

A STUDY OF RISK FACTORS FOR ISCHEMIC HEART DISEASES (IHD) AMONG EMPLOYEES OF A DEFENCE ESTABLISHMENT

Colonel P.K. Dutta*, Major J.V. Sulladnath and Colonel A.C. Urmil*****

ABSTRACT

Prevalence of certain known risk factors of Ischemic Heart Disease (IHD) was studied among 323 civilian male subjects all above 40 years of age employed in a defense establishment during 1988. The study revealed that majority of the study subjects were physically inactive, obese and smokers, belonged to personality type A. Hypercholesterolemia, hypertension and diabetes milieus were found in 38.39, 26.01 and 26.11 per cent respectively among the study population. A positive family history of IHD was given by 25.08 per cent of these subjects. A total of 98.14 per cent of study subjects were having one or more risk factors. Study also revealed that 194.43 per cent of study population had 0-10 per cent probability of developing IHD within a period of 6 years.

Ischemic heart disease (IHD) has been established as a multifactorial disease. Various risk factors associated with IHD, as brought out by previous studies include hyperlipidemia, hypertension, smoking, diabetes milieus, physical inactivity, obesity, emotional stress, positive family history of IHD. Hyperuricemia and use of oral contraceptives¹.

One of the important approaches for prevention of IHD as suggested by WHO Expert Committee (1981) was to identify people having one or more risk factors and an overall assessment of IHD risk individually. Individuals with high risk factor levels need specific advice. Large scale controlled trials to identify the risk factors and subsequent reduction of the incidence of IHD were also encouraging, though not many such studies have been undertaken in India². Keeping this in view, it was proposed to analyze the risk factors for IHD among the employees of a Defense establishment in Pune. The salient findings have been presented in the present study.

MATERIALS AND METHOD

A cross sectional prevalence study of various IHD risk factors was carried out among the employees of a Defense establishment in Pune, from February 1988 to June, 1988. Out of a total of 1295 employees, the study population comprised of 323 males, all above the age of 40 years.

* Ex-Associate Professor, Department of Preventive and Social Medicine Armed Forces Medical College Pune-411 040

** Ex-Postgraduate Student, Department of Preventive and Social Medicine, Armed Forces Medical College Pune - 411 040.

*** Ex-Reader, Department of Preventive and Social Medicine, Armed Forces Medical College. Pune-411 040

A pretested schedule was used to collect relevant data. Clinical examination included recording of height, weight and blood pressure (3 casual readings) on 2 different occasions in sitting posture. For personality testing a separate self administered questionnaire was used. Intravenous blood was collected in measure of 2 ml. for estimation of serum cholesterol and 0.1 ml of non-fasting capillary blood for estimation of blood glucose. Each employee was subjected to Harvard's step test to measure the level of physical activity.

The criteria used for identification of degree of risk in respect of various risk factors were as under:

a. **Serum Cholesterol:** Serum cholesterol levels between 220-260 mg/100ml were considered as carrying moderately high risk' and more than 260 mg /100 ml as carrying high risk'. Both these categories were considered together as 'at risk'.

b. **Hypertension:** Systolic blood pressure (BP) between 141-159 mm of Hg and/or diastolic blood pressure between 91 -94 mm of Hg were regarded as 'border line hypertensive's carrying moderately high risk' while systolic BP equal to greater than 160 mm of Hg and/or diastolic BP equal to and greater than 95 mm of Hg were regarded as 'hypertensive's' carrying 'high risk'. For the purpose of risk assessment both these groups were treated as hypertensives.

c. **Smoking:** The study population was first divided into 'current smokers' and 'ex-smokers'. Current smokers were those who were smoking on an average one cigarette per day for one year as compared to ex-smokers who had been smoking regularly for years, but had given it up since last one year. Current smokers were also asked about the type of smoking (Cigarette/***Bidi***) per day and total duration of smoking in years. Exposure quantum in terms of 'cigarette year' was calculated and for this purpose smoking of 5 *bides* was recorded as equal to one cigarette. One cigarette year' was defined as on an average one cigarette smoked per day for a duration of one year. Those current smokers whose quantum of exposure equaled to 200 smoking years or less were regarded as 'light smokers', those with more than 200 and less than 400 smoking years as 'moderate smokers' and those with 400 or more smoking years were labeled as heavy smokers'. In the present study all current smokers were regarded as 'high risk' while ex-smokers were regarded as moderately high risk'.

d. **Physical Activity:** The study population subjected to Harvard's step test was divided into 3 groups based on scores obtained in terms of exercise effort in minutes *vis-a-vis* heart beat recovery. Those with a score of less than 50 had poor physical fitness and were considered as physically inactive and at 'high risk'. Those with a score between 50-80 had average physical fitness and were regarded as moderately physically active and at 'moderately high risk'. In the present study both these categories were considered together as 'high risk'.

e. **Diabetes Mellitus:** Study subjects with casual capillary blood glucose levels of more than 150 mg/100 ml were subjected to oral glucose tolerance test. Those with less than 150 mg/100 ml were regarded as normal. Those subjects, who had capillary blood glucose either equal to, or more than 120 mg/100 ml (fasting) or 200

mg/100 ml and above after an hour or after 2 hours of 75 gm of glucose load were considered to be having diabetes mellitus and those with capillary blood glucose of less than 120 mg/100 ml (fasting) and between 140-200 mg/100 ml, 2 hours after were considered to have impaired glucose tolerance. Both these categories were considered 'at risk' for IHD for the purpose of this study.

f. *Obesity*: The individuals with Quetlet Index (Weight x 100) / Height of 0.130 to 0.189 were considered to be undernourished, between 0.190 to 0.209 as normally nourished and those with index of more than 0.210 as having obesity (overnourished. (This last group was considered 'at risk' for IHD.)

g. *Personality Type*: A self administered adjective check list consisting of 39 adjectives for type A personality and 26 adjectives for type B personality was used³. Each of-these 39 adjectives for type A personality was rated on a scale of 7, i.e. 1 to 7 and each of 26 adjectives for type B personality was scored by subtracting the rating marked by individual from number 8 (one number higher than the maximum score of each adjective in order to avoid getting zero). Persons with score of below 228 were considered to be belonging to personality type B and those with score of 228 or above belonging to personality type A which is a risk factor for IHD.

h. *Family History of IHD*: Individuals whose first degree relatives had any of the conditions, namely exertional angina, old or recent myocardial infection, diagnosis of IHD or sudden death were considered to be having positive family history for IHD and regarded 'at risk',

i. *Assessment of Individual Risk*: Table (Appendix A) designed by Erica Brittain at Stanford University in 1979 was used to give separate points (scores) for the degree of following risk factors; (a) systolic blood pressure; (b) cigarette smoking; (c) glucose intolerance; and (d) age/serum cholesterol. The total points obtained by an individual were correlated to the probability of getting IHD in 6 years in men aged 35-70 years. However, in the present study left ventricular hypertrophy included in the table was not studied and hence the total score obtained was less and the estimates of probability worked out for assessing the individual's risk was on the lower side.

RESULTS

The results of this study have been presented in Tables 1 to 10.

i. *Serum Cholesterol Level*: Table 1 shows that 38.39 per cent of the study subjects were having serum cholesterol levels above 220 mg/100 ml and therefore, were 'at risk' for IHD.

TABLE 1
DISTRIBUTION OF STUDY POPULATION BY SERUM
CHOLESTEROL LEVEL

Serum Cholesterol mg/100 ml	Number	Percentage
Less than 200 mg	199	61.61
Between 220-260 mg	97	30.03
Above 260 mg.	27	8.36
Total	323	100.00

ii. **Blood Pressure and IHD**. A total of 26.01 per cent of the study subjects (borderline hypertensive and hypertensive's clubbed together) were 'at risk' for IHD as has been presented in Table 3.

TABLE 2
DISTRIBUTION OF STUDY POPULATION ACCORDING TO BLOOD
PRESSURE READING

Blood Pressure	Number	Percentage
Normotensive	239	73.99
Borderline	59	18.27
hypertensive	25	7.74
Total	323	100.00

iii. **Effects of Smoking**: Table 3 revealed that 55.42 per cent of study subjects were smokers and therefore, 'at risk' of IHD. A further analysis of smokers revealed that 21.05, 13.00 and 8.06 per cent of study subjects were light, moderate and heavy smokers respectively.

TABLE 3
DISTRIBUTION OF STUDY POPULATION ACCORDING TO SMOKING
CATEGORY

Category	Number	Percentage
Current smokers	136	42 11
Ex-smokers	43	13.31
Non-smokers	144	44 58
Total	323	100 00

iv. **Physical Activity and IHD**: A total of 91 61 per cent of study population were physically inactive and therefore, 'at risk' for IHD as has been given in Table 4.

TABLE 4
STUDY POPULATION ACCORDING TO PHYSICAL ACTIVITY
(AS PER HARVARD'S STEP TEST)

Physical Activity"	Number	Percentage
Physically inactive	105	32.61
Moderately physically	190	59.00
inactive	27	8.39
Physically Active		
Total	323	100.00

•One physically handicapped person was not examined

v. **Diabetes Mellitus:** It is evident from Table 5 that 26.11 per cent of the study subjects were having diabetes mellitus and impaired glucose tolerance and therefore, 'at risk' to IHD.

TABLE 5
STUDY POPULATION ACCORDING TO DIABETES MELIUS AND IMPAIRED GLUCOSE TOLERANCE

Category	Number	Percentage
Diabetes Mellitus	22	6.81
Impaired Glucose Tolerance (ICT)	62	19.30
	239	73.89
Total	323	100.00

vi. **Nutritional Status:** Table 6 shows that 50.46 per cent of the study subjects were obese and 'at risk' for IHD.

TABLE 6
DISTRIBUTION OF STUDY POPULATION ACCORDING TO NUTRITIONAL STATUS (AS PER QUILLETS INDEX)

Nutritional Status	Number	Percentage
Under nourished	44	13.62
Normal	116	35.92
	163	50.46
Total	323	100.00

vii. **Personality and IHD:** It is evident from Table 7 that 32.47 per cent of the study subjects belonged to type A personality and were 'at risk' for IHD.

TABLE 7
DISTRIBUTION OF STUDY POPULATION ACCORDING TO PERSONALITY TYPE A AND B

Personality Type	Number	Percentage
Type A	104	32.47
	219	67.53
Total	323	100.00

viii. **Family History and IHD:** 25.08 per cent of the study subjects had a positive family history of IHD and were 'at risk¹ of IHD as has been depicted in Table 8.

TABLE 8

DISTRIBUTION OF STUDY POPULATION ACCORDING TO FAMILY HISTORY OF IHD

Family History of IHD	Number	Percentage
Positive	81	25.08
Negative	181	56.04
Not	61	18.88
Total	323	100.00

ix. **Number of Risk Factors Present:** Table 9 reveals that 98.14 per cent of study population had one or more risk factors. 77.73 per cent of study population had any two to any five risk factors. 1.86 per cent had no risk factors and none of the individuals had all the eight risk factors.

TABLE 9

DISTRIBUTION OF STUDY POPULATION ACCORDING TO NUMBER OF RISK FACTORS

Number of Risk Factors	Number	Percentage
Nil	6	1.86
Any One	14	4.33
Any Two	60	18.58
Any Three	62	19.20
Any Four	75	23.22
Any Five	54	16.73
Any Six	31	9.58
Any Seven	21	6.50
All Eight	-	-
Total	323	100.00

x. **Probability of Developing IHD:** It has been revealed in Table 10 that 71.21 per cent of study subjects had 0.5 per cent chances of developing IHD within a period of 6 years. 23.22 per cent had 6-10 per cent chances of developing IHD within a period of 6 years. These two groups constituted 94.43 per cent of the total study population.

TABLE 10
DISTRIBUTION OF STUDY POPULATION ACCORDING TO PROBABILITY
OF DEVELOPING IHD WITHIN 6 YEARS*

percentage of Probability of Developing IHD within 6 Years	Number	Percentage
0-5	230	71. 21
6-10	75	23.22
11-15	13	4.02
16-20	4	1. 24
21-25	1	0.31
Total	323	100.00

*Based on scoring method used in Stanford study for men aged between 35-70 years.

DISCUSSION

The prevalence rate of 8.36 per cent of hypercholesterolemia found in the present study (taking 260 mg /100 ml as cut off point) is much lower as compared to 23 per cent reported by Doyle *et al.* in Albany USA, 29 per cent by Paul *et al.* in Chicago USA and 23 per cent by Kennel WB in Framingham study². These differences were mainly attributed to the differences in dietary habits which were largely socio-culturally determined. Key *et al.* have also reported strong correlation between dietary habits and high serum cholesterol levels in blood².

The prevalence of hypertension observed in the current series was 7.74 per cent. Gupta *et al.* (1978) found prevalence rate of 6.43 per cent in urban population⁴, whereas Malhotra (1971) reported prevalence rate of 6.2 per cent among Indian Railways employees⁵. In another study, Mathur *et al.* (1963) reported a prevalence rate of 4.2 per cent in an urban population⁶. These differences in the prevalence were mainly attributed to population differences in age, occupation, socio-economic status, geographic area and place of residence.

The presence of smokers in this study was 55.42 per cent. Neumann *et al.* (1979) reported a prevalence rate of 35 per cent in free living population of Argentina⁷. The high prevalence rate of smokers in the present study may be due to socio-cultural characteristics and monotonous nature of work of the study population.

In the present study, 91.6 per cent subjects were found to be physically inactive though this could not be compared with the findings of other workers using

Harvard's step test, due to non-availability of similar studies. The high prevalence of physical inactivity may be due to sedentary nature of occupation, urban living conditions and the age factor considered in the present study (more than 40 years of age).

The current series also revealed that half of the study population (50.46 per cent) was obese. This also could not be compared with the findings of any other study, using same methodology due to paucity of literature. However, the probable contributory factors responsible for such high prevalence were probably due to sedentary nature of work and better nutritional status of the study population.

Prevalence of diabetes mellitus (6.81 per cent) and impaired glucose tolerance (19.20 per cent) as per present study, seem to be higher as compared to 0.9 per cent by Tripathy *et al.* (1979) and much lower as compared to 15.4 per cent reported by Trimoorathi *et al.* (1983)^{8,9}. The observed difference could be attributed to population differences in the age group, their dietary habits, occupation and geographic areas.

According to the findings of the present study, 32.47 per cent study subjects were found to have type A personality. However, no similar population based studies, using similar methodology, were available for comparison. White lacer (1969) observed that personality type A was six times more 'at risk' of getting IHD than those with personality type B¹⁰.

In the present study, 25 per cent had positive family history of IHD which was much higher as compared to 10.9 per cent reported by Neumann *et al.* (1979) in free living population of Argentina⁷. The observed higher prevalence may be because of higher literacy and higher socio-economic status to which the study population belonged.

As per findings of this study, 94.45 per cent of study subjects had 0.10 per cent probability of developing IHD within next 6 years as estimated with the help of probability assessment by scoring method as used in Framingham study². This probability remains subject for verification by a prospective study which is very strongly suggested.

In conclusion, it may be mentioned that out of various risk factors analyzed in the current series, hypercholesterolemia hypertension, diabetes Miletus, physical inactivity, obesity and family history were found to have significant association in subsequent development of Ischemic Heart Diseases (IHDs). Hence, Health Administrators should plan and organize suitable programmes to impart health education to vulnerable population for improving their awareness on the subject.

38.39, 26.01 26.11

25.11

98.14

94.43

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APPENDIX - A

PROBABILITY OF DEVELOPING CORONARY HEART DISEASE IN 6 YEARS Men (Aged 35-70)

Points	0	1	2	3	4	5	6	7	8	9	10	
SBP	100	110	120	130	140	150	160	170	180	190	200	
CIG	No				Yes							
LVH	No						Yes					
GLU	No		Yes									

HDL-C	FACTOR
AGE/CHOL (mg/dl)	MULTIPLIER
30	1.82
35	1.49
40	1.22
47	1.00
50	0.82
55	0.67
60	0.55
65	0.45

	Age											
Chol	36	38	40	42	44	46	48	50	55	60	65	70
165	3	6	9	11	14	16	18	19	23	26	27	27
180	5	8	10	13	15	17	19	20	24	26	27	27
195	7	9	12	14	16	18	20	21	24	26	27	27
210	8	11	13	15	17	19	21	22	25	27	27	27
225	10	12	15	17	19	20	22	23	26	27	28	27
240	11	14	16	18	20	21	23	24	27	28	28	27
255	13	16	17	19	21	23	24	25	27	28	28	27
270	15	17	19	21	22	24	25	26	28	29	28	26
285	16	18	20	22	24	25	26	27	29	29	28	26
300	18	20	22	23	25	26	27	28	29	29	28	26
315	20	22	23	25	26	27	28	29	30	30	29	26

Compiled by Erica Brittain at
Stanford University, 1979, from multiple
logistic functions in The Framingham Study.
Dec. 27, 1971. U.S. Government Printing Office

Calculation of Probability

Enter points (in red) for

- Systolic Blood Pressure
- + Cigarette Smoking
- + Left Ventricular Hypertrophy
- + Glucose Intolerance
- + Age/Serum Cholesterol
- = Total Points - Probability

TP	Prob	TP	Prob	TP	Prob
5	003	20	021	35	13
6	004	21	024	36	14
7	004	22	028	37	16
8	005	23	031	38	17
9	006	24	035	39	19
10	006	25	040	40	21
11	007	26	045	41	23
12	008	27	050	42	25
13	009	28	057	43	28
14	010	29	064	44	30
15	012	30	071	45	33
16	013	31	080	46	36
17	015	32	090	47	39
18	017	33	100	48	42
19	019	34	11	49	45

SCREENING FOR CARCINOMA CERVIX IN LOWER SOCIO-ECONOMIC CLASS OF PERI-URBAN COMMUNITY

Radha Y. Aras*, J.D. Rege**, Nalini Pai***, Anita Baliga****
and Naimuddin*****

ABSTRACT

Pap test has been carried out on women above the age of 25 years and residing in peri-urban slum community, by considering systematic random sample. A total of 60.9 per cent were illiterate and response to an initial invitation to be screened was of the order of 34.6 per cent. Prevalence for definite malignancy was 8.2 per 1000 women and that for severe dysplasia was 4.8 per 1000 women. 76.3 per cent of women reported for Pap test were Muslims and all the cases of cancer cervix were detected in Muslim women. Thus screening for cancer cervix has proved to be a very important tool for the detection of early, preinvasive curable stage and further to take measures, to prevent it from progressing into a life threatening illness.

