. A little over half (52.5 per cent) of the workers gave incorrect ingredients/procedure, and 0.9 per cent gave no response. In Bangalore, all the Anganwadi Workers (252) gave incorrect responses. In Guwahati the largest percentage of workers (98.3 per cent)" as compared to the workers in the other centres gave correct response regarding the preparation of ORS as has been described in Table 4.

A majority of the Anganwadi Workers (58.4 per cent) gave no response regarding the method of preparation of ORS using packets. In Bangalore not even a single Anganwadi Worker gave any answer. Out of 270 workers who gave the response 189 (70.0 per cent) gave the correct answer and 81 (30.0 per cent) gave incorrect response. The largest number of correct responses were obtained from Anganwadi Workers belonging to the Guwahati region.

Another important point which was brought out by this study was that none of the workers from any of the centre attempted to give the method of preparation using

TABLE 4
DISTRIBUTION OF RESPONSES OF ANGANWADI WORKERS
REGARDING THEIR KNOWLEDGE ABOUT PREPARATION OF ORS

		Number of Anganwadi Workers				
Preparation Method	Response	Delhi No. (Per cent)	Bangalore No. (Per cent)	Lucknow No. (Per cent)	Guwahati No. (Per cent)	Total No. (Per cent)
Home made method	Correct	32(41.0)	0(0.0)	100(68.5)	171(98.3)	303(46.6)
	Incorrect	43(55.1)	252(100.0)	46(31.5)	0(0.0)	341(52.5)
	No Response	3(3.9)	0(0.0)	0(0.0)	3(1.7)	6(0.9)
Using ORS Packets	Correct	44(56.4)	0(0.0)	17(11.6)	128(73.6)	189(29.1)
	Incorrect	31(39.7)	0(0.0)	49(33.6)	0(0.0)	81(12.5)
	No Response	3(3.9)	252(100.0)	80(54.8)	45(25.8)	380(58.4)

pinch and scoop' which was considered to be more practical and useful than knowing the quantities in exact grams. According to this study out of 99.1 per cent responses obtained, majority were in terms of exact grams and only 39.1 per cent (all from Bangalore and all incorrect) responded in terms of household measures (tea-spoon and glass used as measures), Only 0.6 per cent Anganwadi Workers could state their exact role in the management of diarrhoea. The incorrect response revealed that the Anganwadi Worker considered that their role in diarrhoea management was just to refer the child to the doctor in severe cases or to restrict the diet of the child suffering from diarrhoea.

Poor performance of workers in Bangalore and Guwahati regions have been found. The possible reasons may be younger age of trainees in Bangalore and no work experience before training in both the centres. Poor selection of trainers by the training centres i.e. MA. (Economics and Sociology) and B.A. (Home Science) teaching health topics. The performance of trainees is directly related to the performance of trainers.

It is evident from the study that trainees of grassroot level workers should have sufficient field experience and they should train grassroot level workers in a "simple language relevant to field situation which was lacking in the training and was also observed through several class-room sessions.

RECOMMENDATIONS

On the basis of the findings of the present study, the following recommendations are made with a view to improve the content and effectiveness of the diarrhoea management training provided to Anganwadi Workers:

- i. Trainers selected for providing training in diarrhoea management should be doctors who are either ICDS consultants of projects or sector advisors. They should have sufficient work experience in ICDS.

- ii. Guidelines regarding teaching points and practical session on various aspects of diarrhoea should be given to the trainers.
- iii. Guidelines should be given to the trainers to give importance to diarrhea management even in sessions dealing with the topics of breastfeeding, environmental sanitation, personal hygiene, nutrition education and safe drinking water.
- iv. During continuing education sessions in sector meetings, the diarrhea management session should be taken every six months, and in each of these sessions the ICDS sector advisor must demonstrate the preparation of ORS by using household measures and ORS packets.
- v. The time period specified in the syllabus of Anganwadi Workers for the lectures as well as practical sessions on Diarrhoea Management Training should be strictly adhered to by the trainers. To make the lecture more effective, interesting and easy to understand, sufficient teaching aids should be used by trainers during the training.
- vi. During the field placement of Anganwadi Workers, the trainees should be shown cases of dehydration admitted to PHC/District Hospital.
- vii. During practical sessions the trainees should be given practices in the preparation of ORS using household measures.
- viii. Less experienced and illiterate workers should be identified during training courses and they should be given special attention during training courses.

Lkkjk'k

अतिसार रोगों की रोकथाम करने के बारे में आंगनबाड़ी कार्यकर्ताओं की कार्यक्षमता चूंकि उन्हें प्रदान किए गए प्रशिक्षण पर निर्भर करती है, इसलिए इस अध्ययन के अर्न्तगत अठारह आंगनबाड़ी कार्यकर्ताओं के एक सैम्पल के माध्यम से आंगनबाड़ी कार्यकर्ताओं को प्रदान किए गए प्रशिक्षण की गुणवत्ता की समीक्षा करने का प्रयास किया गया है। दिल्ली, बंगलौर, लखनऊ और गुवाहाटी तथा इन नगरों के आस पास स्थित प्रशिक्षण केन्द्रों का अध्ययन किया गया है। अध्ययन से प्राप्त निष्कर्षों से पता चलता है कि लगभग सभी आंगनबाड़ी कार्यकर्ता अतिसार रोगों की रोकथाम करने में अपनी सह भूमिका से अवगत नहीं थे। आंगनबाड़ी कार्यकर्ता यह समझते हैं कि उनकी भूमिका दुःसाध्य केसों में शिशु को मात्र फिजीशियन के पास रैफर करना है अथवा अतिसार रोग से पीड़ित शिशु का आहार पर नियंत्रण लगाना है। इसके अतिरिक्त यह भी देखा गया था कि बीमारी के कुछेक महत्वपूर्ण घटकों संबंधी संकल्पनाएं स्वयं प्रशिक्षकों को पूरी तरह से स्पष्ट नहीं थीं।

**THE MATERNAL OWN INTRA-UTERINE BIOLOGICAL INFLUENCES
AS DETERMINANT OF BIRTH WEIGHT IN BLACK MOTHERS
DELIVERING AT THE CHARITY HOSPITAL OF LOUISIANA IN NEW
ORLEANS, USA**

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ABSTRACT

The impact of the mothers' own birth weight on the birth weight of their babies was studied in a population of 400 Black women (200 cases 200 controls) delivering at the Charity Hospital of Louisiana in New Orleans. After controlling for the possible confounding variables, such as maternal age, duration of gestation, education, marital status, cigarette smoking, pre-natal care visits, weight gain during pregnancy, gravidity, abortions, pre-pregnancy weight, birth weight of the previous baby and the socio-economic status. Findings revealed that the baby's birth weight is highly associated with the maternal own birth weight ($P < 0.0000$), the birth weight of the previous baby ($P < 0.025$), duration of gestation ($P < 0.025$), and the number of pre-natal care visits ($P < 0.025$). Using stepwise logistic regression analysis, the mothers own birth weight was found to be the most influential factor in determination of birth weight. The study showed that the log of the odds ratio for low birth weight occurrence decreases by 0.19014 for every pre-natal care visit.