Cancer of uterine cervix is the most common cancer in women in developing countries, and the second most common cancer in women throughout the world, with approximately 500,000 new cases each year, many of them fatal. It accounts for 25 to 50 per cent of cancers in Indian women and contributes to about 80 per cent of all cancers of female genital tract. Fortunately, the natural history of cervical cancer is such that it is possible to detect it early during a preinvasive curable stage and to take measures to prevent it from progressing into a life threatening illness. The prolonged early phase of cancer in situ can be detected by the Pap smear. This screening procedure was carried out in women from low socio-economic class of community to find out prevalence of cervical cancer and to detect the cases in their early incipient stage.

MATERIALS AND METHOD

An urban health centre situated at Shivajinagar, Deonar peri-urban area of Bombay, caters to the surroundings of lower socio-economic class of 150,000 populations staying in authorized houses. Considering the population of women in reproductive age and above (approximately 30,000, 20 per cent of total population), 1800 women were selected by systematic random sampling. House to house visits

*Associate Professor, Department of Preventive and Social Medicine

**Associate Professor, Department of Pathology

***Professor and Head, Department of Preventive and Social Medicine

****Lecturer, Department of Preventive and Social Medicine and Shivajinagar Urban Health Centre

*****Medical Social Worker, Shivajinagar Urban Health Centre Department of Preventive and Social Medicine Topiwala National Medical College, Bombay-400 008

were paid by the medical social worker and women above the age of 25 years were called at urban health centre for pap smear tests. Early marriages (68 per cent of girls were already married by the age of 18 years) and early fertility was a conspicuous feature of this community. Hence, the women above the age of 20 years were screened only.

Women were called at health centre and cervical scrap smears were obtained from the squamo-columnar junction using an Ayre spatula. Smears were fixed in 1:1 ethyl alcohol and stained by papanicolaou technique. The reporting on smears was carried out as per WHO classification, *i.e.* mild, moderate and severe dysplasia or carcinoma on cytomorphological basis. Women were called back after about ten days to collect report and for further line of treatment and advice.

RESULTS

Though 1800 women were called, only 623 women turned up for pap smear testing, *i.e.* response rate was 34.6 per cent. 60.9 per cent of women who reported at health centre were illiterate.

Age wise distribution of Pap smear tests have been presented in Table 1. Potentially carcinogenic changes in the form of dysplasia of cervical epithelium in these women of low socio-economic class appeared to be occurring in their thirties.

As the community was predominantly of Muslims, 76.3 per cent Muslim and only 22.6 per cent Hindu women reported for Pap test at the health centre as has been given in Table 2. Five cases turned out to be malignant (confirmed by cervical biopsy) *i.e.* prevalence rate of cancer cervix in the present study was 8.2 per 1000 women. Cancer cervix seems to follow a progressive course from epithelial dysplasia to carcinoma in situ to invasive carcinoma⁵. About 7.89 per cent of cervical dysplasia in women from the age group of 31 to 40 years was of severe condition deserving immediate attention for reversal of pathology as have been shown in Table 3. Considering the fact that there were 3 women showing evidence of severe dysplasia (pre invasive stage of cancer cervix), actual prevalence could be considered as 13 per 1000 women (8 cases per 613 Pap smear). No significant difference has been found in the occurrence of dysplasia in the three age groups (Table 3, CR = 0.345, $p > 0.05$).

DISCUSSION

Regarding the screening test, numerous studies have shown that the response to an initial invitation to be screened was of the order of 50 to 60 per cent in developed countries⁴, the response rate being the least in women, thought to be most at risk, as for example, the poorest and the least educated women². The response rate was 34.6 per cent in the present study as 60.9 per cent of the sample women were found to be illiterate.

Cytological analysis showed 270 (45.5 per cent) inflammatory changes, 88 (14.35 per cent) dysplasia lesions and 5 (0.82 per cent) malignant lesions in this

TABLE 1
AGE WISE DISTRIBUTION OF PAP SMEAR REPORTS

Pap Smear	AGES			Total
	<30 years	31-40 years	>41 years	
Normal	56	72	38	166 (27.08)
Metaplasia	13	34	28	75(12.03)
Inflammation	100	119	60	279(45.51)
Dysplasia	27	38	23	88(14.36)
Carcinoma in situ.	-	3	-	3 (0.49)
Invasive carcinoma	-	2	-	2 (0.33)
Total	196	268	149	613(100)

Figures in bracket indicate percentages. 10 smears were unsatisfactory to report, hence not included here.-

TABLE 2
DISTRIBUTION OF PAP SMEAR REPORTS ACCORDING TO RELIGION

Pap Smear	RELIGION			Total
	Hindu	Muslim	Others	
Normal	41	124	1	166
Metaplasia	11	63	1	75
Inflammation	70	203	3	279
Dysplasia with inflammation	16	70	2	88
Ca. in situ.	-	3	-	3
Invasive Ca.	-	2	-	2
Not reported	3	7	-	10
Total	141 (22.6)	475 (76.3)	7(1.1)	623(100)

TABLE 3
DISTRIBUTION OF DEGREE OF DYSPLASIA OF EPITHELIUM ACCORDING TO AGE GROUP

Age Group Yrs.)	Mild	Moderate	Severe	Total	Total women
<30	18(66.67)	09 (33.33)	-	27(100)	196
31-40	19(50)	16 (42.11)	3 (7.89)	38(100)	268
>41	17(73.91)	06 (26.09)	-	23 (100)	149
Total	54 (61.36)	31 (35.23)	3(3.41)	88 (100)	613

Figures in bracket indicate percentages. C.R.s 0.345, P>0.05

Study (Table 1). In an ICMR study conducted at New Delhi, prevalence of Inflammation was 53.3 per cent, dysplasia 2.3 per cent and malignancy 0.2 per cent³. A study conducted in rural population of Wardha district. Cytological examination revealed 1.14 per cent dysplasia and 0.25 per cent malignant lesions⁶. In an another study on uterine cervical dysplasia, initiated at Institute of Cytology and Preventive Oncology (ICPO), New Delhi, women with unhealthy cervix and inflammation formed 11.4 per cent of all the screened women⁷.

An interesting finding of the study was that all malignant lesions were found in Muslim women (Table 2). It may be due to the fact, that it was predominantly Muslim community (76.3 per cent of study population) while other studies conducted in Bombay and Pune showed higher incidence of cancer cervix in Hindu community.

In a study conducted at Greater Bombay in 1980, Hindu and Muslim female population was 28.6 and 6.03 per cent respectively and incidence of cancer cervix in this population was 16.6 and 8.4 per cent respectively⁸. In an another study conducted at Pune City showed that Hindu female population 8.5 times more than that of Muslim (35.1. 4.1) and the incidence of cancer cervix in Hindu and Muslim females was 22.7 per cent and 4.6 per cent respectively⁹.

CONCLUSION

Cervical scrap smear stained by Papanicolaou technique (Pap test) easily applied, screening procedure for community to detect precancerous and early cancerous lesions of cancer cervix. There is no doubt that in population of low socio-economic and low educational status and high and early fertility status Pap testing could prove to be a tremendously useful method for primary and secondary prevention of carcinoma cervix.

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सारांश

नियमित रैंडम सैम्पल के मुताबिक उपनगरीय गन्दी बस्तियों में रहने वाली 25 वर्ष से अधिक आयु की स्त्रियों पर पैप टैस्ट किया गया। कुल मिलाकर 60.9 प्रतिशत अनपढ़ पाई गई जिनमें 34.6 प्रतिशत से स्तरीय छानबीन (स्क्रीनिंग) किए जाने के प्राथमिक निमन्त्रण का प्रत्युत्तर मिला। लगभग 8.2 प्रति हजार स्त्रियों में रोग की निश्चित घातकता थी और गम्भीर डायस्लासिया से 4.8 प्रति हजार स्त्रियां पीड़ित पाई गई। अध्ययन से यह पता चलता है कि 76.3 प्रतिशत स्त्रियां

मुसलमान थी और इनमें ही कैंसर सर्विक्स के मामले भी देखने में आये। अतः, रोग की शुरु-शुरु की अवस्था में ही इसका पता लगाने, रोग की रोकथाम के लिए आवश्यक प्रयास करने, जीवन को चुनौती देने वाले इस भयावह रोग को पनपने से रोकने की लिए आवश्यक छान-बीन (स्क्रीनिंग)करना एक महत्वपूर्ण उपाय सिद्ध हुआ है।

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A PROSPECTIVE STUDY OF FACTORS AFFECTING INCIDENCE OF ACUTE RESPIRATORY INFECTION (ARI) AMONG CHILDREN OF A SERVICE COMMUNITY

J. Mukhopadhyas*

ABSTRACT

Acute Respiratory Infections (ARI) contribute a major share in the morbidity and mortality of young children. The present study reveals the role of various factors which affect the incidence of ARI. Among these breast-feeding, nutrition, indoor smoke pollution, parental smoking habit and also immunization were the most important factors and these have been recognized as amenable to change. An effective preventive strategy has also been highlighted.

The continuing massive morbidity and premature mortality from Acute Respiratory Infection (ARI) especially, in the developing countries poses a great challenge to the public health planners. On the basis of crude assumption WHO estimated that ARI causes 2.2 million deaths throughout the world every year¹. ARI accounts for 20 per cent of all deaths among children of the age group of 0-14 years and highest mortality has been reported among infants where death rate in some countries even exceeds 2000 per 100,000 live birth².

Apart from infectious agent, child's genetic and immunological status and several other factors also contribute to the occurrence of ARI. Few of them have been listed as birth weight of child, smoking habit of parent, indoor smoke pollution, immunization, and climatic factor and breast-feeding. The aggregate information indicated that there has been an inextricable relationship between various medical and social factors in occurrence of ARI. ARI also merits cognizable attention as it causes considerable high morbidity and unwanted premature mortality. Therefore, the present study was undertaken to determine the role of various factors affecting the incidence of ARI among children population of a service community.

MATERIALS AND METHOD

The present study was carried out at Tambaram, an Air Force Station in South India having a total population of 11000. Being a Defense Cantonment, this Station has a well organized medical, social and welfare services for the residents. The location of Station Sick Centers (Medical Centre) comes well within the domestic area. The Station is already being covered under various ongoing national health programmes. Since April 1985, measles vaccine has been introduced at this Station.

An initial house to house visit was conducted to inform the parents about the objectives of the study and also to ascertain various social and environmental

* Officer-in-Charge, SHO AF Station, Tamberam Madras-46

Factors like family size, smoking habit of the parents and details of housing conditions. At the same time, nutritional assessment of the children was also carried out; 50th percentile of Harvard Standard (weight for age) was used as reference³. Cut off point used for detecting malnutrition was 80 percent of standard weight for age.

A total of 2835 children in the age group 0-14 years were kept under surveillance during April 89 to March 90. Children falling sick due to ARI were medically examined, investigated, treated and classified as per WHO model (Appendix A)⁴. The initially obtained social and environmental data was further studied, along with the medical data. Revisits were also made to the houses as and when required. The children seeking in-patient care were admitted in Medical Centre and those seeking specialist opinion were referred to Military Hospital. Madras.

RESULTS

There were total 1545 families in the Station having a total of 2835 children in the age group of 0-14 years. Birth rate in the Station during the period was 6.7 per 1000 and average family size was 4.2.

Out of 2835 children, 330 belonged to officers and 2505 belonged to Airmen families. Total numbers of infants were 74. Male and female ratio was 1000989.

TABLE 1
AGE AND SEX DISTRIBUTION OF CHILDREN

Age Group	Officers		Other Ranks		Total
	Male	Female	Male	Female	
0-1	7	5	27	35	74 (2.61)
1-5	18	15	140	163	336 (11.85)
5-14	145	140	1088	1052	2425 (85.54)
Total	170(6.00)	160(5.64)	1255(44.27)	1250(44.09)	2835(100.00)

Figures in parentheses indicate percentages.

TABLE 2
ARI MORBIDITY ACCORDING TO SEASONAL VARIATION AND AGE DISTRIBUTION

Age Group	No. of ARI Episodes among Children				Total
	Mild ARI		Severe ARI		
	Summer	Winter	Summer	Winter	
0-1	70	132	5	24	251 (14.60)
1-5	228	310	12	28	578 (33.60)
5-14	352	480	25	34	891 (51.80)
Total	650 (37.79)	942 (54.77)	42 (2.44)	86 (5.00)	1720(100.00)

$$\chi^2 = 2340; \text{d.f.}=6, P < 0.001$$

Figures in parentheses indicate percentages.

A total of 1720 episodes of respiratory infection among children were reported to OPD. 128 children suffered from severe ARI (Bronchopneumonia, Bronchiolitis Bronchitis and Laryngitis). There were 231 episodes of ARI among 74 infants, thus comprising an ARI incidence of 3.5 episodes per infant per year. Similarly, among under five children ARI incidence was 1.72 episodes per year per child. Total number of cases registered with children OPD for various reasons (including ARI) was 10772; thus, ARI contributes nearly 16 per cent of total OPD load. Incidence of measles was 0.7 per 1000 children during the study period. Seasonal distribution showed that statistically significant more number of cases have occurred during winter. Out of 128 severe ARI cases 26 (20.3 per cent) were admitted to the hospital. Average duration of treatment of ARI cases (managed at OPD) was 4.3 days.

Sixty per cent children belonged to the families where fathers smoke cigarettes and these were significantly more affected than their counterparts whose fathers were non-smokers. The risk of infection was 1.15 times more among children whose fathers smoke. Even occurrence of severe ARI was mostly found among these children only.

TABLE 3

ARI MORBIDITY ACCORDING TO FATHER'S SMOKING HABITS

Children belonging. families where	Number of children affected		Total
	With ARI	Without ARI	
Father	900	801	1 701
smoker	526	608	(6000)
Total	1426(50.30)	1409 (40.70)	2835(100.00)

RR = 115 X = 11.6. d.f. =1; P<0.001
Figures in parentheses indicate percentages.

TABLE 4

ASSOCIATION OF BREAST FEEDING AND ARI MORBIDITY AMONG CHILDREN AGED LESS THAN 2 YEARS

Number of Affected	Number of Children According to Duration of Breast Feeding			Total
	Stopped Feeding Before 6 Months	Breast Fed Till 12 Months	Breast Fed Even After 18 Months	
With ARI	35	34	25	94 (60.20)
Without	11	14	37	62 (39.80)
Total	46 (29.50)	48 (30.70)	62 (39.80)	156(100)

X² = 16.27: df. = 2: P<0.001
Figures in parentheses indicate percentages.

A total of 156 children in the age group of 0-2 years were studied. There has been a progressive decrease in the occurrence of ARI among these children with consecutive increase in the duration of breast-feeding; the association was found to be statistically significant.

All the 74 infants were born in hospital during the study period and none of them were low birth weight (2.5 kg.). All the infants were immunized according to national schedule against six childhood preventable diseases. None of the under five children had overt signs and symptoms of Protein Energy Malnutrition (PEM). However, 112 children (33.3 per cent) in 1-5 years age group were underweight, according to their age and 84 of them had hemoglobin less than 12 gm per cent. These underweight children suffered 1.85 episodes of ARI per child per year as compared to their normal counterparts who suffered 1.65 episodes per child per year. The overall prevalence of underweight was 31 per cent among the children of 3-14 years age group.

916 (59.3 per cent) families used LPG for cooking and rest 629 (40.7 per cent) families used kerosene stove for the same. 195 (19.67 per cent) families staying in temporary accommodation did not have separate kitchen and therefore, had been cooking in the bedroom. 489 children belonging to these families were found to run a risk of respiratory infection, 1.18 times higher than the children belonging to families staying at permanent accommodation. This association was also found to be statistically significant.

The common statistical indicator used for the assessment of housing condition was per capita floor space occupancy. Among the families staying in temporary accommodation per capita floor space occupancy was in the range of 98 to 116 sq. ft. For Airmen families staying in permanent accommodation, the same was 120 to 145 sq. ft; for Officers it was 150 to 320 sq. ft. per person. The incidence of ARI among the under five children of these three categories of families were 1.9; 1.69 and 1.6 episodes per child per year respectively.

DISCUSSION

The various demographic parameters point out that the community studied has

TABLE 5
ASSOCIATION OF ARI MORBIDITY AND BED ROOM SMOKE POLLUTION

Children belonging to families where	Number of children affected		Total
	With ARI	Without ARI	
Cooking in Bed	283	206	489(17.25)
Room Having	1143	1203	2346 (82.75)
Total	1426(50.30)	1409 (40.70)	2835(100.00)

RR=1.18. X²=13.35; df= 1. P<0.001.

Figures in parentheses indicate percentages

low fertility rate as compared to national standards. Women in the age group of 15-44 years constituted 17 per cent and children in the age group 0-14 years constituted 25.8 per cent of total population.

The incidence of ARI was 3.5 episodes per year among infants and 1.7 episodes per year among under five the incidence of measles was 0.7 per 1000 population. ARI contributed 16 per cent of total cases attended to OPD. Registrar General of India reported that ARI accounts for 5-8 episodes per year in urban and 1-3 episodes per year in rural areas, among under five children and it is responsible for 20-40 per cent of all cases brought to children's OPD⁶. Another scholar also observed that an ARI episode of 5.9 per year among the rural under five Nepalese children. Further, he also found out that incidence of measles was 2.89 per 1000 population. The estimated incidence of measles in India has been calculated to be 1.9 per 1000 population⁸. The incidence of ARI and measles seemed relatively low when compared to the national figures and it appears probable that small family, ongoing immunization and MCH programmes. Together with health consciousness and easy availability of medical services have contributed jointly to achieve such an appreciating trend.