Low birth weight has been considered of the most serious international health problems that substantially contributes to the high infant morbidity, mortality and mental retardation ail through the world and particularly in the third world countries. Recently, a great deal of attention has been paid to the study of high risk pregnancy, particularly in vulnerable populations to low birth weight delivery.

Many studies showed that poor maternal nutritional status, defected environmental conditions, infections and low socio-economic conditions were among the leading causes of limited intra-uterine fetal growth and development. There were also some other social factors such as cigarette smoking shown to have an adverse effect on the fetal growth and development during the first 12 weeks of pregnancy.

The present study took a different direction from the many studies which related the birth weight size to a joint effect of the social and environmental conditions. The study emulated the research of the few workers who postulated the existence of some maternal factors that interfere with the fetal intra-uterine growth and

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development, and hence the birth weight size 8. None of those studies was performed in Black populations.

This new direction is of a paramount importance, especially with the poor results of supplementation in some countries and the logistic difficulties in extending pre-natal care services for all pregnant women in countries suffer from manpower and financial resources. This will help in delivering the services with more concentration on the real vulnerable to low birth weight babies delivery.

MATERIALS AND METHOD

Two hundred cases (mothers of low birth weight babies) and 200 controls (mothers of normal birth weight babies) were selected systematically from mothers delivering at the Charity Hospital of Louisiana in New Orleans during the period July, 1985 and January, 1986. The basis of selection of study subjects was the birth weight of their babies. Study cases were selected from mothers giving birth to babies weighing 2500 grams while the study control mothers were selected from the mothers who delivered normal birth weight babies (2500 grams). The controls were selected from mothers who delivered normal birth weight babies immediately after the study mother was selected. Both the cases and control mothers were in the age group 16-32 years. They were selected from non-diabetic with singleton pregnancies mothers.

The study mothers were then interviewed about the missing data from the records, 24 hours after delivery to have a good response from the mothers while the birth trauma is much reduced.

The maternal own birth weight was obtained from the study controls and cases verified by their mothers who were mostly met during the patients stay at CHNO. Those patient's mothers who were not met in hospital were contacted by telephone.

Black mothers from greater New Orleans used to deliver for generations at CHNO, so it was easy to make a double check of the maternal birth weight using the old baby birth books stored within the CHNO.

To carry out a double check the study mothers were asked about the exact date of birth, place of birth and her mother's maiden name if she was married. Then the investigator would go and look into the available records to verify the collected information which almost ninety per cent was correct. The availability of the records and cooperation of the study subjects and their families made the study easier to conduct at CHNO.

DATA ANALYSIS

The precoded collected data was stored in the computer on daily basis between 6 and 10 p.m. using logistic regression and analysis, SPSSX (soft ware programme for social sciences) and BMDP (soft ware for biomedical sciences) it was convenient to study the relationship between the maternal own birth weight and the birth weight of her baby after controlling for other 49 variables which were known to have an effect on the birth weight. The stepwise logistic regression programme ended into the four most important determinants of birth weight.

RESULTS

TABLE 1
STUDY GROUPS DISTRIBUTION BY DURATION OF GESTATION

Gestation in Weeks	Maternal Status			
	Number of Controls	Percentage of Controls	Number of Cases	Percentage of Cases
28	0	0.0	4	2.0
29-37	114	57.0	139	69.5
38	86	43.0	57	28.5
Total	200	100 per cent	200	100 per cent
Statistics $\chi^2=12.3514$		Df. 2		Significance 0.0021

TABLE 2
THE STUDY GROUPS DISTRIBUTION BY THE BIRTH WEIGHT OF THE PREVIOUS BABY

Birth weight of previous baby in grams	Maternal Status			
	Number of Controls	Percentage of Controls	Number of Cases	Percentage of Cases
1500	1	0.9	0	0.0
1501-2500	10	8.9	80	71.4
2500	101	90.2	32	28.6
Total	112	100 per cent	112	100 per cent
Statistics $\chi^2=101.262$		Df. 2		Significance 0.0000

TABLE 3
STUDY MOTHERS DISTRIBUTION BY THEIR OWN BIRTH WEIGHT

Mother's own birth weight in grams	Maternal Status			
	Number of Controls	Percentage of Controls	Number of Cases	Percentage of Cases
2000	4	1	35	8.7
2001-2500	29	14.5	119	59.5
2501-3000	57	28.5	27	13.5
3001-4000	79	39.5	15	7.5
4000	31	15.5	2	1.0
Total	200	100 per cent	200	100 per cent

Statistics

Chi-Square
158.246

Df;
4

Significance
0.0000

TABLE 4
THE STUDY GROUPS DISTRIBUTION BY THE NUMBER OF PRE-NATAL
CARE VISITS

Number of Visits	Maternal Status			
	Number of Controls	Percentage of Controls	Number of Cases	Percentage of Cases
1	0.0	0.0	4.0	2.0
2	5.0	2.5	7.0	3.5
3	1.0	0.5	12.0	6.0
4	9.0	4.5	13.0	6.5
5	5.0	2.5	9.0	4.5
6	7.0	3.5	22.0	11.0
7	21.0	10.5	23.0	11.5
a	20.0	10.0	21.0	10.5
9	17.0	8.5	24.0	12.0
10	55.0	27.5	41.0	20.5
11	17.0	8.5	7.0	3.5
12	26.0	13.0	12.0	6.0
13	3.0	1.5	1.0	0.5
14	8.0	4.0	1.0	0.5
15	4.0	2.0	2.0	1.0
16	2.0	0.1	0.0	0.0
Missing	0.0	0.0	1.0	0.5
Total	200	100 per cent	200	100 per cent
Statistics	Df.		Significance	
X ² =46.0575	16		0.0001	

TABLE 5
RESULTS OF THE LOGISTIC REGRESSION ANALYSIS

Term	Coefficient	Standard Error	Coefficient	P-Value
			Standard Error	
Gestational age	0.66443	0.4404	1.5090	0.0240
Birth weight of Previous baby	2.59950	0.4431	5.8660	0.0000
Number of Pre-natal Visits	-0.19014	-0.7048 E	-2.698	0.0051
Mothers Birth Weight	2.53860	0.4157	6.107	0.0000
Constant	-0.96480	0.7352	-1.312	-

DISCUSSION

Alleviation of the impact of low birth weight has always been of great interest to health professionals and governments all over the world and particularly in countries where facilities for low birth weight babies catch upgrowth are not always available.

It has ever been the interest of many health professionals to find out the real causes leading to low birth weight and guard against them at the appropriate time. Most of the studies have looked into the problems from the traditionally known as socio-economic perspective.