Paternal smoking habit constituted an important risk factor, for occurrence of ARI among the children and especially so among the infants. Children belonging to the families where father smoked tobacco suffered a significantly higher number of episodes of ARI and the occurrence of severe ARI was mostly among these children. These findings were similar to those reported from developed countries where, it has been shown that smoking habits of parents were directly related to incidence of ARI in infants⁷. Other researchers while reviewing literature on 'The effect of passive smoking on children' calculated an increased risk (1.5-2 times) of ARI in children whose parent smoke⁹.

Breast feeding stood out to be a remarkably essential factor for prevention of ARI among the children aged less than 2 years. A statistically significant progressive decline in the occurrence of ARI has been observed among these children with consecutive increase in the duration of breast feeding. Similar findings have also been reported by various other studies. The median relative risk of ARI was about 2-5 times higher in bottle-fed infants as compared to breast-fed one⁹. Further, it has been estimated that breast feeding will result in 20 per cent reduction in moderate to severe ARI morbidity; 15 per cent reduction in ARI mortality in infants under 6 months of age and 10 per cent reduction in morbidity and mortality between 6-12 months.

About 33 per cent of under five children and 31 per cent of children in the age group of 5-14 years were found to be underweight according to their age. Researchers while carrying out a nutritional survey among school children of Navy Nagar, Bombay observed that 42.3 per cent of children in the age group of 5-17 years were underweight according to their age¹⁰. The present study also revealed that the underweight children numerically suffered more number of episodes of ARI than their normal counterparts.

Bedroom smoke pollution was recounted as a distinct factor which played a

significant role in the occurrence of ARI among these children. The under five children, who generally spend long hours with their mothers busy in cooking fuel in contributing to ARI also been investigated in Britain and USA, and as per their reports it seems that exposure to nitrogen dioxide from cooking may increase the risk by affecting child's respiratory defense mechanism.

Per capita floor occupancy ratio as revealed by this study was found to be well within the acceptable limits as specified by WHO statistical indicator for standard housing⁵. It was also observed that the under five children staying at less spacious temporary houses had significantly more episodes of ARI as compared to their normal counterparts who stayed at permanent accommodations. It may be due to the fact that high population density increases the risk of respiratory infections.

ARI contributes a major share in the morbidity and mortality of young children. The disease can be controlled at family level except in few cases that may have to be referred to health centers or hospital. Basic preventive strategies include, immunization against vaccines preventable diseases, breast feeding, adequate nutrition, smoke reduction both from cigarettes and cooking stoves, improved personal hygiene and health education of parent.

सारांश

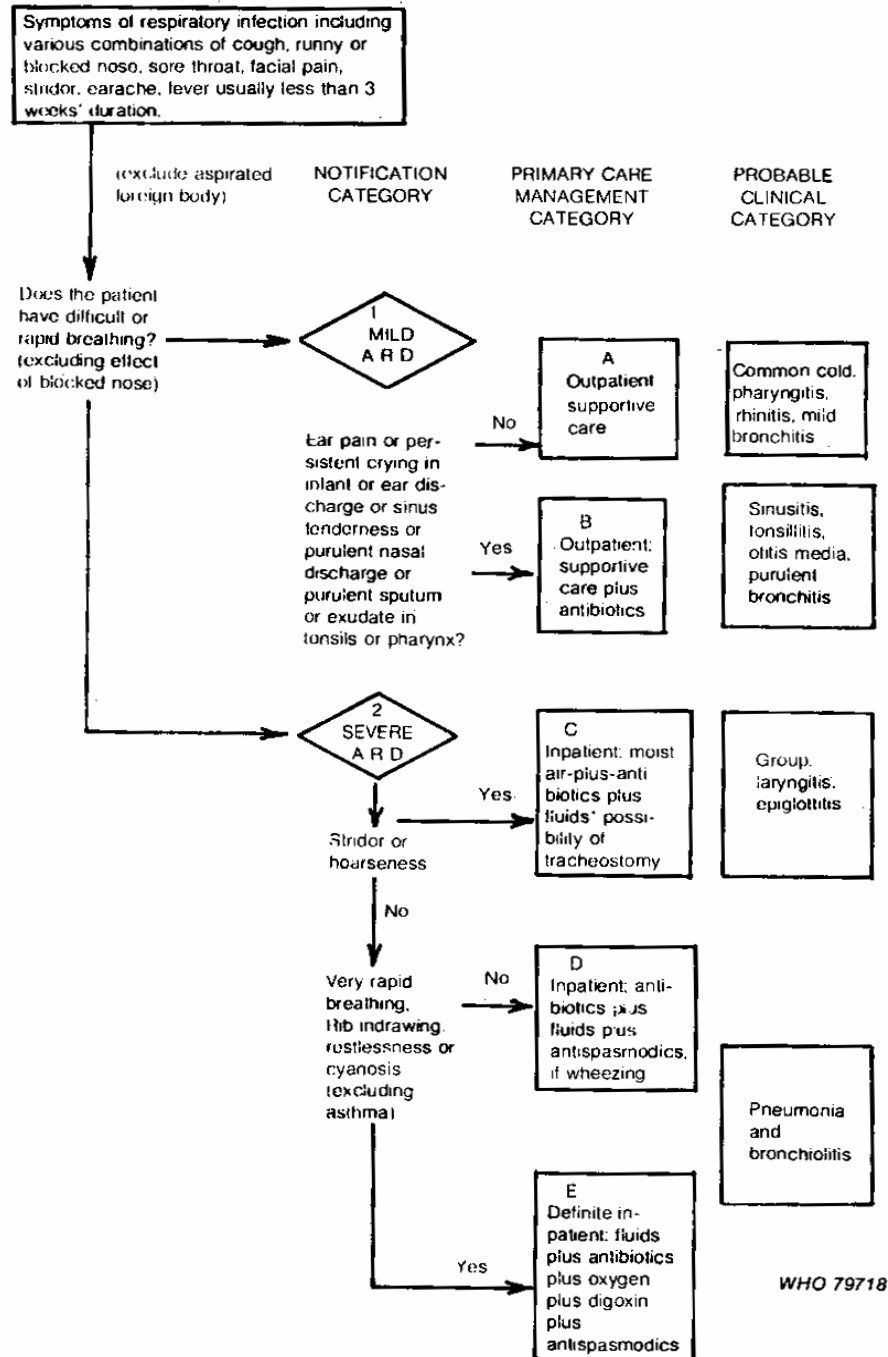
तरुण शिशुओं में होने वाले रोग एवं मृत्यु के लिए श्वास संबंधी गंभीर संक्रमण एक अत्यन्त महत्वपूर्ण भूमिका निभाता है। प्रस्तुत अध्ययन में इन मामलों को प्रभावित करने वाले मर्दों की अहमियत की ओर ध्यान दिलाया गया है। माँ द्वारा अपना दूध पिलाने (स्तनपान कराने), पोषण, घर में होने वाले धुएँ और धूल-धक्कड़ से होने वाला प्रदूषण, विरासत में मिलने वाली धूम्रपान की आदत और प्रतिरक्षण इत्यादि कुछ महत्वपूर्ण कारण हैं जिनमें आवश्यक परिवर्तन लाकर स्थिति में सुधार लाने के लिए प्रस्तुत लेख में जोर दिया गया है। प्रस्तुत अध्ययन में एक प्रभावशील प्रतिबन्धक रणनीति पर भी प्रकाश डाला गया है।

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SIMPLIFIED CATEGORIES OF ACUTE RESPIRATORY DISEASE



*In this instance, referral for medical care is desirable.

SOCIO-CULTURAL ANALYSIS OF THE CASES OF REVERSAL OF FEMALE STERILISATION: A RETROSPECTIVE STUDY

Shail Dubey* and Shri Kant Singh**

ABSTRACT

As the number of female sterilization continues to grow, side by side the need for reversal of operation is also growing. This paper throws light on the socio-cultural, economic and other characteristics of people who seek reversal of the female sterilization. Besides, the factors influencing the reversal of sterilization have also been analyzed. Findings revealed that the middle class urban couples were in preponderance in this series. While, loss of children due to high infant mortality rate, particularly, male ones, were the most important deciding factors behind reversal of the female sterilization.

As early as 1981, the late-Mrs. Indira Gandhi called for re-invigorating India's family planning programme by saying "The time has come for us, while in a state of shock, to revamp and revitalize our family planning programme, to re-examine existing schemes for information, communication and motivation" (Gandhi, 1981)'.

A large number of medical options are now available for reducing the birth rate. Though, many of these methods are being popularized through the family planning programme for limiting the family size to two or three children, Government agencies are given maximum emphasis on sterilization operations. Realization of the target, set for sterilization has now become the sole concern of the Government in its efforts towards controlling the population growth rate.

However, as the number of female sterilization continues to grow, the need for reversal of operation is also growing. It is estimated that one to two per thousand sterilization may require reversal of the procedure (Population Report, 1980)². In Western countries, reversal of tubal sterilization is necessitated mostly owing to changed circumstances such as divorce and change of mind for psychological factor. While, in India, it is needed mostly to compensate for the loss of children, particularly male ones. The demand for sterilization is increasing among younger women and if this important welfare programme is backed by availability of centers, providing reversal of surgical sterilization, it will have great impact on increase in sterilization and consequently on population control..

In this paper, an attempt has been made to study the socio-cultural characteristics of the reversed sterilization cases as well as focused attention on the factors influencing the reversal of female sterilization.

*Professor. Department of Obstetrics and Gynecology, Centre of Post Partum Programme Institute of Medical Sciences. Banaras Hindu University (B.H.U.), Varanasi-221 005.

**Post Doctoral Research Fellow, Department of Statistics. Faculty of Science, Banaras Hindu University Varanasi-221 005.

MATERIALS AND METHOD

The study is based on the reversal of female sterilization carried out at the Post-partum Centre of the Institute of Medical Sciences, Banaras Hindu University. All the details were recorded from the case sheets of the patients who underwent tubal surgery for reversal of sterilization between 1976 to 1990. The follow up details were collected from the register maintained for the purpose.

The cases were divided into two broad groups. Group I consisted of patients who were considered the most suitable for reversal and Group II were those patients who were relatively less suitable from the success point of view. The important points for the consideration of groups included age, method of sterilization (Laparoscope or laparotomy), lapse of time between sterilization and reversal, history of post operative period and investigation reports of the fertility tests of the couple. Besides all these factors, the length of remaining tube was the most important consideration. This was determined by Hysteron salpingography and diagnostic laparoscope prior to the surgery. The cases whose available tubal length was less than 4 cm after reconstruction were included in category II.

ANALYSIS AND DISCUSSION

It would be worthwhile to mention that the knowledge and adoption of various methods of contraception were highly affected by socio-economic and cultural development of couples. Consequently, the reversal of sterilization was also influenced by the same though it was not the only factor for existing variation. The per cent distribution of reversal according to various socio-economic characteristics has been presented in Table 1. Out of total 31 reverse sterilized cases about 22.6 per cent were considered less suitable after a vigorous screening.

When these cases were analyzed according to the present age of females at the time of reversal, maximum about 42 per cent belonged to the age-group 30-35 years followed by about 37 per cent in the age group 25-30 years. While, in case of group II, more than half (about 57 per cent) belonged to the age group 30-35 years. Further, by applying appropriate statistical test, it was found that no association exists between different groups of cases and age-group of female at the time of reversal ($\chi^2=0.6$ at 1 degree of freedom).

The educational profile indicates that majority were illiterate, just literate or high school. This implies that majority of the cohort belonged to lower strata in the educational stratification. It may be due to the fact that higher educational standard perhaps hampers out desire of more children. It revealed a direct relationship between women's education and her parity as well as size of the family. It may be mentioned here that occupation is the best means to understand the socio-cultural status of a person in a society. In this regard, it was observed that majority of cases were of housewives followed by unskilled workers. Only a small fraction (about 4.2 per cent) belonged to professional category.

Further, these cases were analyzed according to their residential status, where more than two third cases belonged to urban areas. It may be perhaps due to lack of

TABLE 1
SOCIO-CULTURAL PROFILES OF REVERSE STERILISED CASES

Characteristics	Per cent distribution in two groups		Chi-square X	Degree of freedom d.f
	Group I	Group II		
Age Group (in years)				
25-30	37.5 (9)	28.7 (2)	0.63	1
30-35	41.7(10)	57.4 (4)		
35-40	20.8 (5)	13.9 (1)		
Education				
Illiterate	37.5 (9)	42.8(3)	0.07	1
Literate	33.3 (8)	26.6(2)		
High School	16.6(4)	26.6(2)		
Intermediate	4.2 (1)	0.0(0)		
Graduation and above	4.2 (1)	0.0(0)		
Professional	4.2 (1)	0.0 (0)		
Occupation				
Housewife	43.3 (20)	85.7(6)	0.07	1
Unskilled	12.5 (3)	14.3(1)		
Worker	4.2 (1)	0.0 (0)		
Professional				
Residential Status				
Urban	66.6(16)	71.4(5)	0.07	1
Rural	33.4 (8)	28.6 (2)		
Economic Status				
Well to do (Rs 4000 and above) per month	12.5(3)	14.3(1)	1.88	2
Middle (Rs 1000-3999)	45.8(11)	71.4(5)		
Poor (Below Rs 1000)	41.7(10)	14.3(1)		

The bracketed figures show the number of observations

knowledge and availability of this service in rural folks. A CHI-square test indicated that the grouping of reverse sterilised cases was independent of their residential status. Besides, these were analysed according to their economic status too, where economic status groups have been considered according to monthly income of the patients/spouses and were distributed into three groups. The table shows that most of the cases belonged to middle economic status group, though there were considerable number of observations in well to do and poor economic status groups also. An insignificant value of CHI-square test statistic at 5 per cent probability level indicated that the selection of reverse-sterilised cases into two groups was independent of economic status also ($X^2 = 1.88$ at 2 degrees of freedom).

Citation of the most common factors influencing reversal of sterilisation were difficult because it may vary according to region and environment in different phases of development. Of course, desire for more children, usually without further explanation, was the most common reason for reversal of sterilisation, while, in Western countries it may be due to the desire to have children with a new husband.

In developing countries, the higher infant mortality rate was also a major reason behind seeking reversal. Having a close-look at these factors along with other number of factors influencing reversal of sterilization, e.g. divorce and/or remarriage, death of male children after sterilization, illness of surviving children, etc Distribution of deciding factors for reversal of sterilization has been given in Table 2 by considering it into three parts; time interval between sterilization and reversal, sex wise distribution of surviving children and other reasons.

The table reveals that among group I, about 60 per cent had reversed within three years of sterilization, while, only 4.2 per cent had the procedure after the interval of 5 years or more on the other hand, a reverse pattern is observed in group II, where maximum (about 57 per cent) have required reversal after five or more years of sterilization. The average duration of reversal in two groups of cases was 33.5 and 57.4 months respectively, while taking all cases together it was found to be 39 months

Preference for a male child has been deep-rooted in the Indian culture and that it was one of the main hindrances to accept small family norms. Besides, it is

TABLE 2

PER CENT DISTRIBUTION OF INFLUENCING FACTORS OF REVERSE-STERILISATION IN TWO GROUPS OF CASES

Factors influencing reversal	Group 1	Group II	Chi-square	Degree of freedom d.f.
Time interval between sterilisation and reversal (in months)				
1-24	29.2 (7)	0.0 (0)		
24-36	33.3 (8)	0.0 (0)		
36-48	20.8 (5)	28.6 (2)		
48-60	12.5 (3)	14.3 (1)		
60 and above	4.2 (t)	57.1 (4)		
Sexwise distribution of living children				
M F				
0 0	29.2 (7)	0.0 (0)		
0 1	25.0 (6)	0.0 (0)		
1 1	4.1 (1)	28.6 (2)		
0 2	29.2 (7)	42.8 (3)		
0 3	12.5 (3)	28.6 (2)		
Other factors				
Death of all children or	29.2 (7)	14.3 (1)	366	3
Illness of surviving	58.5 (14)	42.8 (3)		
children or death of only son	4.1 (1)	28.6 (2)		
Family pressure	8.2 (2)	14.3 (1)		
Couple got divorced or remarriage				

The bracketed figures represent the number of observations.

Important to point out that in India, customs and traditions require a son for various reasons'. As result, son and daughter do not get equal importance. Keeping this aspect into account the reverse sterilized cases have been analyzed according to distribution of surviving children sex wise. The table revealed that in group I, there were about 4 per cent cases having one son. While, the corresponding percentages for 1, 2 and 3 daughters were 25.0, 29.2 and 12.5 respectively. Whereas, in group II about 70 per cent cases were having daughters only. Thus, the analysis showed that the reversal of sterilization was required not only on account of number of surviving children but on the number of surviving sons. Consequently, having a close look at other factors affecting reversal of sterilization, it was observed that 'death of only son' was the most important factor behind reversal of sterilization among both the groups. While, separation from husband and remarriage caused the minimum about 8.2 and 14.3 per cent in two groups respectively. Further, a CHI-square test statistics indicated that the factors affecting reversal of sterilization and grouping of the cases were independent ($X^2 = 3.7$ at 3 degrees of freedom).

RESULTS AND CONCLUSIONS

The study concludes that the socio-economic status has a great role in decision of reversal of sterilization. Illiteracy, poverty and unemployment have influence on decision of reversibility. These categories of females were highly porous, but have high infant mortality and have greater desire for a son. The residential status of the said category reflects the knowledge of urban population about the availability of reversal service. The rural women were ignorant and perhaps could not easily approach the service centre.

The paper revealed that the average duration between sterilization and reversal has been less than 5 years in majority of cases. The sex of lost child has the biggest influence. All women emphasized on the male issue. There was not even a single case where the couple wanted reversal for the sake of one more daughter. Death of only daughter was never a consideration for reversal but death of a son was considered to be vital.