In one of the massive-studies carried out in the State of California is the Kaiser project, where it was found that, even after controlling for many of the factors, low birth weight is still) a serious unresolved problem in the black populations in America. Seven per cent of the Blacks had a birth weight <2500 grams while only 3.6 per cent of the Whites had a birth weight£2500 grams.

Findings of the study revealed that though there were many factors which determine the birth weight size, besides these there were four other influential factors which significantly contribute to the birth weight size as shown in Tables 1 to 4.

The stepwise logistic regression analysis showed that the maternal own birth weight, the birth weight of the previous baby, the duration of gestation and the number of pre-natal care visits were the crystal determinants of the birth weight size ($P < 0.025$). Table 5 depicts a high odds ratio associated with the significant determinants of low birth weight in the exposed population (population at risk) than in the unexposed populations (the control population).

From the logistic regression Table 5, it can also be seen that the log of the odds for low birth weight increases by 2.5386 if the mother herself was of low birth weight (<2500 grams), this corresponds to an increase in the odds ratio of 12.7 (the antilog of the mother's birth weight coefficient associated with the occurrence of low birth weight. The logistic regression also showed that log of the odds ratio for low birth weight occurrence decreases by 0.19014 for every pre-natal care visit. Thus, the appearance of the maternal birth weight among the four major determinants of birth weight was a suggestive evidence of a deep rooted unresolved nature of its influence. The study didn't look into the genetic makeup of the parents. It could be due to functional and biological influences within the mother's own embryonic life transferred from one generation to another. Hence, the presence of low birth weight goes beyond the ever believed socio-economic and rational differences between nations.

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सारांश

इस लेख में ऑरलीन्स स्थित लौइसियाना चैरिटी अस्पताल में प्रसव कराने वाली 400 अश्वेत महिलाओं के 200 सामान्य केस तथा 200 प्रेक्षणाधीन केस के व्यक्तिगत जन्मभार का उनके शिशुओं के जन्मभार पर पड़ने वाले प्रभावों के बारे में अध्ययन किया गया था। सम्भावित भ्रामक विभेदकों — जैसे प्रसूता महिला की आयु, गर्भावधि, शिक्षा, वैवाहिक स्थिति, धूम्रपान संबंधी आदतें, प्रसवपूर्व देखरेख दौरे, गर्भावधि के दौरान भार में हुई वृद्धि, सगर्भता, गर्भपातों की संख्या, गर्भधारणपूर्व भार, पूर्व जन्मे शिशु का जन्मभार तथा सामाजिक-आर्थिक स्थिति आदि की नियंत्रणात्मक प्रेक्षण करने के पश्चात प्राप्त निष्कर्षों से पता चलता है कि शिशु के जन्मभार तथा माता के व्यक्तिगत जन्मभार $P=0.0000$, से बहुत गहरा सम्बन्ध है। इसी प्रकार पूर्व जन्मे शिशु के जन्मभार $P<0.025$, गर्भावधि $P<0.025$ तथा प्रसवपूर्व देखरेख दौरे की संख्या $P<0.025$ से भी इसका गहरा संबंध है। वृद्धिघात समान्रयण विश्लेषण पद्धति का प्रयोग

करने पर यह पाया गया कि बच्चे के जन्मभार निर्धारण में गर्भवती महिला का व्यक्तिगत जन्मभार बहुत प्रभावकारी घटक होता है। इस अध्ययन में अल्प जन्मभार संबंधी घटनाओं के संदर्भ में यह प्रदर्शित किया गया है कि प्रसूता महिला को प्रसवपूर्व सेवाएं प्रदान करने संबंधी किस गस प्रत्येक दोरे से संयोगानुपात 0.19014 की दर से कम हो जाती थी।

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STAFFING PATTERN OF PHARMACY SERVICES OF HOSPITAL

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ABSTRACT

The staffing pattern of pharmacy service of a teaching hospital at Pune has been studied. Work measurement techniques have been applied to find out the ratio of pharmacists to in-patients. According to the findings of the study, a norm of one pharmacist for 100 in-patients has been worked out for a hospital.

The number of pharmacists required for any particular hospital varies with programme, policies, responsibilities, services and their utilisation for in-patients, out-patients, employees and the public. In 1972, other researchers have estimated 11 pharmacists for 700 bedded hospital. Further, it has been recommended, "The ratio of one pharmacy staff member for each 50 beds of hospital capacity is a fairly accurate staffing estimate. Though this may vary somewhat, the general consensus is that a ratio of more patients for pharmacist could ultimately prove detrimental to long-term departmental efficiency objectives.

The staffing pattern and workload of pharmacy staff of a teaching hospital Pune is discussed and optimum staff for the hospital pharmacy has been calculated by work measurement technique.

MATERIALS AND METHOD

The teaching hospital is 1047 bedded hospital. The study of pharmacy services of hospital has been done from January 1984 to March 1984.

Work measurement is the application of technique to establish the time for a qualified worker to carry out a specific work at a defined level of performance, these techniques have been used for evaluation of workload of hospital pharmacy to analyse the desired level of staff for efficient functioning of pharmacy services and optimum utilisation of pharmacy staff.

The two methods time study and activity sampling have been used. The sample size of activity has been decided by the following formula:

$$\text{Number of observation (n)} = \frac{4p(100-p)}{L^2}$$

P= Estimated proportional work activity.

L= Limit of accuracy (or confidence limit).

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It has been estimated by time study that if time of activity being estimated is approximately seventy five percent of total time and the degree of confidence is ± 3 per cent then the formula becomes:

$$n = \frac{4 \times 75 (100-75)}{9} = 833 \text{ observation.}$$

OBSERVATION AND DISCUSSION

The medical store is authorised seven pharmacists to run the pharmacy services of the hospital. Five to six pharmacists are only available at any given time of the year since one pharmacist by turn remains on leave. Five to six pharmacists trainees are available to the department for five to nine months in a year since they come for an attachment of three months duration each. During the period, when no trainee is available, three medical assistants are attached to cope up with the extra work. The distribution of pharmacists has been shown, in Table 1.

TABLE 1
DISTRIBUTION OF PHARMACY STAFF

Place of Staff	No. of Pharmacy Staff	Additional Staff Given Though not Authorised
Medical Store		
Pharmacists	3	
Storekeepers	2	
Dispensary for wards and Departments		
Pharmacists	2	1
OPD Dispensary		
Pharmacist	1	1

Note: One pharmacist remains always on leave.

Medical store has two dispensaries - one for OPD and another for wards and departments, in addition to this, hospital casualty and ante-natal clinic of family welfare centre dispense medicines to the patients attending these clinics. The number of prescriptions issued by the dispensary has been shown in Table 2.

Medical store does not issue any medicine to any ward and department on Sunday and holiday except in emergency. Dispensary for OPD and another for wards and departments does not function on Sundays and holidays.

EVALUATION OF ACTIVITY TIME FOR DISPENSING AND OTHER ACTIVITIES BY SAMPLING TECHNIQUE

The work has been broken down into different elements or activities and the time calculated by activity sampling of 833 observations w.e.f. 1 March, 1984 to 21 March, 1984. The activity sampling of OPD dispensary has been given in Table 3

TABLE 2
NUMBER OF PRESCRIPTIONS SERVICED BY DISPENSARY IN JANUARY AND
FEBRUARY 1984

Place of Dispensary	January 1984	February 1984	Average prescription per working day	Average prescription per holiday
Medical Stores	1026	1105	42	2
OPD	8661	804	334	
Dispensary for Wards and Departments	5815	5345	223	
Casualty Department	2004	1870	71	32

TABLE 3
ACTIVITY ANALYSIS OF OUT-PATIENT DEPARTMENT DISPENSARY

Activity	No.of Observations	Percentage of Total	Minutes
Activity A (Reading the prescription)	142	17	142.8
Activity B (Packing the medicine)	158	19	159.6
Activity C (Dispensing the medicine)	83	10	84.0
Activity D (Time between two patients)	75	9	75.6
Activity E (Indenting the stores, accounting and documentation)	167	20	168.0
Activity F (Administration of Dispensary)	67	8	67.2
Activity G (Away from desk)	83	10	84.0
Activity H (Idle -No work)	25	3	25.2
Activity I (Personal or relaxation)	33	4	33.6
Total	833	100	

and wards and departments' dispensary in Table 4.

The OPD dispensary functions from 0800 hrs to 1400 hrs, out of this 0930 hrs to 1400 hrs pharmacists are busy in dispensing the medicine being peak period (Activity A to D). It has been observed that fifteen per cent of total prescriptions are serviced during 0800 hrs to 0930 hrs hence they utilise this time in activity other than A to D also. They are not able to finish their activity like E and F hence they work in the evening 1600-1700 hrs to complete their work. One pharmacist and one trainee pharmacist or nursing assistant work at OPD dispensary. The activities were tabulated in Table 4 as actually they were performed. Two persons work seven hours a day hence 840 mts are available.

Two pharmacists and one additional staff is given at this dispensary. This additional staff is either medical assistant or trainee pharmacist whosoever is available. These persons work from 0800 hrs to 1400 hrs, dispensing is done (Activity A to D) by two persons while third person is doing activity in the morning hours. Activity E_2 is done in the afternoon since it is not possible to finish all the activities in the morning hours. The dispensary is dispensing 292 items.

The activity analysis of medical stores has been given in Table 5.

There were five persons (three pharmacists and two storekeepers) working in the medical stores, result of activity, analysis of all personnel has also been tabulated in the Table 5.

EVALUATION OF NORMAL TIME OF DISPENSARY

The dispensing to each patient has been broken down into activity or elements as has been shown in earlier activities. The observed items were taken for activity A, B, C and D by noting the average time of all observed observations (Table 3,4 and 5). The normal time has also been calculated and tabulated for each element separately. A rating of observed time is calculated and has been shown in Table 6. The observed time and normal time of activity E, F and G is the same hence, the time of these activities has not been shown in Table 6.

The observed time is less in activity B and C, that is packing the medicine and dispensing the medicine because during the peak period pharmacist was not giving proper instructions and also not packing or labelling the medicines. The dispensing is being done quickly because of many queueing patients, hence quality of dispensing is not upto the required level of performance.

CALCULATION OF STANDARD TIME

The standard time has been calculated by addition of Relaxation Allowance (RA) and contingency allowance in normal time. This calculation has been depicted in Table 7.

It will take 119 seconds to dispense one prescription. The number of prescription on each day has been shown in Table 2, hence time required to dispose of all these cases each day has been shown in Table 8. The workload of casualty department prescriptions is spread over a period of 24 hours hence it was not considered for tabulation in Table 8.

TABLE 4
ACTIVITY ANALYSIS OF DISPENSARY FOR WARDS AND DEPARTMENTS

Activity	No. of Observations	Percentage of Total	Minutes
Activity A	84	10	126.0
Activity B	93	11	138.6
Activity C	33	4	50.4
Activity D	25	3	37.8
Activity E 1	208	25	315.0
(Issue Medicines to Departments/Wards)			
Activity E 2	183	22	277.2
(Accounting)			
Activity F	66	8	100.8
Activity G	83	10	126.0
Activity H	25	3	37.8
Activity 1	33	4	50.4
Total	833	100	1260.0

TABLE 5
ACTIVITY ANALYSIS OF MEDICAL STORES

Activity	Observation	Percentage Total	of Minutes
Activity A	7	0.85	18
Activity B	8	0.95	20
Activity C	5	0.57	12
Activity D	3	0.38	8
Activity E	468	56.25	1181
Activity F	150	18.0	378
Activity G	92	11.0	231
Activity H	25	3.0	63
Activity 1	75	9.0	189
Total	833	100.0	2100

TABLE 6
RELATIONSHIP OF OBSERVED AND NORMAL TIME IN SECONDS

Activity	Observed time (seconds)	Rating scale (Normal performance rating 100)	Normal time (seconds)
Activity A	29	100	29
Activity B	32	122	41
Activity C	15	132	22
Activity D	12	100	12
Total	88		104

TABLE 7
CALCULATION OF STANDARD TIME

Normal time of dispensing per patient	Relaxation Allowance per cent	Contingency Allowance per cent	Total Standard
104 Seconds	10	5	119 seconds (1.98 minutes)

TABLE 8
TIME REQUIRED TO DISPOSE OFF ALL THE PRESCRIPTION

Place of Dispensary	Prescription per day	Time required to dispose off prescription
Medical Stores	42	83.3 minutes (1.34 hours)
OPD	334	661.3 minutes (11.02 hours)
Dispensary for wards and departments	23	441.5 minutes(7.35 hours)
Total	599	19.71 hours

The time required to dispose of prescriptions as calculated by standard time is 19.71 hours while time actually taken for activity A, B, C and D at medical stores and dispensaries is 14.56 hours (Table 3, 4 and 5). The 5.2 hours less time per day has been taken because of short cuts in dispensing and due to overcrowding.

The relaxation time for pharmacist has also been utilised much less than prescribed by several management scientists. The minimum of ten per cent RA should be allowed for males for proper quality of work while it is four, four and nine per cent (Table 3, 4 and 5) hence allowance of relaxation of 2.45 hours additional should be given to pharmacist. Hence, additional pharmacist should be made available to take the load of 7.65 hours (5.2 hours difference of standard time and observed time and 2.45 hours additional RA). One pharmacist will be required for additional 7.65 hours each day. Two additional persons - one trainee pharmacist in OPD and another person for dispensary of wards and departments has been given, this should be regularised rather than *ad hoc* arrangement. Since, the workload demands this extra authorisation (Table 3 and 4). One additional pharmacist for leave relief should be posted as the replacement. The medical assistant will not be able to do the same quality of work. Thus authorisation of pharmacist should be 11 instead of seven.