सारांश

महिलाओं द्वारा नसबन्दी कराए जाने के मामलों की संख्या में वृद्धि के साथ-साथ नसबन्दी खुलवाए जाने की आवश्यकता भी जोर पकड़ती जा रही है। महिलाओं द्वारा नसबन्दी खुलवाए जाने के लिए जरूरतमन्दों द्वारा ऐसा करने की सामाजिक-सांस्कृतिक, आर्थिक एवं अन्य विशेषताओं(लक्षणों) पर प्रस्तुत लेख में प्रकाश डाला गया है। इसके अतिरिक्त, नसबन्दी खुलवाए जाने के बारे में प्रभाव डालने के लिए उत्तरदायी कारकों का भी विश्लेषण प्रस्तुत लेख में किया गया है।

अध्ययन में किए गए विश्लेषण से प्राप्त निष्कर्षों से पता चलता है कि मध्य-वर्गी शहरी दम्पती इस संदर्भ में सबसे आगे थीं। उच्च बाल मृत्युदर के कारण बच्चों विशेषकर लड़कों का मर जाना महिलाओं द्वारा नसबंदी खुलवाए जाने के पीछे अत्यधिक महत्वपूर्ण निर्णायक कारक रहा।

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A STUDY OF WATER STORAGE PRACTICES IN A RESIDENTIAL AREA OF KANPUR

Manju Mehta* and Asha V. Dass**

ABSTRACT

The study was conducted in a residential area of Kan pur city. There was no regular water supply. Therefore, residents have to store the water for various purposes and one of the main purposes was drinking/cooking. Different types of materials, like earthenware, brass, copper, stainless steel, plastic, glass and galvanized iron were used for storing drinking water. Most commonly used materials were earthenware, glass and plastic. There was also variation in the material used according to the season. Particular material was used for storing drinking water because of some specific reasons. The respondents were using the materials which were easy to clean, maintain, easy to handle, cheap and was available to them free of cost/gift.

Water meant for human consumption must be free from chemical substances and micro-organisms which might be dangerous to the health of living beings. Drinking water should over and above, being safe and pure, should be pleasant to drink, it should be cool, clear, colorless and of agreeable to taste and smell. The most important reason for man's concern with the quality of water is the protection of public health from water borne diseases. Many dreadful diseases and illnesses have been associated with the water directly or indirectly. Therefore, it becomes important that water should be disinfected and properly stored. Regarding storage vessels, it is a common belief in our country that some of the metals like copper, silver act as the disinfectant purify water and also make it safer to drink. In the *Onsruta Sanghita* a collection of medical lore in Sanskrit appears this instruction, "it is good to keep the water in copper vessel, expose it to sunlight and filter it through charcoal". In the *Neghrund Bhasan* a collection of medical maxims from *Ayurvedas* in the Chapter on "Water", directions have been given to treat foul water by boiling, exposing to sunlight and by dipping seven times a piece of hot copper and then filter it and cool it in an earthen vessel¹. Keeping this in mind, that quality of water improves with the storage in different kinds of metal vessels which act as the disinfectant the present study, was aimed to determine the various materials used for storing drinking water in different seasons and the reason for using that particular material.

METHODOLOGY

The study was conducted in a residential area of Indian Institute of Technology, Kanpur, 100 housewives were selected from the residential area through random

*Research Associate, Deptt. of FRM. College of Home Science, Haryana Agricultural University, Hisar.

**Lecturer, Deptt. of Home Management, Faculty of Home Science, MSU Baroda, Gujarat.

sampling techniques. The data were collected through interview with the help of a properly developed tool, *i.e.*, questionnaire and was analyzed using a appropriate statistical technique.

RESULTS AND DISCUSSION

SOCIO-ECONOMIC Profile: The results pertaining to the socio-economic profile of the respondents have been presented in Table 1. It was found that most of the respondents were of Hindu religion (81%). Little less than one half were in the age group of 31-40 years (47%), having high level of education and belonging to the family size of 5-6 members (51 %). Majority had monthly income from all the sources between Rs.1501 -2000 (54%) and more than fifty per cent respondents' husbands' occupation was employed as technical staff. Regarding employment of the home-maker more than three-fourth (80%) were the housewives and among employed sixty per cent were teachers.

Water Storage Practices: The source of drinking water for the respondents was tube well. Water was supplied for a limited period and respondents were getting water supply for one to three hours during morning, noon, evening and night as has been shown in Table 2.

The supply of water was for limited hours. Therefore, all of the respondents were storing the water for drinking purpose.

Materials Used for Storing Drinking Water Depending on the season respondents stored the drinking water-in the vessels of different materials.

It was found out that during summer season little less two-third of the respondents (67%) were using earthenware vessels followed by plastic bucket (37%), brass and stainless steel (17% each). No one used copper vessel for storing drinking water. In monsoon and winter season, plastic buckets were used by a large number of respondents followed by stainless steel. Refrigerator was mostly used in summer season for storing drinking water and majority of them used glass bottles (46.87%) and plastic bottles (45.31%). Candle filters with stainless steel (77.77%) and galvanized iron bucket (17%) were used throughout the year as has been presented in Table 3.

Similarly, other scholars have mentioned in their reports that mud pots were used by the majority (68.75%) of respondents, followed by the use of steel utensils by 40 per cent respondents². The least used material for storing water was aluminum followed by plastic as majority of the respondent's never stored water in these utensils (81.25 and 61.25 per cent respectively).

Reason for the Use of Different Material for Water Storage: Use of material for storage of drinking water because of various reasons has been given in Table 4. Earthenware was used by most (67%) of the respondents because it maintained proper temperature for drinking (94.02%) about half of the respondents were using it as it was easy to replace and also cheap in cost (44.77%). Brass vessels were used

TABLE 1
SOCIO-ECONOMIC PROFILE OF THE RESPONDENTS (N = 100)

S. No.	Characteristics	Frequency/ Percentage
1	Age of the respondents	
	21 -30 years	30
	31 -40 years	47
	41 -50 years	21
	51 -60 years	2
2.	Religion of respondents	
	Hindu	81
	Muslim	6
	Sikh	6
	Christian	7
3.	Education of the respondents	
	High level	44
	Middle level	37
	Low level	19
4.	Family size (number of family members)	
	1-2	3
	3-4	34
	5-6	51
	7-8	11
	9-10	1
5.	Monthly income from all sources	
	Rs.1001 -1500	20
	Rs.1501-2000	54
	Rs.2001-2500	16
	Rs.2501-3000	10
6.	Occupation of husband	
	Technical staff	56
	Office staff	25
	Academic staff	17
7.	Employment of home-maker	
	Teacher	12
	Office staff	5
	Medical staff	2
	Technical staff	2
	Unemployed	80

Low level of education: Up to Metric

Middle level of education: High school to below graduation and undergraduate diploma

High level of education: Graduation and above

TABLE 2
DISTRIBUTION OF RESPONDENTS ACCORDING TO DURATION OF WATER SUPPLY PER DAY
(N = 100)

Duration	Supply of water			Total
	One hour	Two hours	Three hours	
Morning	2	5	-	7
Noon	27	9	19	55
Evening	11	-	8	19
Night	-	1	18	19

TABLE 3
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE MATERIAL USED FOR STORING
DRINKING WATER

S. No.	Material	Summer	Monsoon	Winter
1	Earthenware	67	21	15
2	Brass	17	14	19
3	Copper	-	4	4
4.	Stainless steel	17	19	21
5.	Refrigerator storage	64	5	4
	- Glass bottle	30(46.87)	1 (20)	-
	- Plastic bottle	29 (45.31)	3(60)	3(75)
	- Stainless steel bottle	5(7.81)	1 (20)	1 (25)
6.	Candle Filter	9	9	9
	- Stainless steel	7 (77.77)	7(77.77)	7 (77.77)
	- Plastic	2 (22.22)	2 (22.22)	2 (22.22)
7.	Galvanised iron bucket	17	17	17
8.	Plastic bucket	37	43	47

Figures in parentheses indicate percentage.

TABLE 4
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE REASON
FOR THE USE OF PARTICULAR
MATERIAL VESSELS

S. No.	Reason	Material							
		Earthenware N= 57	Brass N=19	Copper N=4	Stainless steel N=21	Glass N =30	Plastic N=66	Water filter N = 9	Galvanised N = 17
1.	Because of tradition	1 (1.49)	7 (36.84)	-	4 (19.04)	-	-	-	2 (11.16)
2.	No other substitute was available	1 (1.49)	5(26.31)	-	2 (9.52)	-	3(4.41)	-	2 (11.76)
3.	Purification of water	9 (13.43)	-	1 (25)	-	-	-	6 (66.66)	-
4.	Safe for health	1 (1.49)	-	2(50)	4 (19.04)	-	4 (5.88)	8 (88.88)	-
5.	Got as present	-	6 (31.57)	1 (25)	-	-	-	-	-
6.	Cheap	30 (44.77)	-	-	1 (4.76)	12 (40)	34 (50)	-	-
7.	Easy to clean	22 (32.83)	-	-	15 (71.42)	23 (76.66)	43 (63.23)	-	-
8.	Easy to maintain	21 (31.34)	1 (5.26)	-	9 (42.85)	3(10)	21 (24.63)	-	1 (5.88)
9.	Easy to handle	-	-	-	2 (9.52)	-	10(10.49)	-	-
10.	Unbreakable	-	3 (75.28)	-	3 (14.28)	-	4 (5.88)	-	9 (52.94)
11.	Easy to replace	30 (44.77)	-	-	-	7 (23.33)	2 (20.94)	-	-
12.	Maintenance of proper temperature for drinking water	63 (94.02)	-	-	-	-	-	-	-

Figures in parentheses indicate percentage

by fewer (19%) respondents and reason for use was, because of the tradition (36.84%), got it as a present in the marriage (31.57%) and because of no other substitute (26.32%). Copper was used only by 40 per cent of respondents, reason given for use was, they considered it safer for the health (50%) and also believed that it purifies the water, and because they got present in the marriage (25% each). Reason for using the stainless steel was simply because it was easy to clean (71.42%) and easy to maintain and handle (42.85%). Glass was described as easy to clean by majority of the respondents (76.66%) and was free of cost (12%). Plastic was used by majority of the respondents (68%) because it was easy to clean (62.23%), cheaper (50%) and also easy to maintain (24.63%). Water filter was used by less than one-tenth of the respondents (9%) because they considered it safe for health (88.88%) and a material to purify the water (66.66%). Galvanized iron was the material used by 17 per cent of the respondents because of the reasons that it was unbreakable (52.94%) and was cheaper (29.41 %).

On the whole, it can be concluded that most of the respondents were using the material which was easy to clean and maintain, easy to handle, cheap and also the specific material which was available to them as a gift. Fewer were using the stainless steel and water filters because they thought it as safe for health and provides pure drinking water.

It may be summarized that earthenware was the best to be used in the summer because it maintained the desired temperature for the season where as plastic was used in the winter because there was no effect of the temperature on it, easy to clean, maintain and handle.

सारांश

प्रस्तुत अध्ययन कानपुर शहर के एक आवासीय क्षेत्र में किया गया । उस क्षेत्र में जल-आपूर्ति की कोई नियमित व्यवस्था नहीं थी। अतः, उस क्षेत्र के निवासियों को विभिन्न कार्यों, उनमें से भी खासतौर पर, पीने और खाना बनाने के मुख्य उद्देश्य से पानी भर कर रखना पड़ता था। पीने के लिए पानी भर कर रखने के लिए मिट्टी, पीतल, तांबे, स्टेनलैस स्टील, प्लास्टिक, शीशे और जस्ता चढ़े (गैल्वेनाइज्ड) लोहे जैसी धातुओं से बने बर्तन इस्तेमाल में लाये जाते थे। मौसम के अनुसार अनुकूल धातु के बर्तनों के प्रयोग में भिन्नता देखने में आई। पीने के लिए पानी भर कर रखने के लिए कुछ विशेष कारकों से खास धातु के बर्तन प्रयोग में लाए जाते थे। सरलतापूर्वक साफ किए जा सकने वाली, रख-रखाव में आसानी

वाली, आसानी से इस्तेमाल किए जा सकने वाली, सस्ती और मुफ्त में या उपहार में मिलने वाली धातु के बर्तनों का प्रयोग अक्सर प्रयोगकर्ताओं द्वारा किया जाता रहा है।

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NEONATAL MORTALITY RATE, FERTILITY AND THEIR RELATIONSHIP IN TWENTY COUNTIES OF SOUTH-WEST CHINA

Kaining Zhang* and Dellia Davin**

ABSTRACT

This paper looks at the neonatal mortality rate (NMR) and fertility in twenty counties in SOUTH-WEST China and examines the relationship between them. It finds both NMR and fertility were higher than the national average in the counties surveyed, and there were significant regional differences. Neither association nor linear correlation was found between the NMR and fertility in the twenty counties. This absence is attributed to the fact that in these areas population growth has decreased mainly as a result of an ambitious family planning programme, and the NMR has declined gradually as a result of efforts to improve the primary health services and of socio-economic advance. The decrease of population growth and decline of the NMR were not necessarily associated.

The Neonatal Mortality Rate (NMR) is regarded as one of the most basic measures of well-being in society, and a sensitive indicator of the health^{2,3,4}. It is believed that there is certain interaction between a high NMR and high fertility in developing countries and areas. On the one hand, high fertility may be partly brought about by high child mortality. On the other, high fertility may in turn create conditions for a high NMR¹. However, the situation may be different in developing countries where family planning policies have been strictly implemented.

Since the late 1970s, an ambitious population plan, the chief element of which is the single-child family policy, has been introduced into China. The single-child family policy, as its name suggests demands that except in extraordinary circumstances, couples should have no more than one child.

Family planning achievements in China's cities have been impressive, but far greater difficulties have been met in implementing the population plan in the countryside^{5,6}. At present exceptions to the one child rule mean that many couples in the countryside were actually allowed to have a second child. Moreover, although they were very rarely "permitted" many higher-parity children were in fact born "outside the plan"⁶. One child-family regulations issued at provincial level generally provide for favorable treatment of ethnic minority couples who were allowed to have second and sometimes even third or more children under less restricted conditions than members of the majority Han people. Population policy has produced a decrease in the overall growth of population, but the concessions,

*Department of Health Statistics, Kunming Medical College, Kunming 650031, P.R. China. (Now a visiting scholar at the Dept. of East Asian Studies, University of Leeds, LS29JT U.K.).

**Department of East Asian Studies, University of Leeds, Leeds, LS29JT, U.K.

together with previously existing socio-economic factors, mean that the decrease has been more marked for some ethnic groups than for others.

During the last few decades, despite many difficulties and set-backs. China has made immense progress in health development. With strong support from the World Health Organization and other United Nations agencies, China has developed its immunization programme rapidly. The incidences of poliomyelitis, diphtheria, measles and whooping cough have been declined markedly⁷. As a result, NMR in China's rural areas has been lowered but there still exists significant difference in the patterns of progress in different regions and for different ethnic groups.

To examine the relationship between the NMR and fertility in the more remote of China's rural areas, twenty counties of Yunnan, a South-western province with a large number of ethnic groups in its population, have been selected to conduct the present case study.

BACKGROUND

Yunnan is in the South-west of China. According to the national population census of 1990, this province had a population of 36,972,610 people composed of 26 ethnic groups of which 16 were only found in Yunnan. Of the provincial population, 33.39 per cent were ethnic minorities⁸. Historically, Yunnan was one of the most backward in China, and this remote province was underdeveloped according to various indicators, when compared with most of other regions in China. For instance, Yunnan's gross industrial and agricultural product in 1989 was only 45,590,000,000 Yuan (about 9.118,000,000 US dollars), ranking 22nd among the 30 provinces, municipalities and autonomous regions. The gross product per capita was 1,264 Yuan (about 252.8 US dollars), giving a ranking of 28th, higher only than that of Guizhou Province with 1065 Yuan and Xizang (Tibet) with 768 Yuan⁹. The number of doctors and nurses per thousand of population is lower than in most other parts in China.

In the past, both NMR and fertility in Yunnan were very high. It was believed that high fertility in this area was partly caused by high child mortality'. Since the late 1970s in Yunnan, as elsewhere in China, the one-child family policy has been implemented but the concessions for the ethnic minorities have meant that although the overall growth of population has been reduced, the degree of decrease differs between various ethnic groups. According to the national population census of 1990. from 1982 to 1990 in Yunnan, the Han population increased 10.77 per cent. By contrast, the ethnic minorities had a 19.62 per cent increase⁸. As migration to this area has been limited, these increases are mainly explained through birth and death rates. Meanwhile, as a result of the attempts to improve the primary health care in China's rural areas, and the strategies of WHO and UNICEF for Primary Health Care and for Health for All by the Year 2000, the NMR in the countryside of Yunnan has been gradually reduced.

In 1989, China began a five-year cooperation programme with the United Nations Fund for Population Activities, WHO and UNICEF, aimed at improving maternity and child health in the rural areas of China. Twenty counties in Yunnan

were involved. They were selected from the most remote or most underdeveloped counties, or from ethnic minority autonomous counties (certain counties with high proportion of ethnic minorities in their populations were given an unusual degree of autonomy from the central and provincial government and thus have autonomous in their titles). Some fulfilled two or more of these criteria. To provide a general picture of the socio-economic and health care context, a ten-week survey was conducted from May to July 1990. Information was collected for the whole of 1989 about population, socio-economic factors and public health services by 3,092 surveyors, who had been trained systematically under the Programme Direction Group in Yunnan. The total population in the twenty counties was 7,057,937 of whom 21.88 per cent or 1,544,946 persons were women aged 14 to 49. Of the women in this fertile age group, 73.90 per cent were married. Birth data were collected from the whole population while the NMR was studied in a 1 :3 sample taken randomly from the twenty counties. The quality control sample checking indicated that in the fertility survey the margin of error was 0.11 per cent while that in the NMR survey was 0.41 per cent.

RESULTS

NMR: Among the 48,218 neonates, infants aged under 28 days, 2,381 died making up 68.11 per cent of the deaths aged under one year. The NMR was 49.38 per thousand. Of the 2,381 deaths of neonates, 24.11 per cent were attributed to pneumonia, and 13.78 per cent to tetanus. In some counties diarrhea was still significant as a cause of mortality of the neonates. Most such deaths can be avoided once effective health and education services are in place and the NMR in these rural areas will then decline steeply. The NMRs in each of the twenty counties have been shown in Table 1.