CONCLUSION

The ratio of pharmacist should be one for 100 in-patients. Benjamin (1983) has suggested a ratio of one pharmacist for 50 beds. Since, American hospitals' service individual prescription for each in-patient while in our hospitals in-patients are serviced individually by the nursing units and not by medical stores or pharmacy, hence workload is comparatively less for pharmacy of in-patients in our hospitals, hence, the ratio as studied by work measurement of one patient for 100 in-patients is quite sufficient.

सारांश

पूणे के एक शैक्षणिक अस्पताल की फार्मसी सेवाओं के कार्मिक ढाँचे के बारे में अध्ययन किया गया था। इसमें अंतरंग रोगियों तथा फार्मसिस्टों के अनुपात का पता लगाने के लिए "कार्य मापक" तकनीकों का प्रयोग किया गया था। इस अध्ययन के आधार पर यह मानदण्ड निश्चित किया गया है कि एक अस्पताल में 100 अंतरंग रोगियों पर फार्मसिस्ट का एक पद रखा जाना चाहिए।

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COSTING OF VIRAL HEPATITIS

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ABSTRACT

Costing of disease is an essential baseline data for planning and evaluation of health services. However, such type of studies are not common in the developing world. An attempt has been made to estimate the cost of viral hepatitis which, was found to be alarming. Such type of studies will stimulate interest for future research in the field of health economics. It will be of immense use to planners and policy makers, especially when the resource allocation is to be done to the diverse sectors for community development because health field usually gets the priority at the end of planning.

The relationship of economic system to health and to health care system is in itself a fascinating area of study in which economics as a discipline can substantially contribute along with other disciplines. "Health economics needs to measure the need, after the valuation of some kind, and measure the outcome or effectiveness in which the essential element of valuation has too often been ignored. Basic to the purpose of policy decision is evaluation which has to be based on nothing but costing or valuation".

Morbidity and mortality have twofold effects on the economic of the community. The sick person has to spend for illness either by paying for the physician's services, for drugs or for laboratory investigations. Secondly, the community resources in the form of hospital services are tapped by the sick; he temporarily becomes a nonproductive member of society while continuing to utilise the health facilities of community. This, therefore, costs directly to an individual and indirectly to the community. While studying the economic cost of sickness it is essential to estimate the cost of individual services rendered and the morbid condition for which it is rendered. There are different methods evolved for costing and it is not easy to quantify the loss due to an illness in actual monetary terms. This field is comparatively-neglected in India.

It was thought worthwhile to make an attempt to estimate the economic impact of disease on the community. Viral Hepatitis (VH) is endemic in Aurangabad city of Maharashtra State, India. An attempt to estimate its impact in monetary terms in the calendar year 1978 has been made.

OBJECTIVES

The objectives of the study were to develop a method to estimate the cost of viral hepatitis in Aurangabad city in the calendar year 1978 considering the two

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different components: (a) the direct cost to the individual; and (b) the indirect cost to the community.

MATERIALS AND METHOD

The study involved two aspects of estimating the amount of sickness of viral hepatitis (VH) occurring in the city and of estimating the cost of sickness for every case of VH in the city.

A. ESTIMATION OF THE OUTDOOR, INDOOR AND TOTAL CASES OF VIRAL HEPATITIS IN THE CITY

Aurangabad City had estimated mid-1978 population of 2,82,372. Viral hepatitis is endemic in the city and a number of cases were admitted to the local Medical College Hospital throughout the year. A number of general and specialist practitioners of medicine treat the VH cases round the year. Major outbreaks of VH take place almost every year. An increase in attendance of VH cases to the outpatient department of Medical College Hospital occurred in the month of April 1978. The impression gathered by the medical practitioners of the city also gave rise to a suspicion of an increased incidence of VH. In order to confirm this, a five per cent random sample of houses in the city was drawn for surveying the VH cases. The survey was undertaken in the last week of May 1978 with the help of malarja surveillance workers and vaccinators, covering a population of 15,079 in the city. The surveyors were trained to ask the history of jaundice in preceding six months. No confirmatory test for VH was employed and hence conditions other than VH giving rise to jaundice are likely to have been encountered in the survey.

The survey indicated that the outbreak lasted during March 1978 to May 1978 and cases in December 1977 to February 1978 were very less in number. These figures gave percentage daily attacks during pre-epidemic and epidemic periods in the population surveyed.

With the suspicion of VH outbreak in the city, from April 1978 to December 1978, a surveillance system was established in the outpatient department and infectious diseases ward of the Medical College Hospital. The exact number of residents of city who might have taken treatment from O.P.D. during January to March 1978 was not known. However, the same was known for the rest of the period of that year after the establishment of surveillance system. In order to have an estimate of outpatient cases in January to March 1978, it was presumed that the proportion of indoor cases and outdoor cases of VH during the period from April to December 1978 will not be substantially different from that during January 1978 to March 1978. Hence, this ratio of indoor to outdoor cases for the period April 1978 to December 1978, was worked out and was applied to total number of indoor cases in January to March 1978 to estimate the outdoor cases in that period. This estimated number and actual registered gave total outpatient strength of VH cases in the year 1978.

The infectious diseases ward had 554 admissions of VH from January to November 1978 of which 402 were residents of the city. The records and cases for December 1978 were lost to follow up. However, the total VH admissions were 25 in

the month of December 1978. Hence, from these figures the VH cases, residents of the city who were likely to have got admitted to the hospital in December 1978 were calculated. This gave the total indoor admissions of VH cases in the year 1978.

From these two different sets of data collected, one from the 5 per cent house sample survey and the other from the outdoor and indoor cases in the year 1978 were then further processed to make final estimate of total VH cases in the year 1978.

The attack rate for the non-epidemic cases from January to February 1978, and attack rate for epidemic cases from March to May 1978 derived from the five per cent sample survey which gave the estimate of total number of cases separately during those periods. The ratio of indoor admissions and total estimated cases in the city was then worked out separately for these periods. It is a known fact that the cases of VH continue to occur at a substantially high frequency even after occasion of the peak incidence and it takes a long time for the incidence to reach the endemic level. It was presumed that this phenomenon has occurred during the months of June, July and August 1978 and then the cases came down to prior endemic level in remaining part of the year 1978. The cases in the immediate post-epidemic period will occur at a level lower than that of observed during the epidemic period. Hence, it was assumed that the average ratio of indoor admission to city cases during non-epidemic and epidemic periods from January to May 1978 will be a useful guide for estimating the total number of VH attacks in the city during the period from June 1978 to August 1978. The same ratio during non-epidemic period is likely to be a good estimate of VH cases during the period from September to December 1978.

Thus, the total of these different estimates for the periods from January to February 1978, March to May 1978, June to August 1978 and September to December 1978, were expected to give the best estimate of total number of cases that might have occurred in the city during the calendar year 1978.

B. ESTIMATION OF COST OF VIRAL HEPATITIS

The costs were calculated separately for three categories, *viz.* (1) indoor cases, (2) outdoor cases, and (3) cases from the city which probably were treated by the medical practitioners outside the Medical College Hospital.

The Direct Cost: This included the cost of physician's services, services of paramedicals, diet, drugs, laboratory investigations and contingencies. In case of indoor admissions all these costs were worked out. In case of outdoor cases cost of diet was excluded. For cases from the city, the cost for services of paramedicals, diet, and contingencies was excluded.

The Indirect Cost: This included the cost of morbidity because of off-work period and the cost of mortality. The morbidity cost is based on age, occupation, and income factors of the VH cases in three different categories studied. The cost of mortality was estimated from the cases who died in the Medical College Hospital during the study period. The factors considered for estimation included age, sex, occupation and income of the diseased. In order to find out the VH cases which

might have died outside the hospital, the death registration during the year 1978 was scrutinised with the help of Municipal Health Authorities. The total of the two sources of data was taken to estimate the mortality cost due to VH. It was not considered essential to find out the mortality cost in case of outpatient cases for obvious reasons.

I A. DIRECT COST OF HOSPITALISED CASES

a. **Cost of Physician Services;** The daily remaining patients of infectious diseases ward was worked out, of which half of the cases happened to be of VH. The salary drawn by teaching staff and residents doctors posted in the ward was worked out. The monetary contribution towards pension and leave benefits of these doctors was also calculated on per day basis. The two of these gave the daily cost of physician services to all the remaining cases in the ward in that year. Half of this cost is attributable to the VH cases.

b. **Cost of Services of Paramedicals:** Another method based on "patient-hour stay" was employed to calculate this cost. The salary expenditure on paramedicals for the year 1978 was taken from the Accounts Section of the Institution. From the outpatient strength and remaining patients in the year 1978 in the hospital, the total patient hour stay for that year was calculated. The assumptions made were that every hospitalised patient stays in the hospital for 24 hours a day and that every outpatient case has to spend one hour in the outpatient department. From these figures the total cost of paramedicals services per patient-hour was calculated. Thus, cost for total VH admissions was worked out along with average period of hospitalisation. The contribution towards leave and pension benefits was not possible to work out.

c. **Cost of Diet:** The total remaining patients in the hospital for the said year and expenditure on diet for that year gave average daily expenditure for each patient. The VH patient days in the hospital were worked out and the per patient per day cost of diet was applied to that figure. The correct way of calculation would have been according to the diet taken by each case and the cost of each dietary item, "excluding those who were taking home diet. However, for simplification the average cost of hospital diet was used.

d. **Cost of Drugs:** The chemotherapeutic agents, their type, quantity and duration of administration was worked out for cases of VH admitted in the hospital. The medical stores of the hospital detailed out the cost of medicines in the year 1978. The total cost of medicines for the cases studied gave an average per patient cost of medicines for the total-VH admissions in the year.

e. **Cost of Laboratory Investigations:** The different biochemical investigations ordered during the entire period of hospitalisation of each of the cases studied were enumerated. It was not possible to know the exact cost of fractions of different laboratory reagents used in the tests, the cost involved for housing the laboratory, cost of equipments and its repairs and maintenance and the cost of services of laboratory personnel utilised in different laboratory tests advised. Hence

the average charges charged by practising pathologists in the city were assumed to be equivalent to the expenditure likely to be incurred by the hospital on such tests. However, this cost is inclusive of profit margin on the part of practising pathologists. The cost per test and test per patient were projected on total VH admissions to find out the total cost for laboratory services. From this cost one third amount was arbitrarily deducted in order to make deduction for the profit margin.

f. Cost of Material and Supplies: (i) Cost exclusively for hospitalised

patients: The items like linen, patient clothing, which are exclusively used for hospitalised cases were separated from total expenditure on material supplied by the hospital in the year 1978..This gave the per remaining patient cost of material and supplies,-which was further applied to the total VH admissions.

(ii) **Cost common for hospitalised and outpatient** cases. The service items like electricity, water tax, rent, wages, repairs, maintenance, etc. which are shared both by inpatient and outpatient are difficult to separate and hence the combined per patient hour cost was estimated. This was projected on VH cases and their mean hospitalisation period.

I B. ESTIMATION OF INDIRECT COST OF HOSPITALISED CASES

g. Morbidity Cost: The exact occupation and income of the hospitalised cases studied was noted. In case of small landowners it was not possible to assess the exact income and hence, like daily wage earners who do not have any fixed flow of income, it was presumed that their daily income was Rs.4. In case of housewives it was not possible to attach exact monetary values to the services rendered by them for the family. Similarly, in case of school and college students the exact monetary loss due to unutilised facilities because of absence from school or college or cost of time spent by the attendant at hospital was not possible to make out. In view of this the national per capita income for the year 1978 was considered to be equivalent to cost of school or college days lost and cost of services of housewives. However, both of these were likely to be underestimates. In case of daily wage-earners or skilled labourers an allowance was made for weekly off, when they are not paid.

The physicians in the city and hospital informed that on an average a patient of VH is advised three weeks rest after the attack. However, it is unlikely that the housewives or daily wage earners refrain from work for three weeks. This was corroborated by some patients. Hence, it was arbitrarily presumed that 15 days is the off-work period in VH cases.

The daily income and number of patients in each type of occupation gave the morbidity loss for 15 days, in the cases studied. The average loss because of morbidity in these cases was projected on remaining .cases of VH with- the assumption that the occupation and income, status of these cases is not likely to differ far from those, studied,

h. Indirect Cost of Mortality: A total of 29 deaths of VH occurred in hospital during the year 1978 of which the age at death and occupation of only 16 cases was recorded with certainty. According to occupation, daily earning and working days

lost in a year, the loss due to death of an individual was calculated. Wherever applicable an allowance for weekly off without earning was made. Two deaths at the age of 78 and 98 years were excluded as they were not economically productive members. Two deaths occurring in under fives were accounted for. However, in their case national per capita income was the measure and it was presumed that they would have earned equal to the national per capita income at least, if they would have lived upto the expected age. At a given age how many more years the individual is likely to live was found out from expectation of life at different ages and then the annual loss was multiplied by the total number of years lost, to arrive at the loss due to mortality. The average cost of all the 14 deaths studied was applied to the remaining 13 deaths, the details of which were not known exactly and hence it was presumed that the age, and occupation of these had been similar to the 16 deaths studied. From these 13 deaths again 1.6 deaths were excluded, presuming that they were likely to be from the non-productive age group as other two deaths amongst the 16 deaths studied.