TABLE 1
NMRs IN EACH OF THE TWENTY COUNTIES IN YUNNAN (1989)

Rank	County	NMR (per thousand)	Rank	County	NMR (per thousand)
1	Xinping'	83.72	11	Xindian'	46 22
2	Lancang*	64.26	12	Guangnan	45 47
3	Luxi	63.44	13	Malong	45 37
4	Jinggu*	63.11	14	Weishan"	43 99
5	Canning	55.53	15	Xiangyun	43 51
6	Luquan'	53.52	16	Jiansnui	43 10
7	Yuanmou	52 38	17	Fenggmng	40 03
8	Yuanjiang*	49 10	18	Midu	39 94
9	Mouding	48 23	19	Shiping	39 36
10	Yaoan	46.36	20	Zhenxiong	33 41

*ethnic autonomous county

Fertility: The fertility rate of women aged 14 to 49 in the twenty counties was 87.12 per thousand while the fertility rate of the married women in the same age group was 117.9 per thousand. The fertility rates of women aged 14 to 49 in each of the twenty counties have been listed in Table 2 while the fertility rates of married women in same age group have been shown in Table 3.

TABLE 2
FERTILITY OF WOMEN AGED 14 TO 49 IN THE TWENTY COUNTIES (1989)

Rank	County	Fertility (Per thousand)	Rank	County	Fertility (Per thousand)
1	Xinping*	131.7	11	Xiangyun	81.
2	Luxi	118.3	12	Jianshui	80.
3	Guangnan	106.0	13	Yaoan	78.
4	Yuanmou	104.5	14	Yuanjiang"	78.
5	Lancang'	96.1	15	Weishan*	77.
6	Sniping	89.9	16	Midu	75.9
7	Zhenxiong	88.3	17	Malong	74.
8	Fengging	85.1	18	Mouding	74.1
9	Xindian*	84.0	19	Luquan'	71.1
10	Jinggu*	83.3	20	Canning	67.6

*Ethnic autonomous county

TABLE 3
FERTILITY OF MARRIED WOMEN AGED 14 TO 49 IN TWENTY COUNTIES (1989)

Rank	County	Fertility (Per thousand)	Rank	County	Fertility (Per thousand)
1	Luxi	160.6	11	Zhenxiong	114.3
2	Xinping'	137.3	12	Fengging	113.7
3	Guangnan	134.2	13	Jianshui	113.1
4	Shiping	129.7	14	Midu	111.5
5	Xiangyun	121.0	15	Yuanjiang"	109.0
6	Xindian*	118.7	16	Malong	108.5
7	Jinggu*	117.0	17	Yaoan	102.5
8	Weishan*	116.8	18	Mouding	101.6
9	Lancang*	115.4	19	Luquan*	101.5
10	Yuanmou	115.3	20	Canning	101.4

*Ethnic autonomous county

The fertility rate of women in the fertile age group ranged from 67.6 (Canning) to 131.7 (Xinping) per thousand. Fertility in four of the twenty counties was slightly lower than the average fertility for China as a whole in 1986, which were 75.84 per thousand¹⁰. On the other hand, the fertility rates of married women in the age group, ranging from 101.4 (Canning) to 160.6 (Luxi) were all much higher than the national average in 1986, which was 84.66 per thousand¹⁰.

The fertility rate is affected by the age structure and age at marriage of the female population, is a well known fact. In China most women marry after 18 years of age (indeed the minimum legal age at which a women may marry has been 20 since 1981), and it is uncommon for an unmarried woman to have a baby. Therefore, in China the fertility rate of married women aged 14 to 49 may be a more significant indicator of fertility trends than rate of all women in this age group. According to this measure, marital fertility in all the twenty counties was much higher than the average in China.

Relationship Between the NMR and Fertility

Having established that marital fertility is the relevant measure, it will be now used to examine the relationship between the NMR and fertility.

Contingency Coefficient Analysis: The median (middle score) indicates the central tendency of the data". The median of the NMRs in the twenty counties equals 46.29 per thousand and that of fertility rates - 114.8 per thousand. All these counties were classified into four groups by comparing individual NMRs and fertility rates with their medians. The results have been depicted in Table 4.

TABLE 4
CLASSIFICATION OF THE TWENTY COUNTIES ACCORDING TO THE NMR AND
FERTILITY RATE OF MARRIED WOMEN AGED 14 TO 49

NMR	Fertility Rate of Married Women Aged 14 to 49	
	< Median	> Median
< Median	[Group (a)] Jianshui, Zhenxiong Malong, Fengging Midu	[Group (b)] Xindian*. Weishan* Xiangyun, Sniping Guangnan
	[Group (c)] Yuanjiang*. Luquan" Yaoan, Moudmg Canning	[Group (d)] Xinping*. Lancang* Jinggu*. Yuanmou Luxi

"Ethnic autonomous county

The contingency coefficient (c) has been widely used to indicate the association between two variables within tables like Table 4". The contingency coefficient of table 4 turned out to equal 0.2229 and the testing of c suggests that no

significant association existed between the NMR and fertility in the twenty counties. (For calculation of c , see Appendix A.)

Linear Correlation Analysis: Linear correlation analysis was employed to examine the linear correlation between the NMR and fertility". The product moment linear correlation coefficient (r) between the NMR and fertility of married women in the fertile age group equals 0.3634 and the significant testing of r indicated that no significant linear correlation was found between the NMR and fertility in Yunnan. (For calculation of r , see Appendix B).

DISCUSSION

NMR: As has been shown in Table 1, the NMRs in the twenty counties were rather high ranging from 33.41 (Zhenxiong) to 83.72 (Xinping) per thousand. By contrast, the NMR in Shanghai County, one of the most advanced rural area in China, was reported 8.50 per thousand in 1985². The child mortality inequities' existing between urban and rural settlements in developing countries has been reported and discussed a great deal¹³. The present study suggests that the inequity even exists between relatively advanced and underdeveloped counties in rural areas of developing countries. As has been pointed out already, Yunnan was underdeveloped even by Chinese standards. In addition, all the twenty counties selected for this study were particularly underdeveloped or remote, or were ethnic autonomous counties. Their infrastructure, medical care and health services were being developed. Moreover, a large proportion of the population in these areas was still illiterate or semi-illiterate. They had limited knowledge of how to care for infant scientifically, and it was for that reason that NMR in these areas was so high. Health education has played an important role in developed countries". It has been introduced into many developing countries including China, and significant achievements have been made⁵. Yet in Yunnan, women's health education was just beginning. It was expected that the health status of women and children in this remote province would be promoted with the development of the health education.

Although the NMR was at high level in all the twenty counties, there were significant regional differences. The highest rate, that of in Xinping County (83.72) was nearly as three times that of the lowest, that of Zhenxiong (33.41). Perhaps, it may be worth pointing out that of the four counties with the highest NMR, three were ethnic autonomous and five out of the seven ethnic autonomous counties had relatively high NMR ($NMR > \text{median}$). Whether there were certain cultural or nutritional factors, besides the socio-economic and health service level, which affect neonate mortality, still remains unknown. It is interesting to note that of the two ethnic autonomous counties with relatively low NMR, Weishan was mainly inhabited by the Bei and the Hui ethnic groups, while in Xindian the Hui were in majority. Both the Bei and the Hui groups were relatively developed socio-economic ally by the standards of Yunnan province and they also enjoyed a relatively advanced health service. For instance the survey revealed that Weishan and Xindian had the third and the fifth, the highest proportion of pregnant women giving birth in hospital rather than at home.

Fertility: The fertility rates of married women in the fertile age group in the twenty counties ranged from 101.4 (Canning) to 160.6 (Luxi), and these were all much higher than the national average in 1986, which was 84.66 per thousand. This may be due to the result of the concessions by which the ethnic minorities were allowed to have more children. According to the 1990 population census, from 1982 to 1990, the Han population increased nationally by 10.80 per cent. By contrast, the ethnic minorities showed a 35.52 per cent increase¹⁸. The fertility of the twenty counties, with a large proportion of ethnic minority population, should be so much higher than the average for China as a whole.

Although fertility was high in each of the twenty counties, there were still considerable differences to explain. As already mentioned, the ethnic minorities were favored under the population policies. From Table 4, it may be noticed that five out of the seven ethnic autonomous counties had, as might be expected, relatively higher fertility (fertility median). If the twenty counties in the survey were divided into the ten with relatively higher fertility (fertility median) and the ten with relatively lower fertility (fertility median), another indicator of the upward pressure on fertility exerted by the national minorities population may be gained. The higher fertility group had a minorities to the Han ratio of 81.25:100. By contrast, in the lower fertility group the ratio of minority people to the Han was only 27.75:100.

The less expected result was that two ethnic autonomous counties had relatively lower fertility (fertility median). Yuanjiang, as has been shown in Table 3, which had the sixth lowest fertility of the twenty counties was mainly inhabited by the Hali ethnic minority while Luquan, with the second lowest fertility of the twenty counties was inhabited mainly by the Yi and the Miao ethnic groups. According to the national population census of 1990, the Hali minority had the sixth lowest population growth of the 25 ethnic minorities in Yunnan between 1982 and 1990⁸. The reasons for this relatively low fertility remained unknown. The causes of Luquan county's low ranking appeared to be different. The relatively low fertility of the Miao minority, the eighth lowest of the 25 ethnic minorities living in Yunnan was not the main cause of Luquan's low ranking in the fertility table. In fact, Luquan had rather high fertility just a few years ago, and its rapid population growth was thought to be one of the main reasons for this county's poverty. Luquan was identified as one of the 15 most underdeveloped counties of the 126 in Yunnan. However, since the early 1980s China has implemented a programme to help the poor in the most underdeveloped regions and counties. In Luquan, this programme has involved promoting family planning as well as economic and social development". As a result, fertility has fallen considerably. Data from the 1990 census show that between 1982 and 1990, the population of Luquan increased only 8.32 per cent. By contrast, in Yunnan province as a whole, the ethnic minority population increased by 19.62 per cent and the total population by 13.57 per cent⁶. Today, Luquan has been cited as an example of a rural area mainly inhabited by the ethnic minorities which has reduced its fertility successfully.

Relationship Between the NMR and Fertility

As already been reported in the present study, neither association or linear correlation was found between the NMR and fertility in the twenty counties This

finding seems strange, for it has been a widespread assumption that in the developing countries and areas there has been a definite interaction between a high NMR and a high fertility. Nevertheless, if the family planning campaign and child health programme in rural China were taken into account, the finding may be natural enough. Since the late 1970s, a fairly efficient family planning organization system has been established in China, which was extended even to remote and rural areas. Nationally organized, its existence was not dependent on the local socio-economic and health service level. Some studies suggest that today in some rural areas of China such as Yuanmou County, the only main factors affecting the population growth was the age structure of the women and the efficiency of the family planning system¹⁸. Certainly, the role of the village cadres was vital to the success or failure of the family planning programme⁶. Thus, fertility may differ from village to village, and from county to county, because of the different working efficiency of the cadres. Fertility change in Yunnan today has been ceased to be a "natural" process only affected by the socio-economic and health service level.

Meanwhile, in Yunnan, the achievements of the campaigns for the Primary Health Care and for Health Care for All by the Year 2000, have been remarkable. Techniques for the child, such as oral rehydration treatment (ORT) have saved many children thereby reducing the NMR dramatically. Nevertheless, significant differences still remain between different ethnic groups, and regions due to various historical and geographic factors. Moreover, measures designed to reduce neonate and infant mortality do not simultaneously change all the aspects of people's behavior life-style and living standards which may affect the fertility.

As has been shown in Table 4, the twenty counties were divided into four groups: (a) Counties with relatively low NMR and fertility; (b) Counties with relatively low NMR but relatively high fertility; (c) Counties with relatively high NMR but relatively low fertility; (d) Counties with relatively high NMR and fertility. Table 4 itself indicated that no association exists between the NMR and fertility in the twenty counties. Among the ten counties with relatively high NMR, half also had the relatively high fertility. Nevertheless, another five counties had the relatively low fertility. Moreover, among the ten counties with relatively high fertility, five also had a relatively high NMR, but another five had a relatively low NMR.

According to a widespread assumption that the reduction of neonate mortality was a necessary and sufficient condition of reducing fertility. Recently some experts have argued against this. For instance, Dr. Maurice King believes that association between declines in child death and birth rate is best explained in the response of both rates to other common factors. He points out: "The association between declines in child death and birth rate is complex. The view that, if the child death rate declines, the birth rate must decline also, and there is a causal relation between them, is untenable"⁹. Group (b) in the present study, counties with relatively low NMR but relatively high fertility, confirms that lowering the NMR in a developing area does not necessarily reduce fertility, if there has been a tradition of wanting a large family. Obviously population in such areas tends to grow rapidly and if it is desired to reverse this tendency the family planning should be promoted intensively.

The assumption that in developing countries neonate and infant mortality must be reduced before fertility can fall has been accepted widely. The evidence of group (c), counties with relatively high NMR but relatively low fertility, suggests that if the fertility is initially high, even before neonate and infant mortality have been reduced to a low level, family planning campaigns may obtain impressive achievements. Luquan county even supplies, an example of lowering fertility while neonate and infant mortality maintained at a relatively high level. Nevertheless, great effort was required to reduce the high neonate mortality in these counties.

Comparative Analysis of Some Counties under Certain Similar

Conditions: Yuanmou, Mouding and Yaoan comes under the Chuxiong area. They have a similar geographical and socio-economic background. Perhaps because of similarities of health services and socio-economic factors, the NMR in each of these three counties was higher than the median, ranking seventh, ninth and tenth among the twenty counties. As to the fertility, in mountain areas of Yuanmou, the rate of couples having more than two children was reported particularly high⁸. As a result, the fertility of this county was higher than the median, giving a ranking of the tenth among the twenty counties. By contrast, both Yaoan and Mouding were in the low fertility group, ranking the seventeenth and eighteenth as has been given in Table 1 and Table 3.

Both Jianshui and Shipping comes under the Honghe area. According to the survey the level of maternity and child health services in these two counties was almost the same. For example, the proportions of pregnant women delivered in hospital rather than at home in Jianshui and Shipping were 50.22 per cent and 63.53 per cent, the second and the first highest among the twenty counties. Doctors working in the rural areas of Jianshui and Shipping averaged 2.48 and 2.23 per village, giving the ranking of sixth and seventh among the twenty counties. It comes as no surprise that the NMRs of these two counties were very similar, 43.10 per thousand in Jianshui and 39.36 in Shipping. Yet, perhaps because the family planning system in Jianshui worked more effectively than that in Shipping fertility in Jianshui was only 113.1 per thousand, thirteenth among the twenty counties. By contrast, Shipping had a rather higher fertility (129.7 per thousand) ranking the fourth highest as has been shown in Table 1 and Table 3.

CONCLUSIONS

1. The NMR in the twenty counties was still rather high, although it was declining gradually. Many infectious diseases had ceased to be the major causes of neonate mortality, but pneumonia, tetanus and dysentery still posed a serious threat. Close attention should be paid for controlling these in order to reduce the NMR.
2. Among the twenty counties, there were significant regional differences in the NMRs. Whether there were certain cultural or nutritional factors, besides the socio-economic and health service level, which affect the neonate mortality remains uncertain.
3. In all of the twenty counties, the fertility rate of married women aged 14 to 49

was rather higher than the national average. This may be explained by the concessions allowed to ethnic minorities, and the large proportion of ethnic minority population in these counties, but also by the remoteness and backwardness of these counties.

4. There were considerable regional differences in fertility rates. It appears that these also reflected both concessions for the ethnic minorities under the population policies, and the regional differences in the efficiency of the family planning systems.

5. Neither association nor linear correlation was found between the NMR and fertility in the twenty counties. In these areas, population growth has decreased mainly as a result of the ambitious family planning programme, and the NMR has declined gradually as a result of both efforts to improve the primary health services, and socio-economic advance. The decrease of population growth and decline of the NMR were not necessarily associated.

6. Lowering the NMR in these counties does not necessarily reduce fertility. Therefore, if fertility control is a desired policy objective, family planning should be promoted while, on humanitarian grounds, great efforts should be made to develop the primary health services.

सारांश

प्रस्तुत लेख दक्षिण-पश्चिम चीन के बीस सूबों में नवजात शिशुओं की मृत्युदर एवं प्रजनन क्षमता पर दृष्टिपात करते हुए उनका परस्पर संबंधों का विश्लेषण करता है। लेख में किए गये विश्लेषण के अनुसार सर्वेक्षण किए जाने वाले सूबों में नवजात शिशु मृत्युदर एवं प्रजनन क्षमता राष्ट्रीय औसत की अपेक्षा कहीं ऊँची थी और क्षेत्रीय भिन्नताएं अर्थपूर्ण थीं। बीस सूबों में नवजात शिशु मृत्युदर एवं प्रजनन क्षमता में न तो कोई समागम ही था और न ही कोई सीधा परस्पर संबंध था। यह अनुपस्थिति इस तथ्य की पुष्टि करती है कि एक महत्वाकीक्षी परिवार नियोजन कार्यक्रम के परिणाम स्वरूप इन क्षेत्रों की जनसंख्या-वृद्धि में मुख्यतः गिरावट आई है और इसके साथ-साथ प्राथमिक स्वास्थ्य परिचर्या सेवा सुविधाओं में सुधारात्मक प्रयासों तथा सामाजिक-आर्थिक प्रगति के फलस्वरूप नवजात शिशु मृत्युदर में क्रमशः गिरावट आई है। जनसंख्या-वृद्धि एवं नवजात शिशु मृत्युदर में गिरावट का परस्पर संबंध होना आवश्यक नहीं है।

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THE CALCULATION OF THE CONTINGENCY COEFFICIENT (c)

The contingency coefficient (c) is calculated as:

$$C = \sqrt{\frac{\chi^2}{N + \chi^2}}$$

Where c = the contingency coefficient,

N = Sum of the observed frequency for any cell in contingency table.