II. COST OF VIRAL HEPATITIS IN OUTPATIENT CASES

The VH cases had attended the infectious disease outpatient of medicine department of medical college hospital. The details of staff working in outpatient and the daily and annual outpatient strength was found out from the administrative office of hospital.

i. **Cost of Physician Services:** The different categories of physicians attending the outpatient and their hourly salary was calculated, presuming that they are paid to work for 24 hours a day in the hospital. Daily they spend 3 hours in outpatient department. Therefore, their salary for 3 hours was presumed to be the cost of their services for treating outpatient. This cost divided by total outpatient attendance gave the per patient per day cost of physician services. It was observed that the VH cases on an average report to O.P.D. three times during the course of illness. Hence, the total cost of physician services finally would be three times for single visit.

j. **Cost of Services of Paramedicals:** It was calculated on similar basis as that for hospitalised cases.

k. **Cost of Drugs:** The medicines prescribed from outpatient for VH cases were randomly checked from case sheets/papers and by enquiring from treating physicians. The cost of medicines was checked from the hospital stores. The cases being ambulant, were attending the O.P.D. on an average 3 times in the course of their illness, each time getting a quota of drugs for 4 days. Hence, the per case cost of medicines was multiplied by 3 to get the total per case cost which was further used to estimate the cost per total VH outpatients.

l. **Cost of Contingent Expenditure:** It was calculated in similar fashion as was done for hospitalised cases;

m. **Cost of Laboratory Services:** All the VH cases attending the O.P.D. had undergone urine examination for presence of bile salts and bile pigments. Such a test costs Rs.5 with practising pathologists. The cost was calculated in similar manner as that for hospitalised cases after making an allowance for profit margin.

n. **Indirect Cost of Morbidity:** The exact occupation and income of VH cases was not known. Hence, the national per capita income of Rs.3.18 was assumed to be the daily income of these patients. It, however, is likely to be an underestimate. The procedure for estimation of morbidity cost was similar to that of hospitalised cases.

The mortality cost was not possible to know in this group. However, it was presumed that the deaths, if any, amongst this group were likely to have been registered at Municipal Council of the city and detected.

III. COST OF VIRAL HEPATITIS IN CASES FROM CITY

The VH cases as estimated from the sample survey, excluding the number attending Medical College Hospital, was presumed to be taking treatment from the medical practitioners from the city.

The medical practitioners of the City were interviewed about the types of prescriptions issued to VH cases, duration for which patients are treated, leave and rest advised, etc. This gave an approximate idea about the type and quantity of drugs prescribed and the duration, the cost of prescriptions was worked out from the chemist's shop. It was evident from the interviews that the urine examination for the confirmation of diagnosis was ordered at least once in every patient. The patients were advised about three weeks' rest. However, as stated before, it is presumed that they were taking rest for 15 days only. The exact occupation and income of these cases was not known. Therefore, the national per capita income was used to measure the morbidity cost of all these cases. It cannot be presumed and was also unlikely that all the cases were attending the clinic of medical practitioners. Hence, these costs were worked out for one-third, half and two-thirds of city cases.

The deaths which might have occurred in the city but not recorded in the hospital should ordinarily be traceable from the vital statistical record maintained by the municipal authorities. The death register of municipal council for the year 1978 was scrutinised to find out the entries of deaths with cause of death as jaundice or viral hepatitis. Similar to the reasoning adopted for calculation the cost of deaths which occurred in hospital and presuming the age, sex and occupation was similar „ to those who died at hospital and those who did not, the mortality cost of the deaths in cases from city was calculated.

OBSERVATIONS

i. **Estimation of VH Cases in Aurangabad City:** The five per cent sample survey of houses covering 15,079 population from the total mid-year population of 2,82,372 of Aurangabad city in the year 1978 revealed that 196 cases of VH had occurred in January to May 1978. Of these, 24 occurred in January and February 1978, the pre-epidemic period, and 172 from March to May 1978, the epidemic period. During the year 1978 a total of 420 cases of VH were hospitalised at the Medical College Hospital. In the period April 1978 to December 1978 the total outpatient attendance of VH cases was 400 and the indoor admissions in the same period were 304. Thus, the ratio of indoor cases to outdoor cases in this period was 1:1.31. The indoor cases in January to March 1978 period were 116. Making use of

afore-mentioned ratio, for 116 indoor admissions it was estimated that 152 outdoor cases had attended hospital in the period January to March 1978. Thus, the total estimated outpatient attendance was 552 in the year 1978.

The cases which were detected in the survey, the indoor admissions, the estimate of total cases in city and the ratio of indoor admission to total cases in the city, during the different periods of VH prevalence has been shown in Table 1.

TABLE 1
ESTIMATE OF VIRAL HEPATITIS CASES IN AURANGABAD CITY IN THE
YEAR 1978

Period	Indoor admissions	Number of cases detected in survey	Number of cases estimated in city	Ratio Indoor cases: City cases
Pre-epidemic 1 /78 to 2/78	69	24	449	1 : 6.50
Epidemic 3/78 to 5/78	138	172	3221	1 : 23.34
Immediate post epidemic 6/78 to 8/78	118	-	1760	1 : 14.92
				Note: (Ratio taken as average of that of the pre-epidemic and epidemic periods)
Late post epidemic 9/78 to 12/78	95	-	617	1 : 6.50
Total	420	196	6047	1 : 12.81

Thus, the estimate of total viral hepatitis cases in the year 1978 was 6047 cases, of which 552 had attended outpatient department, 420 were admitted to Medical College Hospital, Aurangabad and 5075 cases from the city were probably under the care of medical practitioners.

ii. **Estimation of Cost of Viral Hepatitis:** From the 420 indoor cases of VH, 143 could be studied in detail as to their age, sex, occupation, income, treatment, etc. The costing based on these cases is applied to remaining 277 indoor cases to estimate the total cost.

In the same year 29 indoor patients died because of VH, of which 16 deaths could be studied in detail. The death register at municipal council indicated still another 56 deaths, the cause of death in which was VH, Thus, total 35 deaths were presumed to have occurred because of VH in Aurangabad city in the year 1978. The

average mortality cost studied from 16 deaths is projected on these deaths to arrive at total mortality cost of VH in the year 1978,

In the Tables 2,3 and 4 the direct and indirect cost of VH in case of hospitalised cases, outdoor cases and other cases from city has been shown respectively. These also depict the per case cost and per cent cost for indoor and outdoor cases.

The mortality cost for other cases from city was Rs.26,73,558 based on 49 deaths as detected from municipal council's death register and adjusted.

Taken together, the cost of hospitalised cases, outpatient cases and presuming all other cases of VH had taken treatment from the practising physicians in the city, the total economic impact due to disease has been shown in Table 5.

Thus, the total cost as estimated in the year 1978, in Aurangabad city was Rs.48,04,743. In other words every citizen had to pay Rs,17 as the cost of viral hepatitis in Aurangabad city in the year 1978. The direct cost was only 9.02 per cent while the indirect cost usually not perceptible to the community as such was 90.98 per cent. This distribution of cost is similar to that in Czechoslovakia based on the study of 35,000 cases of VH during the years 1951 to 1970⁵.

TABLE 2
COST OF INDOOR ADMISSIONS OF VIRAL HEPATITIS CASES'IN THE YEAR 1978

Cost Factor	Total Cost Rs.	Per cent Cost Rs.	Cost/Case Rs.
1. DIRECT COST			
i. Physician Service	52,279.00	29.63	124.47
ii. Paramedical services	63,746.00	36.14	151.77
iii. Diet	8,570.00	4.85	20.44
iv. Drugs	11,323.00	6.41	26.95
v. Laboratory examination	16,800.00	9.52	40.00
vi. Material and supplies for indoor only	5,01.1.00	2.84	J 1.93
vii. Material and supplies for indoor and outdoor-	18,655.00	10.57	44.41
Total	1,76,384.00	10.98	419.96
2. INDIRECT COST			
i. Morbidity	43,053.00	301	102.50
ii. Mortality	13,85,879 00	96.99	3299.71
Total	14,28,932.00	89.02	3402.21
Total for indoor	16.05,316 00	100.0	3822.18

TABLE 3
COST OF OUTDOOR CASES OF VIRAL HEPATITIS IN THE YEAR 1978

Cost Factor	Total Cost Rs.	Per cent Cost Rs.	Cost/Case Rs.
A. DIRECT COST			
i. Physician services	1607.00	20.22	2.91
ii. Paramedical services	1070.00	13.47	1.93
iii. Drugs	3113.00	39.18	5.63
iv. Laboratory examination	1840.00	23.16	3.33
v. Material and supplies indoor and outdoor	313.00	3.94	0.56
Total	7943.00	23.17	14.38
B. INDIRECT COST			
Morbidity	26330.00	76.83	47.69
Outdoor-Total Cost	34273.00	100.00	62.08

TABLE 4
COST OF OTHER CASES OF VIRAL HEPATITIS FROM THE CITY IN THE YEAR 1978

Cost Factor/ Cost per Case	1/3 Cases Rs.	1/2 Cases Rs.	2/3 Cases Rs.
1 DIRECT COST			
i. Physician Services (25.00)	42,292.00	63,438.00	84,583.00
ii. Drugs (19.17)	32,429.00	48,644.00	64,858.00
iii. Urine examination (5.00)	8,458.00	12,688.00	16,917.00
Total	83,179.00	1,24,770.00	1,66,358.00
2. INDIRECT COST			
Morbidity (47.70)	80592.00	1,21,039.00	1,61,384.00
Other Cases-Total Cost	1,63,871.00	2,45,809.00	3,27,742.00

TABLE 5
COST OF VIRAL HEPATITIS TO AURANGABAD CITY IN THE YEAR 1978

Cost Factor	Total Cost Rs.	Per cent Cost Rs.	Cost/Case Rs.
Direct Cost	4,33,865.00	9.02	71.74
Indirect Cost	43,70,878.00	90.98	722.81
Total Cost	48,04,743.00	100.00	794.55

During the period from the year 1979 to 1987 a total of 2654 VH cases were hospitalised. In the year 1978, 72.56 per cent cases were from Aurangabad city and from then till now there is no change in policy of hospital admissions and no specific control measures were undertaken for VH. Hence, presuming that the urban rural distribution has not changed, it was estimated that from the year 1979 to 1987 a total of 2282 VH cases from the city were hospitalised in the Institution. The average ratio of indoor admissions to city cases (1:12.81) in the year 1978 when applied to these cases it was calculated that a total of 29,231 cases of VH had occurred in Aurangabad city. This amounted to the cost of Rs.2,22,25.492 at the rate of Rs.794.55 average cost per case. However, this was a gross underestimate as the year to year price inflation was not taken into consideration and further it was presumed that the rate of development is constant, no discounting has been done in an attempt to know the capitalised value.

It is admitted that this attempt to find out the cost of viral hepatitis in Aurangabad city for 1978 has many lacunae. As already stated, such studies are not commonly done in India. The methods of costing and observations have been presented with the hope that it will stimulate interest and result in further conduction of such studies to estimate the cost of sickness. At a time when health sector does not get the resource allocation which it deserves in developmental planning, the results of such studies are likely to provide necessary hard data required by the planners and policy-makers.

SUMMARY

An attempt has been made to estimate the cost of viral hepatitis (VH) in Aurangabad city of Maharashtra State in India during the calendar year 1978 and the cost worked out is projected on estimated cases for the period from 1979 to 1987. A 5 percent random sample survey of houses in the city for prevalence of VH. the number of cases attending the outpatient department and number of cases admitted to infectious diseases ward of Government Medical College Hospital. Aurangabad were considered to estimate the total load of sickness in the city during the calendar year 1978. Further, the sickness estimate for pre-epidemic, epidemic and post-epidemic periods was calculated based on this data. The number of VH cases estimated were 6047 with an average ratio of one indoor case to 12.81 cases in the city. The direct cost to the individual and the community and cost of sickness per case was calculated keeping in view a number of factors and making few assumptions wherever necessary; inter alia, daily remaining patients in the ward, salaries and leaves of medical and paramedical staff, occupation of the case, average per capita income. The direct cost was considered for services of medical and paramedical personnel, diet, drugs, laboratory investigations" and contingent items. The indirect cost included the cost of morbidity because of off work period on account of sickness and the cost of mortality. The costs were calculated separately for hospitalised cases, cases attending only outpatient department and a proportion of cases presumed to be treated by medical practitioners in the city. The total cost for all these cases in the city during the calendar year of 1978 was estimated to be Rs.48,04,743 and the average cost per case of VH in that year was Rs.794.55. In

other words, every citizen had to pay Rs.17 in that year as a cost of viral hepatitis. Presuming that there was no change in endemicity, epidemiological pattern of VH and as hospital admission policy had not changed during the period from the year 1979 to 1987. it was estimated that for the estimated 29,231 VH cases a cost of Rs.2,22,25,492 was incurred in a span of nine years. A number of limitations in the study make the cost or gross underestimate and also it was presumed that the productivity and prices do not change and hence the discounting was not undertaken.

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सारांश

स्वास्थ्य सेवाओं की योजना तैयार करने तथा उनका मूल्यांकन करने के लिए रोग लागत-निर्धारण एक अनिवार्य आधार-भूत सूचना प्रक्रिया है। किन्तु, विकसित देशों में इस प्रकार के अध्ययन सामान्य रूप में नहीं किए जाते हैं। विषण्ण यकृतशोथ बीमारी जो एक खतरनाक रूप धारण कर रही है, के बारे में लागत निर्धारण करने का प्रयास किया गया था। इस प्रकार के अध्ययन स्वास्थ्य अर्थ-व्यवस्था के क्षेत्र में शोधकर्ताओं के लिए भावी अनुसंधान करने के लिए प्रेरणा प्रदान कर सकते हैं। यह अध्ययन योजनाकारों तथा नीति-निर्माताओं के लिए बहुत उपयोगी सिद्ध हो सकता है, विशेषकर ऐसी स्थिति में जब सामुदायिक विकास के लिए विविध क्षेत्रों में स्रोतों का आबंटन किया जाना होता है, क्योंकि स्वास्थ्य क्षेत्र को वरीयता भी योजना स्तर पर ही प्रदान की जाती है।

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