χ^2 = Chi-square calculated as

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where O = the observed frequency for any given cell in contingency table.

E = the expected frequency for the same cell.

THE CALCULATION OF LINEAR CORRELATION COEFFICIENT (r)

The product moment linear correlation coefficient (r) is calculated as":

$$r = L_{xy} / \sqrt{(l_{xx} \cdot l_{yy})}$$

Where r = the product moment linear correlation coefficient

$$L_{xy} = n \cdot \text{Sum}(X \cdot Y) - \text{Sum}(X) \cdot \text{Sum}(Y),$$

$$L_{xx} = n \cdot \text{Sum}(x^2) - [\text{Sum}(X)]^2,$$

$$L_{yy} = n \cdot \text{Sum}(Y^2) - [\text{Sum}(y)]^2,$$

n = the number of pairs of scores,

X= each of the score on the first variable,

Y= each of the scores on the second variable,

Sum = "the sum of"

**INTERVENTIONS IN RURAL HEALTH: ORGANISATION AND
MANAGEMENT OF THE MULTIPURPOSE HEALTH WORKERS'
SCHEME - A CASE STUDY**

P. Durgaprasad* and S. Srinivasan*

ABSTRACT

The present study explores the managerial dimensions of the rural health care system and seeks to examine the effectiveness of management of the Multipurpose Health Workers' Scheme in the States of Karnataka and West Bengal. While analyzing critically the problems facing the health delivery system, the PHC system in particular, the study endeavors, to highlight the policy and programme implementation implications drawn from the intensive field studies conducted in the two States.

HEALTH POLICIES AND PROGRAMMES: THE PARADIGM - TO -ACTION PROCESS

Health and development, symbiotic ally linked as they are, health has long been regarded a priority for sustained development interventions. However, while translating the development priorities into actions, health, while it made some satisfactory progress in a few areas, seems to have attracted little significance on the whole, and consequently has had marginal impact with the result that the health policy instruments as well as the implementation apparatus have come to be characterized by weak conception; inappropriate delivery systems; inadequate budgets and tardy implementation, not to speak of the implementers' deficiencies and apathy and the recipients low levels of awareness and consequent lack of concern, whether in regard to their own health problems or that of the working of the delivery system.

The issue of unsatisfactory performance of the health services has been comprehensively discussed in the Government of India's statement of National Health Policy (1983). It states that the demographic and health scenario of the country still constitutes a cause for serious and urgent concern. The existing situation had largely been engendered by the almost wholesale adoption of manpower development policies and establishment of curative centres based on Western models, which are inappropriate to the needs of the people and the socio-economic context they live in. The hospital-based disease and cure-oriented services, though inappropriate seem to have been provided to certain better-off sections of the society only, that too, at the cost of providing basic health care to the majority. Furthermore, continued emphasis on the curative approach appears to have led to the neglect of preventive promotive and rehabilitative aspects of public health care.

*Member of Faculty, Faculty of HRD, National Institute of Rural Development, Fajeidanagai, Hyderabad-500 030

The conception and delivery of health services in India, leaves much to be desired. Apparently most health interventions, however well intended they may be, seem to have been made even before constructing effective paradigms of action. The paradigm-to-action process seems to have reversed, thus resulting in 'putting the cart before the horse' in the making of our health services delivery system. The extent and quality of impact which such a system can make can well be imagined. The delivery system, consequently, has been replete with maladies.

THE MULTIPURPOSE HEALTH WORKERS' SCHEME (MPHWS)

Towards remedying the situation as mentioned, a door delivery-oriented nationwide health scheme called the Multipurpose Health Workers' Scheme was launched. The main objective of the MPHWS Scheme was to ensure at least a minimum availability of public health facilities which include preventive medicine, family welfare, nutrition and curative and referral services throughout the country.

The MPHWS scheme was launched in the year 1974 with the objective of establishing a health care delivery system in rural areas through a team of multipurpose health workers, one male and one female, in every sub-centre of the Primary Health Centre (PHC) set-up. The specific objectives of the MPHWS scheme were (i) to increase the accessibility of health care services in rural areas; (ii) to reduce the area and population allotted per health worker to improve the quality of health services delivered through the trained Para-medical personnel and to extend the services at the periphery; (iii) to help develop a good rapport with the rural community; (iv) to convert all existing unpurposed workers at different levels into multipurpose workers after reorientation training; and (v) to integrate organization and structure of various health and family welfare programmes at the levels of primary health centre, district and State.

THE MPHWS SCHEME AND THE PHC NETWORK

The Multipurpose Health Workers' (MPHWS) scheme form the most peripheral category of health staff in the existing health services structure. The area of operation of the multipurpose health worker is about 5,000 population in rural areas and 3,000 population in hilly and tribal areas. They provide an integrated package of health care services, the implementation of this scheme has necessitated conversion of the unpurposed health personnel at different levels into multipurpose functionaries. The unpurposed health workers like Basic Health Workers, Vaccinators and Family Planning Workers were brought together to form a cadre of multipurpose health workers for better delivery of services. The launching of the MPHWS scheme thus, heralds an important phase in the country's rural health delivery system by way of a merger of the vertical programmes into an integrated health care delivery system. All this, was aimed at strengthening the primary health centre's the progress of implementation of this scheme has however been slow for it has taken more than a decade to implement the scheme in majority of the districts of the country. The sixth and seventh five year plan mid-term appraisals found that the implementation of this scheme was not satisfactory.

Past Studies of The MPHWs Scheme

A number of general studies have been carried out by social scientists to understand the overall impact of the multipurpose health workers' scheme on the rural populations of India (Maru, *et al.* 1976, Joshi, *et al.* 1978, Nayeem and Murthy 1979, Gupta *et al.* 1986, Planning Commission, 1983). However, no systematic and comprehensive study is available on the management of multipurpose health workers scheme as such. Hence, the present field-based study was undertaken.

The Present Study

The study endeavors to highlight critically the managerial issues facing the health delivery system *viz.-a-viz.* the existing status of the rural health infrastructure and the needs and aspirations of the rural population. Further, it aims at both bridging the gaps in conception and delivery of health services as also suggest ways and means of enhancing the efficiency and effectiveness of rural health care services.

Objectives of the Study

1. To study the organizational structure and management of health care services in the sample States of Karnataka and West Bengal in general, and of the Multipurpose Health Workers' (MPHW) Scheme in particular;
2. To examine the functioning of the Multipurpose Health Workers' Scheme and its impact on the rural population in the sample States; and
3. To suggest improvements in the overall functioning of the Multipurpose Health Workers' Scheme.

METHODOLOGY

The study was conducted in two States *viz.* Karnataka and West Bengal. Four districts in each of the sample States were chosen for study. Three Primary Health Centre's (PHCs) from each sample district and 4-5 sub-centre's (SCs) from each of the sample PHCs were randomly selected. Both male and female multipurpose health workers of the sample PHCs and SCs comprised the respondents. One hundred multipurpose health workers (male and female) were selected at random from each sample State. Thus, the total size of the multipurpose health workers studied was 200. Also, a hundred beneficiaries (users) from each of the States were interviewed to understand the nature of impact of the scheme on the status of their health.

The primary data were collected with the help of the following four Interview Schedules, *viz.* (i) Multipurpose Workers Schedule; (ii) Health Supervisors Schedule; (iii) Medical Officers Schedule; and (iv) Beneficiary Schedule. The beneficiary schedule included aspects relating to awareness, perception and involvement of the beneficiaries in various services offered by the multipurpose workers to the rural population through sub-centre's and primary health centre's.

Secondary information on matters relating to the policies and implementation of

the MPHWS scheme was gathered from the State Directorates of Health and Family Welfare, District Health Officers, PHCs and SCs. In addition, detailed discussions were held with the officials of the sample PHCs as also the district and State level officials.

RESULTS AND DISCUSSION

Organization and Management

The Government of India formulates the health and family welfare policies and programmes and coordinates the same while being implemented by the State Governments through their respective Departments of Health and Family Welfare. Led by a Secretary with the assistance of the Director of Health and Family Welfare and the officials of the Directorate of Health and Family Welfare Services, the Health and Family Welfare Department oversees the implementation of the Multipurpose Health Workers' (MPHWs) Scheme in the State of Karnataka. The Director of Health and Family Welfare, assisted by Additional Directors, Joint Directors and Deputy Directors to provide leadership to the team. However, in West Bengal, there also exists a 'Multipurpose Health Cell' headed by a Deputy Director and assisted by one Assistant Director (Nursing), a Social Welfare Officer and other administrative staff, in addition to the arrangements as stated above in the State of Karnataka. The Deputy Director of Health Services (MPH Cell) in the Directorate of Health Services and Family Welfare has been made overall in-charge of the MPHWS Scheme in West Bengal and is responsible for its implementation at the State level.

The State of Karnataka has been divided into four divisions, namely, Bangalore, Mysore, Gulbarga and Belgaum for the purpose of administering the health and family welfare activities by the State Government. Each division was headed by a Joint Director, who was the overall coordinator of the Division. All the District Health and Family Welfare Officers report to him as also submit their monthly progress reports.

District Level Organization Set-up

The District Offices of the District Health and Family Welfare Officer (DHFWS) in Karnataka State and the Chief Medical Officer of Health (CMOH) in West Bengal State serve as the nerve centers of integration of all State initiated health activities in the rural areas. The entire population of a district has been covered by 8-12 PHCs and the DHFWS or MOH of the district, as the case may be, has been assigned the responsibility of providing line and staff support to the PHCs.

The overall controlling officer of all the health activities at the district level in Karnataka was DHFWS. He was responsible for planning, execution and evaluation of all the health programmes in the districts. He was also in-charge of the MPHWS programme at the district level. The DHFWS and other officers such as the District -Malaria Officer, the District Tuberculosis Officer, the District Leprosy Officer and the District Immunization Officer were responsible for the successful implementation of the MPHWS programme. All the PHC Medical Officers of Health (MOHs and PHCs) reported to him and submitted monthly progress reports.

The Chief Medical Officer (CMOH) was the controlling officer of all State financed health activities at the district level in West Bengal. He acted as the controlling officer of the MPHWP programme. The CMOH is assisted by 4 Deputy CMOH and 3 ACMOH. All the Block Medical Officers of Health (BMOH) of all the PHCs in the district reported to him and also submitted their monthly progress reports.

Organizational Set-up at the Primary Health Centre (PHC) Level

The Primary Health Centre (PHC) occupies a key position in the nation's health care system. PHC is provided with 2 or 3 medical officers assisted by a number of paramedical staff. One of the senior medical officers was designated as Medical Officer of Health (MOH) in-charge of the PHC in the State of Karnataka and Block Medical Officer of Health (BMOH) in West Bengal. Besides the doctors, the PHC team consists of Sanitary Inspectors, Social Welfare Officers/Block Health Educators, Block Public Health Nurses/Lady Health Visitors, Pharmacists, Laboratory Assistant, computer/statistical Assistants, Health Assistants/Multipurpose Health Workers (Male and Female). The study revealed that the staffing pattern in both the sample States was nearly similar.

Organizational Set-up at Sub-Centre Level

At the sub-centre level, there were two main functionaries viz. the Multipurpose Health Workers (MPHWs - Male and Female) who cater to the needs of about 5,000 populations in about 5 villages each.

Management at the District Level

The District Health and Family Welfare Officer (DHFWO) or the Chief Medical Officer of Health (CMOH) was the district level manager of the health team. The MPHWP scheme was managed by a team comprising the District Health Supervisor, District Nursing Supervisor and the District Health Education Officer assisted by a Deputy Health Education Officer. The District Health Supervisor provided technical supervision and guidance to the PHC supervisory staff and also to the Junior Health Assistants (Male) of the all health programmes. The District Nursing Supervisor gives technical guidance and supervises the senior health assistant (female) at the PHC. The District Health Education Officer guides the Block Health Educators of PHCs in educational activities such as orientation camps, mass educational media activities, film shows, 3 multi-media campaigns, etc. The District Immunization Officer monitored the immunization programme at the district level. Similarly, the District Tuberculosis Officer, the District Malaria Officer and the District Leprosy Officer also monitored the respective disease-specific programmes at the district level. The monthly review meetings of the PHCs were held at the office of DMFWO/CMOH once in a month. All the BMOH/MOH of the PHC in the district attended the meetings and the performance of each PHC was discussed and reviewed. The district office compiled all the reports of the PHCs and prepared a consolidated progress report to be submitted to the Directorate of Health Services and Family Welfare.

Management at the PHC/SC Level

The administrative unit of location of Primary Health Centre (PHC) was a community development block in the rural areas.

In Karnataka, there were 502 PHCs and 5,164 sub-centers (SCs). But in the State of West Bengal, there were 1,265 PHCs and 7,665 sub-centers (Health Information of India: 1987).

At the PHC level, the administrative position of the Block Medical Officer of Health (BMOH) in West Bengal and the Medical Officer of Health (MOH) in Karnataka was similar. The DMOH/MOH of the PHC and his staff have been* brought under the administrative control of the Directorate of Health Services and Family Welfare through the Chief Medical Officer of Health (CMOH) or the District Health and Family Welfare Officer (DHFWO) at the district level. The Medical Officer in-charge of the PHC has the overall responsibility of providing integrated health care services to the population assigned to it. He has the assistance of 1 or 2 Medical Officers, male and female Health Assistants, one Sanitary Inspector and a Block Extension Educator to provide line and staff support to the MPHWS.

The sub-centre (SC) was the focal point for the delivery of health care services to the rural population. It forms the base of activities of two MPHWS, a male and female worker, who cater to the health needs of about 5,000 to 8,000 population. Besides dispensing medicines and conducting regular diagnostic/treatment exercises, weekly clinics comprise the major activities of a sub-centre.

The total number of MPHWS (M) ranged from 14 to 26 in the sample PHCs whereas in the case of MPHWS (F) it ranged between 11 and 35. However, in Karnataka, the number of male workers positioned in the sample PHCs was comparatively lower than that of the female workers. The number of female workers positioned was nearly the same as that of the number of sub-centers. A similar picture emerged in West Bengal where the number of female workers positioned was higher than that of the male workers in majority of the sub-centers of the sample PHCs. The study also revealed that the number of SCs attached to the sample PHCs in Karnataka was lower than that observed in West Bengal. In general, one PHC covered the entire population of a block in West Bengal, while in Karnataka 2 or 3 PHCs covered the population of a block/talus.

The Multipurpose Worker (Female) has the responsibility of providing maternal and child health care services and attending to the deliveries. At the sub-centre level, as the MPHWS (M&F) were treated as separate entities, they were given separate targets though they serve the same area and population. Therefore, it becomes necessary for both of these MPHWS to coordinate their activities to achieve the programme targets. However, for various reasons, such a coordination does not exist in the field. Lack of coordination was attributed to the cumbersome programme implementation procedures, mode of transport used, low availability of facilities at the sub-centre's, etc. The structural constraints expressed by the MPHWS included lack of horizontal links both in the organization and management of services.

Supervision

Both male and female workers have separate male and female Health Supervisors who were linked to the Block Medical Officer of Health of the PHC. The PHC was the meeting point for all the Health Workers. The structure envisages that the male and female Multipurpose Workers remain distinctly different as if their functions were mutually exclusive though they work in the same area and serve the same population. This imposed constraints in interaction between them. At the programme management level, particularly with regard to target setting procedures, the targets were not given to the sub-centers but to the individual Health Worker. Since they work in the same area and serve the same population, this approach often leads to conflict and competition, and least of all, to collaboration between the Multipurpose Health Workers.

For reasons like meager financial resources and prioritization of allocation of scarce housing resources, residential accommodation was more accessible to female MPHs than male MPHs. As a result of this, the male MPHs by and large stay outside the SC village. Thus, logistical as well as other types of coordination between the male and female Health Worker was adversely affected.

As almost all the first line Health Supervisors such as the Junior Health Inspector and Lady Health Visitor (both male and female) were promoted from the rank of MPHs, most medical officers often tend to relegate them to a workers' status or not 'consciously' accord them the status due to them. At times, the medical officers directly interact with the MPHs and often, in the process, bypass the supervisors' views and authority. Therefore naturally the supervisors tend to feel left out and aggrieved of the fact that they have not been taken into confidence. As a result, those junior level supervisors tend to identify themselves more with the workers than with their immediate senior supervisors or the doctors.

However, the senior level Health Supervisors such as the Senior Health Inspector as in the case of Karnataka did supervise the performance of work of the MPH. The Block Health Educator in Karnataka and the Social Welfare Officer in West Bengal supplement the supervision work of their senior supervisors (doctors and others). They visited the sub-centre every month and assessed the performance of the MPHs by checking their daily diaries, various registers maintained at the SC and also through the first line Health Supervisors' reports and diaries.

Supervision of Supervisors by Medical Officers

The Medical Officer (in-charge of the PHC) was expected to supervise the work performance of members of health team at regular intervals. This was envisaged to be done by way of visiting the SCs periodically and through reviews of work done by the members of the team at the monthly review meetings presided over by him. Besides, the Medical Officer was also expected to talk to the MPHs and people and get a feel of the supervisors' effectiveness as well as of their work efficiency.

Supervision of the MPHs, however, by the MOs was a rare phenomenon in our

Sample study PHCs. They rarely visited the SCs to supervise the work of the MPHWs at the field level. The field interviews revealed that the MOs complained of not finding sufficient time to visit the SCs as they were busy attending to the outpatients and inpatients, apart from attending to the usual administrative works in the PHC. It was found that a good number of SCs were not easily accessible by road transport. The MOs did not want to take the trouble of visiting the SCs not accessible by road transport. Even if a vehicle was available, inadequate funds for petrol, oil and lubricants (POL) was voiced as a major reason for not visiting the SCs.

The MOs, therefore, generally assign the job of supervision in to their health supervisors. Supervision of Health Supervisors by the MOs was by and large done through checking of the daily diaries of supervisors and by reviewing the progress of work done by them at the monthly staff meetings presided over by the BMOH. The targets and achievements of each health programme with special reference to MCH and FW of each MPHW were reviewed and if there was any shortfall in the achievement of targets he/she was asked to improve upon the performance. This showed how supervision of workers as well as the performance appraisal of the MPHWS scheme is done at the PHC level.

Monitoring of performance of MPHWs by the Medical Officer was to be followed up by personal supervision of workers at the SC level. However, this was not carried out regularly by them. The MPHWs were supervised by their respective sector and block health supervisors but not very frequently. However, the field observations revealed that they (MPHWs) did not get any guidance what so ever for improving their performance. Moreover, supervision of MPHWs by the supervisors was very marginal. Supervision by the Block Sanitary (Health) Inspector and the Block Health Extension Educator was less frequent. Thus, supervision of the MPHWs was evidently very weak. This also indicated that whatever type/quality of supervision was available was confined to the peripheral stratum of the MPHWS scheme and thereby leaving much to be desired in terms of linkages with higher tiers of the scheme at the district and State level.

In the present PHC set-up, supervision of field work of the paramedical staff, especially the MPHWs by the MO of the PHC was very much limited both due to lack of time and high coverage in terms of area and population expected to be serviced by the PHCs. This was more pronounced in West Bengal where the coverage of area and population by the PHC was high. Hence, field work of the MPHWs was not satisfactory. It was suggested that improvement in the utilization of health services of the selected PHCs could be effected only through improving the quality of field work done by the MPHWs and health supervisors. The MOs should supervise the field work of the MPHWs and supervisors more vigorously and at regular intervals which alone will improve the efficiency of the staff. It goes without saying, that the efforts to improve the image of the PHCs and SCs and to the optimally utilization of the staff, services and of the PHCs were greatly dependent upon the vigor of supervision by the Medical Officers.

PROGRAMME IMPLEMENTATION

Effective programme implementation and delivery of health services required

proper planning by the MO in-charge of the PHCs. As leader of the health team, the MO was expected to involve his team-mates in the process of planning and decision-making.

The monthly review meetings and field visits were the two main mechanisms through which the BMOH/MOH kept track of the work progress as also consult the health functionaries on matters relating to programme implementation and impact. However monthly meetings held at the PHC were, by and large, utilized for completing progress reports of SCs/MPHWs and very little time was devoted to programme planning and implementation. The BMOH/MOH usually visited the SCs on very few occasions in a year. Moreover, these visits were more in the nature of inspection rather than identifying and solving the problems of the MPHWs. Communication was mainly downward in the form of instructions and guidelines. The bottom-up communication was mainly in the form of monthly progress reports and monthly review meetings which were not effectively used for communicating problems at the SC level. This communication was further restricted with few visits of the medical officer and very rare visits by the CMOH/DHFWO and the State level officers at the SCs. The monthly progress reports submitted by the MPHWs, health supervisors and the BMOH/MOH of the PHC, often were alone viewed as major sources of monitoring and appraisal. Other mechanisms such as personal visits and meetings were generally found to be not so effective. Reporting was not proper in the sense that the problems as well as progress at the PHC level, more so at the SC level, were not brought out clearly in these reports. Even when the problems were identified, very little follow-up actions was initiated at the PHC/SC level.

Coordination

Coordination amongst various departments at all levels of administration from the Central and State Governments to the district and PHC levels is of critical importance. It is not only a function of structural relationship, but is also a determinant of both the quality and extent of various activities and their outcomes. Therefore, coordination committees have been set-up at various levels. At the Central Government level, a coordination committee has been constituted to provide coordination and direction to the State Government departments of health and family welfare. Similar arrangements existed at lower levels of administration too, which are outlined below.

State and District Level Coordination Committees: At the State level, a coordination committee under the chairmanship of the Minister of Health and Family Welfare was administratively responsible for all health programmes including the MPHW scheme. Representatives of the Directorate of Health Services and Family Welfare were the members of the committee. Each State has a State coordinator who ensures smooth functioning of the scheme. In West Bengal, the Deputy Director of Health Services (MPH) in the Directorate of Health and Family Welfare coordinates the scheme at the State level and was also in-charge of the State level MPHW cell. Similarly, a senior officer of the rank of Joint Director in the Directorate of Health and Family Welfare of the Government of Karnataka coordinates the

scheme at the State level. A nucleus secretariat. . In the Department of Health and Family Welfare of the State Government directed and monitored the progress of the MPHWS scheme in the concerned States. One of the main objectives of the monitoring system was to streamline and improve the implementation of the scheme and increase accountability to the recipients, the donors and the authorities. Thus, the Coordination Committees and monitoring systems evolved by the State Government were expected to help and enhance the performance of the scheme.

The district level coordination committee was chaired by the President of the Zila Parishad in the case of Karnataka and the Sabhadhipathi of the Zila Parishad in West Bengal. The Deputy Commissioner/District Magistrate was the vice-president of the committee. In Karnataka, at the Zila Parishad level, there existed a 'Health Committee' which comprised six members. The District Health and Family Welfare Officer (DHFWO) was its convener. The Committee met once in a month and reviewed the progress of various health programmes including the MPHWS scheme. The DHFWO submitted to the committee monthly reports compiled from the monthly progress reports of the PHC under his jurisdiction. It was found that this committee was functioning satisfactorily in the sample districts of Karnataka. The study also revealed that the committee met frequently in the year 1988 and reviewed the progress of health and family welfare programmes of the district.

The Sabhadhipathi of the Zila Parishad was Chairman of the coordination committee at the district level in West Bengal. The district magistrate was vice-chairman of the committee. Three members were nominated by the Department of Health, and the other three represented other developmental departments/walks of life on the committee. The district coordination committees in the sample district of West Bengal too were found to be working satisfactorily though lacking in enterprise and experimentation. The committee met quite frequently, *i.e.*, once in three months, in the year 1988 and reviewed the progress of health and family welfare programme of the district. Besides, a review committee with the following officers was constituted in each district of West Bengal (i) Chief Medical Officer of Health (CMOH) Chairman of the Committee; (ii) All Dy. Chief Medical Officer of Health (Dy. CMOH), members of the committee; (iii) Karmadhyaktha of the Janaswasthya Sithayee Samithi of the Zila Parishad, member and (iv) Assistant Chief Medical Officer of Health convener of the committee. The committee met at least once in a month, to ensure effective functioning of scheme. It reviewed the progress of the scheme and found out ways and means to improve the programme achievement status and make necessary adjustment in different categories of the staff at the PHC and district levels.

The Multipurpose Health Workers' Scheme, as already outlined, primarily aims at providing simple promotive, preventive and curative health services to the people at their doorsteps as also encourage the community participation for effective delivery of the primary health care. Toward assessing the utilization pattern of the scheme, it was considered important to obtain opinions and perceptions of the beneficiaries of the scheme. An analysis of the same has been presented in the following section.

PROGRAMME AWARENESS OF THE UTILISATION OF SERVICES BY BENEFICIARIES

By and large, a widespread and better level of awareness among people was expected to facilitate better utilization of health care services. Data on levels of programme awareness and utilization of services rendered revealed that a majority of the beneficiaries (95.0 per cent) reported that they were aware of the activities and the services rendered under the MPHWS scheme. Further, the beneficiaries also reported that they used the services of the sub-centre regularly as has been presented in Table 1.

TABLE 1

LEVELS OF PROGRAMME AWARENESS AND UTILISATION OF SERVICES BY BENEFICIARIES

S.No	Indicator	Karnataka		West Bengal	
		Number	Percentage	Number	Percentage
1	Aware of SC Activities	98	98.0	94	94.0
2	Aware of Implementation of MPHWS scheme	85	85.0	92	92.0
3.	Utilised the services of SC	97	97.0	96	96.0
4.	Used SC Service Regularly	98	98.0	91	91.0

The variety of services rendered by the SCs. and data on the most frequently utilized services in the past one year have been analyzed and shown in Table 2.

TABLE 2

SC SERVICES MOST FREQUENTLY USED BY THE BENEFICIARIES IN THE LAST ONE YEAR

S.No.	Services	Karnataka		West Bengal	
		Yes	No	Yes	No
1.	General Medical Care	26	74	33	67
2.	Ante/Post-natal Care	39	61	28	72
3.	Other Maternity Services	31	69	26	74
4.	Immunisation	79	21	57	43
5.	Family Welfare	76	24	54	46
6.	Nutrition	59	41	73	27
7.	Health Education	53	47	77	23

The table revealed that in Karnataka, immunization turned out to be the most frequently used services with 79.0 per cent of the beneficiaries ranking it first and in

West Bengal, health education with 77.0 per cent ranking it first. The other services utilized considerably by the beneficiaries in Karnataka were family welfare (2nd rank, 76.0 per cent), nutrition (3rd rank, 59.0 per cent), and health education (4th rank, 53.0 per cent). Other services like medical care (26.0 per cent), ANC/PNC (39.0 per cent) and maternity care (31.0 per cent) were used less frequently. In West Bengal, apart from health education (1st rank with 77.0 per cent), the other services utilized included nutrition, maternity services, immunization and family welfare. All other services were used less frequently.

As regards, specific illnesses for which the beneficiaries have consulted the SC, the data revealed that a majority of them (70 per cent in Karnataka and 78.0 per cent in West Bengal) approached the SC to receive treatment for fever. This was followed by ailments like cold and cough which ranked second in both the States. It may be inferred from the data that the rural people were mainly attacked by fever, cold and cough and diarrhoea.

The beneficiaries visited the SCs for various reasons in preference to others. An analysis of the same revealed that the main reasons mentioned were free of cost treatment, quick relief and good medical attention. These three reasons were mentioned by majority of beneficiaries. The other commonly heard of reasons were easily accessible, no side effects etc. were expressed by few.

As regards following the prescribed course of treatment recommended by the doctor over 90.0 per cent of the beneficiaries in both the States obtained treatment as prescribed, while only a few did not. The data also revealed that 82.0 per cent of the beneficiaries in both the States have reported that they were fully cured of their problems.

When asked which other medical care centre's other than the SC such as a PHC or district hospital or private clinics were visited by the beneficiaries, over 77.0 per cent beneficiaries in Karnataka and 34.0 per cent in West Bengal said that they visited PHC or district hospital for treatment, fifty six per cent in West Bengal and thirteen per cent in Karnataka listed private clinics while 10.0 per cent of the beneficiaries said that they had not visited any medical care centre other than the sub-centre.

A majority of the beneficiaries (52.0 per cent) preferred allopathic system of medicine in Karnataka while in West Bengal only 34.0 per cent of them preferred the same. In West Bengal, 19.0 per cent preferred Indian systems of medicine to others.

Opinions of Beneficiaries and MPHWs on Impact of Multipurpose Health Workers' (MPHW) Scheme

(a) Opinions of Beneficiaries. Toward assessing the nature of impact the MPHW scheme has had on the rural individual health scenario, the beneficiaries opinions were sought on the usefulness, adequacy and timeliness of the MPHWS home visits first. Almost all (99.0 per cent) of the beneficiaries in both the States said

that the MPHWs visits were useful, while nearly half of them said that their visits were very useful as has been described in Table 3 and 4.

TABLE 3

BENEFICIARIES OPINIONS ON THE USEFULNESS OF THE MULTIPURPOSE HEALTH WORKERS' SCHEME

S.No	Opinion	Karnataka Number	Karnataka Percentage	West Bengal Number	West Bengal Percentage
1.	Very useful	46	46.0	45	45.0
2.	Useful	53	53.0	54	54.0
3.	Not useful	1	1.0	1	1.0
		100	100.0	100	100.0

TABLE 4

BENEFICIARIES OPINIONS ON THE ADEQUACY AND TIMELINESS OF MPHWs' VISITS

S.No	Opinion	Karnataka Yes	Karnataka No	West Bengal Yes	West Bengal No
1.	Adequate	63	37	65	35
2.	Timely	63	37	67	33

Regarding adequacy of visits, 63.0 per cent and 65.0 per cent of beneficiaries from Karnataka and West Bengal reported that the visits were adequate. About 35.0 per cent in West Bengal however wanted the MPHWs to pay more visits while as many in Karnataka desired so. Talking of timeliness of MPHWs' visits, nearly two-thirds of the beneficiaries in both the States reported satisfaction while a third of them differed in their view in this regard.

Opinions of the beneficiaries on the functioning of the sub-centre were also sought. It revealed that 50.0 per cent and 29.0 per cent of the beneficiaries from Karnataka and West Bengal respectively opined that the functioning of the sub-centre was good while the rest (majority of them) in both States said that the functioning of the SCs was 'just about alright' or 'not very satisfactory'.

However, though intriguing, data on improvements in general health of the beneficiaries as a result of the coming of the sub-centre showed that the general levels of health of beneficiaries of both Karnataka and West Bengal respectively had improved. Nearly two-thirds of the respondents considered the MPHWS scheme a better programme than the unpurposed scheme. In West Bengal, over three-fourths of the beneficiaries reported that the MPHWS scheme was better when compared to the unpurposed scheme.

To understand how the positive impacts of the MPHW scheme can be enhanced/sustained, it deemed important to seek from the people their suggestions for improvement of the working of the MPHW scheme. The suggestions included (i) pucca buildings with all the infrastructure facilities to house the PHC and various medical equipments; (ii) regular supply of medicines; (iii) provision of facilities for delivery and maternal care at all the SCs; (iv) increase in the number of the PHC/SC working hours; (v) the multipurpose workers and doctors must pay more and regular visits to the villages; (vi) family planning should be made compulsory and incentives for the same should be increased; (vii) the population and the area a MPHW was supposed to cover intensively appears rather high. Hence the authorities would do well if they could think of reducing the coverage of population per worker. This would certainly enhance the qualitative impact of the scheme in terms of greater client satisfaction, improved overall health conditions of the people and consequently, enhanced confidence of the people in the scheme; (viii) supervision of health supervisors needs to be strengthened for supervision was considered the link pin between PHC and the grassroots level workers and potential users; (ix) the Multipurpose Health Workers' Scheme aims at as wide a coverage of health problems in as much as it envisages totality of health viz. integration of both programmes/activities and services. Hence, the role of MPHW should be considered pivotal and his status and perks increased accordingly.

Towards obtaining critical views of the MPHW themselves on the working of the MPHW scheme, the following opinions seeking themes were administered to the MPHWs (i) advantages of the MPHW scheme, (ii) problems and inadequacies of the scheme; (iii) nature of and scope of work relations and supervision and (iv) community-related aspects of the scheme. Summarized analysis (for detailed analysis of this and other sections please see Dr. P. Durgaprasad. *et al.* Health Care Delivery Systems In Rural Areas. A Study of the MPHW Scheme, NIRD. 1989. Mimeo of the same has been presented as under: (a) Majority of the MPHWs in both the States agreed with the statements relating to theme (i); (b) However opinions relating to theme (ii) were in direct contrast to the theme (i) for over 90.0 per cent of the MPHWs in West Bengal opined that the training given to them was inadequate while over half of their counterparts in Karnataka felt so This has obvious 'and serious implications for the implementation of the scheme, (c) over three-fourths of all MPHWs in both the State felt that MPHW scheme had led to the dilution of rigor in disease-specific action and cure (e.g. Malaria); (d) majority of MPHWs in both the States felt that the cooperation extended to the scheme both by community members as well as their leaders was better when compared to what was witnessed in the unpurposed scheme; (e) the MPHWs views as regards the relative strengths and weaknesses of the MPHW scheme revealed that while 'wider coverage of health' was considered a major strength in Karnataka. the same was not shared by their West Bengal counterparts However surprisingly in both the States, family planning was not considered a strength by majority of MPHWs Whereas In West Bengal as regards MCH. over half of them viewed it as a major strength while their Karnataka counterparts assigned little significance to it poor or at times no supply of medicines' was considered a very major weakness particularly in West Bengal. A

tenth of all workers also mentioned that the so-called 'multi-work' does not allow them to concentrate on any one of their dimensions of work completely.

SUGGESTIONS AND IMPLICATIONS

1. There appear enormous logistical problems like perennial shortage of medicines (*e.g.* wide spectrum antibiotics), non-availability of proper equipments (*e.g.* oxygen cylinder), storage facilities (cold and ordinary) and most important of all, inadequate transport facilities. For efficient and effective implementation of the MPHWS scheme, these critically important logistical problems need to be solved urgently.

2. The population and the area a MPHWS is supposed to cover intensively appears rather high. Hence, the authorities will do well if they could think of reducing the coverage of population per worker. This would certainly enhance the qualitative impact of the scheme in terms of greater client satisfaction, improved overall health conditions of the people and consequently, enhanced confidence of the people in the scheme.

3. It would be better if female MPHWSs (ANMs) alone were made to work for family planning and thereby, relieve the male workers of their family planning responsibilities so that they can concentrate on their multipurpose work more rigorously and cover a larger number of clientele.

4. Some of the workers, particularly the male, do not appear fully confident and professionally capable of conducting their duties in a manner desired by all. Hence, they need to be reoriented and given refresher/crash courses periodically.

5. Private practice by PHC doctors permissible in Karnataka should be stopped and arrangement for commensurate compensation should be made. This would hopefully help increase their attendance at PHCs and SCs.

6. Towards vesting the privileges and powers with the PHC Medical Officers for rewarding the subordinate staff or awarding punishment to them, conferment of authority and delegation of power to MOs by the district and State level health bodies needs to be effected immediately.

7. Supervision of Health Supervisors needs to be strengthened for, supervision is considered the link pin between PHC and the grass root workers and present and potential users.

8. The present method of uniformly allocating financial resources to the PHCs irrespective of their size in terms of population served, disease profiles and geographical/locations considerations, should be changed and a rational method of financial allocation needs to be followed.

9. The Multipurpose Health Worker's Scheme aims at as wide coverage of health problems in as much as it envisages totality of health, *viz.*, integration of both programme/activities and services. Hence, the role of the MPHWS is considered pivotal. However, the purported multipurpose orientation appears to be exhorted of

and confined to the MPHWs alone as if they alone mattered exclusively. But, what is required is multipurpose orientation at all levels and categories of staff. However, such a development is rarely found in the implementing agencies beyond the PHC/SC. The legacy of the unipurposed health work philosophy and its erstwhile practitioners tends to manifest itself in a variety of forms. For example, at the district level unipurpose-oriented programmes/departments continue to exist similarly, the erstwhile unipurposed health Coordinators/Supervisors continue to exhibit biases that smack of their parental discipline orientation. (For example those that work in the area of malaria tend to emphasize the component of malaria work more than the others in the multipurpose work with the result that, willy nelly, conflicting and counterproductive instructions ensue). Therefore one needs to carefully reexamine the concept of multipurpose work as also reorient both the office and field-based staff to the new requirements and the philosophy of the MPHWS scheme.

10 In view of the perennial shortage of medicines at the PHCs and SCs, the doctors/MPHWs should arrange to display information boards about availability of medicines. This would help to erase the wrong notions that people have as regards integrity of the PHC staff viz.-a-viz. availability of medicines.

11 In view of the limited reach ability of PHCs (the servicing zone being by and large, confined to a radius of three to five kilometers), there is a strong need to strengthen the sub-centers by way of supplying adequate medicines and also by ensuring that the MPHWS are available for most part of the day and night.

सारांश

प्रस्तुत अध्ययन में ग्रामीण स्वास्थ्य परिचर्या प्रणाली के प्रबन्धन परिणामों के अन्वेषण के साथ-साथ कर्नाटक तथा पश्चिम बंगाल में चल रही बहुउद्देशीय स्वास्थ्य कार्यकर्ता योजना के प्रबन्धन की प्रभावशीलता की जांच-पड़ताल की गई है। स्वास्थ्य सेवा प्रतिपादन प्रणाली, विशेषकर प्राथमिक समस्याओं के सूक्ष्म विश्लेषण द्वारा नीति एवं कार्यक्रम क्रियान्वयन तथा दोनों राज्यों में किए गए गहन क्षेत्रीय अध्ययनों से प्राप्त परिणामों पर प्रकाश डालने का प्रयास प्रस्तुत अध्ययन में किया गया है।

A STUDY OF THE WORKLOAD OF THE CASUALTY DEPARTMENT OF A LARGE CITY HOSPITAL

S. Malhotra* and R.S. Gupta**

ABSTRACT

Casualty department forms an important area for any hospital but many a times patients have been using it as an Out Patient Department after the regular Out Patient Department of the hospital closes down. The study reveals the types of cases which come to the Casualty Department of Safdarjung Hospital and has analyzed the case-mix pattern of the patients and further analyses the severity of their emergencies and their disposition to the various specialty groups. It gives the profile of medico-legal cases and also gives some suggestions for reducing the workload of medical personnel in its involvement.

The Safdarjung Hospital, New Delhi in which this study was conducted was started during the Second World War, to serve as a base hospital for American troops. After the war, it became an annex of Irwin Hospital and served a large number of patients and refugees during the days of partition. In 1954, when the Central Government Health Scheme was organized, the hospital was taken over by the Government. At this time the sanctioned bed strength of the hospital was 179. Over the years, the hospital has grown to become one of the largest general hospitals in Delhi, with bed strength of 1357 in 1990 and an average daily OPD attendance of 2975. The hospital provides basic and specialized medical care to a very large number of outdoor and indoor patients not only from Delhi, but also from the neighboring States. It also serves as a referral hospital for several Central Government Health Scheme dispensaries.

The casualty department of Safdarjung Hospital receives all accidents and medical emergencies except burns, obstetrics and gynecological cases which are catered to by the respective departments. The main casualty deals with pediatric, medical surgical, ENT and dental cases. It is also one of the designated centres for anti-rabies vaccination and caters to a large number of patients who have suffered stray animal bites.

OBJECTIVES

The study was undertaken with the following objectives (i) to study the case-

This paper is based on the research findings of the thesis done on this topic by Dr S Malhotra under the guidance of Prof RS. Gupta at NIHFV

*Postgraduate M.D Student National Institute of Health and Family Welfare, New Mehrauli Road
Munirka New Delhi-110 067

**Associate Professor and Head, Department of Management Sciences, National Institute of Health and Family Welfare New Mehrauli Road Munirka, New Delhi-110 067

mix pattern of patients attending the casualty by grouping them under various specialties; (ii) to analyze the severity of an emergency disposition of cases under each specialty; and (iii) to study the profile of medico-legal cases.

METHODOLOGY

Retrospective Study: A random sample of 1,500 patients was studied from the casualty records from 1st January to 31st December, 1990, which showed a total attendance of 1,70,634.

Prospective Study: This was carried out over a three-month period from January, 1991 to March, 1991. By the process of systematic random sampling, every 20th patient attending casualty was picked up for the purpose of analyzing the case-mix pattern, severity of emergency and disposition of cases.

Study of Medico-Legal Cases

The casualty also deals with medico-legal cases and these were expected to constitute a substantial proportion of the workload. Such patients not only merit treatment, but exhaustive documentation of such cases is mandatory. All the cases registered as medico-legal during the period of prospective study were analyzed.

To study the case-mix pattern, the patients coming to the casualty were grouped under the broad specialty headings of Medical, Surgical, Orthopedic, and Pediatric and 'Others'. The last category included patients who had minor ENT, eye or dental problems. In each of the specialty groups, the patient was then categorized to study the severity of the emergency.

- i. Serious and urgent cases where there was danger to life of limb needing necessary treatment as an inpatient.
- ii. Serious but not urgent, though still requiring admission.
- iii. Moderately severe, where skilled treatment was required initially but subsequently the treatment could be continued as an outpatient.
- iv. Not severe, where special skills were not required.

The groupings are in conformity with those described by Ellis'. While it was clear that patient falling under categories (i) and (ii) would constitute urgent emergencies, and patients in category (iii) would merit specialized treatment, a majority of patients in (iv) can be termed as 'casual attenders'.

A further analysis of the patients was done to study the disposition of patients, that is whether

- a. the patient was treated and sent home;
- b. referred for specialist opinion or admitted;
- c. kept under observation in the casualty department itself;
- d. underwent minor surgery and was discharged.

This information was available from the main casualty register and the nurse's register kept in the observation ward.

The profile of medico-legal cases was studied by grouping the total number of such cases (2555) during the period January to March, 1991 under the following heads:

- a. Road traffic accidents and industrial injuries;
- b. Assault, including gunshot injuries;
- c. Poisoning, a substantial proportion of such cases was that of patients suspected of alcohol intoxication, brought in by the police, for medico-legal opinion; and
- d. dead 'on arrival.

FINDINGS OF RETROSPECTIVE STUDY

- 1. Case-mix Pattern** The distribution of patients attending casualty in 1990, according to specialty-wise classification has been given in Table 1.

As is evident from Table 1, the specialty-wise distribution of the patients in descending order is Medicine (29.27%), Surgery (26.53%). Orthopedics (16.47%) and Pediatric Medicine (11.33%). The category 'Others' includes patients who have E.N.T., eye or dental problems. It also includes all patients who have come for treatment of stray animal bites and anti-rabies vaccination.

The category 'surgery' includes patients with minor injuries such as abrasions and lacerations.

- 2. Severity of Emergency:** The analysis of the severity of emergency into the four categories for each specialty has been projected in Table 2.

Of the sample analyzed, only 65.47 per cent of the patients required some form of skilled medical care (categories I to III), while 34.53 per cent constituted patients who may be termed 'casual attenders'. Of the 65.47 per cent who required medical care 43.67 per cent had moderately severe conditions requiring treatment as outpatients. Serious cases requiring admission constituted 13.47 per cent while 8.33 per cent were under life threatening conditions.

TABLE 1

SPECIALITY-WISE DISTRIBUTION OF THE PATIENTS ATTENDING CASUALTY IN 1990

Medicine	Surgery	Orthopedics	Pediatric Med.	Others	Total
439	398	247	170	246	1500
(29.27)	(26.53)	(16.47)	(11.33)	(16.40)	(100)

Note: Figures in brackets are percentages

TABLE 2
ANALYSIS OF SEVERITY OF EMERGENCY IN DIFFERENT SPECIALITIES IN 1990

	Medicine	Surgery	Orthopedics	Pediatric Med.	Others	Total
Cat I	20 (4.55)	63 (15.83)	25 (10.12)	17 (10.00)	0 -	125 (8.33)
Cat II	45 (10.25)	99 (24.87)	24 (9.71)	34 (20.00)	0 -	202 (13.47)
Cat III	110 (25.06)	168 (42.21)	185 (74.90)	50 (29.41)	142 (57.72)	655 (43.67)
Cat IV	264 (60.14)	68 (17.09)	13 (5.26)	69 (40.59)	104 (42.28)	518 (34.53)
Total	439	398	247	170	246	1500

Cat I: Life threatening needing admission. (Figures in brackets are percentages.)

Cat II: Serious requiring admission

Cat III: Moderately severe requiring treatment but not admission.

Cat IV: Minor conditions (casual attenders)

Note: Cat III of others' represents patients with stray animal bites. All these were discharged after anti-rabies prophylaxis

Looking at the analysis specialty-wise, it is clear that casual attenders comprise as much as 60.14 per cent of the patients in the specialty of medicine followed by 40.59 per cent in pediatric medicine. In contrast, only 5.26 per cent of the orthopedic patients were found to be casuals. It is explained by the fact that while most orthopedic conditions such as fractures and crush injuries require immediate specialist care, a majority of the conditions of patients in the specialty of medicine' such as fevers and coughs are of a minor nature. The latter can easily be dealt with by alternative centers such as dispensaries and other clinics.

In the surgical group, patients with moderately severe conditions constitute 42.21 per cent of the total under this specialty. This is accounted for by the fact that a large number of patients with (i) small wounds which require suturing; (ii) abrasions requiring dressing; and (iii) different types of colic's come to the casualty. Most of these patients require treatment but not admission.

Most of the orthopedic patients (74.90 per cent) fall in category III. This is a reflection of the large percentage of patients who come for treatment of fractures and sprains. Most of these require treatment given by the specialist but can be treated as outpatients.

3. **Disposition of Patients:** Disposition of all patients was categorized as those - (i) treated and discharged; (ii) referred to specialist; (iii) kept under observation; and (iv) needing minor operations.

The dispositions of the patient in the various specialities have been described in Table 3.

Perusal of the data revealed that in the specialty medicine as much as 65.1 per cent of the patients were treated and discharged. Just over 20 percent were referred to the specialist, while 14.4 per cent were kept under observation and subsequently discharged. The high percentage of the patients treated and discharged represents the large number of patients who rush to the casualty with a variety of minor complaints.

In surgery too, like in medicine, as much as 75.1 per cent of all patients were treated and discharged. A large proportion of these patients comprises of cases with minor lacerations, abrasions and wounds. A fairly large proportion of these cases were such patients who came for the relief of colic and for tetanus toxoid injections.

However, nearly all the patients with orthopedic problems and 80 per cent of the patients requiring pediatric medicine care were referred to the concerned specialists, partly because the facilities for treating these cases at casualty level were poor and also because the percentage of the patients who could be treated and discharged was only 0.4 per cent in the orthopedic group and 20 per cent in the pediatric medicine group.

The findings of the Prospective Study for the above parameters were in conformity with the findings of the Retrospective Study.

Medico-legal Cases

Findings of the Prospective Study. There were 2555 medico-legal cases (MLCs) from January 91 to March 91 which was 8.05 per cent of the casualty

TABLE 3

DISPOSITION OF ALL PATIENTS ATTENDING CASUALTY ACCORDING TO SPECIALITY

	Medicine	Surgery	Orthopedics	Pediatric Med.	Others
Treated and discharged	286 (65.1)	299 (75.1)	1 (04)	34 (20.0)	142 (57.7)
Referred to specialists	90 (20.5)	71 (17.8)	246 (99.6)	136 (80.0)	104 (42.3)
Observation	63 (14.4)	28 (7.0)	0 -	0 -	0 -
Needing minor procedures	0	*	0	0	0
Total	439	398	247	170	246

Figures in brackets represent percentages.

* Minor procedures included in the category treated and discharged.

Note: In 'Others' treated and discharged were all other patients who have suffered stray animal bites. Patients referred to specialists were those referred to ENT, Ophthalmology and Dental Departments.

attendance during this period. While the average daily attendance during the period was 352, the average number of MLCs per day was 28.

The details of the medico-legal cases depicted their profile during the period of the prospective study have been shown in Table 4.

Data revealed that 54.52 per cent of the medico-legal cases were Road Traffic Accidents; assaults comprise 31.27 per cent of the total. The group poisoning (a large majority of patients brought by the police for opinion regarding alcohol ingestion) constitutes 13.66 per cent while the patients declared dead on arrival account for 0.55 per cent of the total.

As is evident, Road Traffic Accidents and assaults constitute about 86 per cent of the MLCs.

DISCUSSION

It becomes clear from the study of the case-mix pattern and the analysis of the severity of emergency in the various specialty groups that a large proportion of patients attending the casualty department do not constitute real clinical emergencies. These patients inundate the casualty departments to the detriment of real emergency cases who actually require the urgent attention of the personnel manning the department. If the casualty is not to be reduced to doing the work of the regular outpatient department, some disposition of the casual attainer has to be made.

The reasons for casual use of the emergency department may be many, some of them being - not everyone has a family physician, or the family doctor was not available, for example, on holidays; the patients feels that the hospital has better facilities for the treatment, or finds the treatment in the casualty cheaper². The patient may find the hospital more convenient to visit or just wants a second opinion³.

TABLE 4

MEDICO-LEGAL CASES DURING JANUARY-MARCH 1991

	January	February	March	Total
Road traffic accidents	473 (57.96)	401 (49.69)	519 (55.69)	1393 (54.52)
Assaults	224 (27.45)	304 (37.67)	271 (29.28)	799 (31.27)
Poisoning	114 (13.97)	99 (12.27)	136 (14.59)	349 (13.66)
Dead on arrival	5 (0.62)	3 (0.37)	6 (0.64)	14 (0.55)
Total	816	807	932	2555

Note: Figures in brackets are percentages.

It has been noticed that under the 'Medicine' specialty, about 60 per cent of the patients arriving at the hospital were sent back after a brief examination. Often they have trivial complaints like fever or cough and cold and do not require attention at the hospital. The percentage of this kind of patients that is, the 'casual attainer' is about 40 per cent in pediatric medicine, but much lower in the specialties of surgery and orthopedics. This is so because in these specialties, even if the severity of the condition does not merit admission, the patient requires some kind of treatment before being discharged, for example, patients with surgical problems like small wounds requiring sutures, abrasions requiring dressing and colic's requiring injections, and patients with minor orthopedic problems like sprains and simple fractures in which they could be treated as outpatients.

To deal with this influx of casual attainers the brunt of the work falls on the junior staff. Interrogation, examination and documentation of this large number of self-referred patients become very time consuming and often diverts the medical staff's attention from the really ill patients.

Casual visitors will continue to arrive in the casualty and emergency department. There exists a wide disagreement as to how these patients were to be managed. One view holds that the doors of the casualty department should be closed to these patients in order to increase the efficiency in dealing with the real emergencies⁴.

A more liberal stand has been taken by another researcher who states that no patient should be turned away from the department, however trivial his complaint may seem. Such a patient may be referred to his general practitioner, if he has one, or be treated in the department and subsequently be referred to a general practitioner⁵.

Looking at the disposition of patient, it becomes obvious that while in the specialties of medicine and surgery, 65 per cent and 75 per cent of the patients respectively were treated and discharged, the situation was different under the specialties of orthopedics and pediatric medicine, in which about 100 per cent and 80 per cent respectively were referred to the concerned specialists. The high percentage of patients 'treated and discharged' in 'medicine' represents the large number of patients who rush to the casualty with minor complaints like fevers and coughs. In 'surgery, they comprise of patients with minor lacerations, abrasions and wounds, with colic's, and patients requiring tetanus toxoid injections.

A large percentage of patients required referral to the specialist in 'orthopedics' and 'pediatric medicine, partly because of poor facilities for treating them at casualty level and also because the condition of the patients required admission and specialist care, as has been seen by the low percentages of 0.4 per cent and 20 per cent of patients who were 'treated and discharged' in these two specialties respectively.

From the study of medico-legal cases, it emerges that about 8 per cent of the casualty attendance during the period of study were medico-legal cases.

Sensitivity to legal concerns in the casualty and emergency department has been an important element in the successful delivery of high quality of emergency care. Hospitals and physicians should establish policies and protocols for dealing with recurring legal issues⁶. Close cooperation among the casualty staff personnel and the legal authorities, both the police and judiciary will obviate the need for unnecessary confrontation between the two and the ultimate beneficiary will be the patient brought into the casualty and involved in legal disputes⁷.

It was observed during the study that patients with even very trivial injuries were required to be registered as medico-legal. This increases the workload of the medical personnel as extensive documentation of all these cases becomes necessary. Similarly, a large number of patients were being brought in by the police for medical opinion regarding alcohol intoxication. This again increases the workload of the doctors. Furthermore, no objective criteria have been given to the doctors to assess such cases. A simple solution to this problem would be the use of breath analyzers by the police personnel themselves, which, besides being a more objective procedure, would obviate the need for medical examination of most of these patients.

सारांश

आपातकालीन चिकित्सा विभाग किसी भी अस्पताल का एक महत्वपूर्ण विभाग होता है। अस्पताल के नियमित बहिरंग रोगी विभाग में रोगियों को देखे जाने का समय समाप्त हो जाने के पश्चात मरीजों को अक्सर कई बार आपातकालीन चिकित्सा विभाग में ही दिखाने जाना पड़ता है। प्रस्तुत अध्ययन सफ़दरजंग अस्पताल के आपातकालीन चिकित्सा विभाग में आने वाले विभिन्न प्रकार के रोगियों के विषय में बताता है। इसके साथ-साथ रोगियों के मिले-जुले मामलों के ढांचे का विस्तृत विश्लेषण भी इस अध्ययन में किया गया है। इस प्रकार न्याय-सम्मत चिकित्सा के मामलों की रूपरेखा देने के साथ-साथ इलाज करने वालों को इसमें शामिल किए जाने के लिए काम-काज का बोझ कम करने के लिए कुछ सुझाव भी वर्तमान अध्ययन में दिए गए हैं।

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