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A STUDY OF MORBIDITY PATTERN IN A RURAL COMMUNITY

I. J. Singh*

ABSTRACT

This paper describes the morbidity pattern in the out-patients attendance of field practice villages of Rural Health Training Centre, Department of Preventive and Social Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi, during July 1975 to June 1976, The out-patient attendance was recorded on predesigned morbidity sheets according to age, sex, season and new episodes respectively. The knowledge of morbidity pattern is beneficial to know which types of diseases occur more, in which age and sex groups and its relative importance with seasons. It is also essential to know the changing pattern of the morbidity among rural community so that quantity of drugs at a certain level is supplied to the health sub centers accordingly.

For planning and implementation of health services in a meaningful way, it is imperative on the part of health administrators to have an insight into the morbidity pattern of the people concerned. Thus, the value of knowing the morbidity pattern of disease in rural area is essential particularly in a developing country like India. Since 80 per cent of the population of India lives in rural areas, the planning of health programmes must be geared towards rural health development so that the optimum development of a healthy nation can be obtained. The health problems become more acute in rural areas because of the different attitudes of the population towards personal hygiene and prevailing poor environmental conditions coupled with low socio-economic and

Statistician, Department of Preventive & Social Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi

low literacy status. This study, therefore, is an attempt to assess the morbidity pattern in rural population so as to help launch a proper health promotion programme. This type of evaluation in relation to the prevalent disease conditions will be beneficial for various reasons namely, (a) to obtain sufficient knowledge about the pattern of morbidity in rural community with regard to which diseases affect most in which age, sex group and its relative importance to seasons and environmental factors, their incidence and mode of spread, (b) to know the changing pattern of the morbidity among the community of rural areas so as to provide health services accordingly.

Method and Materials

The study pertains to three field practice villages *vis.* Ledhupur, Tilmapur and Hiramanpur, registered with Rural Health Training Centre, Chiraigaon, of the department of Preventive and Social Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi; covering 565 families with a total population of 3,717 during the period July 1975 to June 1976. Since, the villages under study were the total villages under Rural Health Training Centre right from its inception; hence the data have been collected and presented for the same only. Paucity of funds, staff and other resources like transport, medicines etc. could permit the selection of only such villages which were near to the Rural Health Training Centre, and could be approached by the staff even in the absence of any conveyance arrangement. These three villages were taken to provide "Total Health Care" through a team which was visiting every day in the morning from RHTC to all these villages. Care was taken not to miss a single case of morbidity in terms of providing health education to the villagers, maintaining contact with the family and providing them with free medicine and consultations, whenever required from time to time. Every day field visits were made by the social scientist and A.N.M. because the team for each village comprised of one medical officer, one social scientist, one laboratory technician, one A.N.M. and an intern. If a member of any family was found to be sick, then he was advised and motivated to attend the OPD in the respective villages. The patients were seen by respective medical officers and interns. Necessary laboratory investigations were performed, whenever required. The laboratory investigation of the blood, stool, sputum and urine was done either in the village OPDs or at the Centre. During the study period, the investigations for blood were done for Hb. TLC, DLC and ESR in 775 patients, stool in 617, sputum in 116, urine in 74 and skin smear, night blood smear and MP were done in 16, 13 and 59 patients respectively. The morbidities were recorded on predesigned morbidity sheets according to age, sex, episodes and month of attack. A family folder was maintained of each family which incorporated the demographic, socio-economic and environmental sanitation particulars.

Results and Discussion

General Particulars: In these villages the total families were 565 with a total population of 3,717 heads. Out of the total families, 541 (95.8%) were Hindus and remaining 24 (4.2%) were Muslims. In these villages maximum number of families *i.e* 184 (32.6%) were skilled labor and 174 (30.8%) were agriculturists. Unskilled labor and business groups were found to be in 78 (13.8%) and 29 (5.1%) families respectively. Weaver's families were 17 (3.0%) only. The number of families engaged in services were 83 (14.7%) at different places.

Out of 565 families, 373 (66.0%) had the *kutcha* houses, 89 (15.8%) *pucca* and 103 (18.2%) *kutcha* and *pucca* mixed houses. However, 180 (32.2%) of them had two rooms and 174 (30.8%) had only one room. The average number of living rooms was found to be 2.55 (i.e. .3) with Standard Deviation (S.D.) 1.65. Besides living rooms only 161 (28.5%) had adequate ventilation In maximum number of families *i.e.* in 284 (30.3%), the kitchen was found to be in living rooms and in 255 (45.1%) families, kitchen was separate.

According to diet habits 95 (16.8%) were vegetarian, 52 (9.2%) were non-vegetarian and occasionally non-vegetarian were 418 (74.0%). The average earning member per family was 2.11 *(i.e.* 2) with S.D. 1.45. So far as income is concerned, 4.6 per cent families were observed to have income of less than Rs.50 per month. In about 48 per cent families, monthly income ranged between Rs. 75-150 and in 27.1 per cent families monthly income was found to be between Rs.151-300. The average *per capita Income* was found to be Rs.29-83.

Out of total population, under fives were 14.8 per cent in which infants were 3 per cent. The school going children were 27.5 per cent. There were 42.3 per cent adults, among these 50.4 per cent were males and 49.6 per cent were females. The age group of 45 years and above constituted 15.3 per cent of the total population.

The analysis was done on the basis of attendance of new patients only. It was to be noted that a total of 7,183 cases were attended at the different sub centers during the study period and among them 3,602 were new patients.

Age and sex differentials in attendance rates: Table 1 shows that the demand for out-patients was maximum (25.21%) for the age group (1-4) years and more from males than females. The second position (17.55%) was in the age group (15-24) years in which females were more than males. Dutta and Kale in a study reported the maximum attendance in the age group (25-44) years and minimum in the age group (15-24) years and above 45 years of age[1]. Attendance from under 15 years was found to be 60.50 per cent of the total attendance. These findings were higher than the observations made by some workers previously in other studies i.e. children up to 14 years formed 42 per cent in Andhra, 55 per cent in Gujarat, 47.4 per cent in Pondicherry and 40 per cent in Uttar Pradesh. The attendance in under 5 years of age was also high (37.18%) as compared to 28.1 per cent in Pondicherry, 23 per cent in Andhra, 27.2 per cent in Gujarat and 22 per cent in U.P. studies.

The out-patient attendance according to actual population was calculated and it was seen that the annual attendance rate was 96.9 per 100 population, among these 93.77 per 100 population was in males and 100.46 per 100 population was in females. Seal *et al* observed morbidity prevalence 19.4 per 100 populations in the general health survey of Rangiah community development block in Assam and Rao *et at.* Found 13.27 per 100 population during the general health survey of Chiraigaon-Block2, 3. The morbidity rate according to the Rao *et at.* Was bound to be underestimated as only one visit was paid to the families and the recall period was too long (one year). A family survey of morbidity was done in one field practice village (Ledhupur) during January 1976 to December 1976 by Panday who observed the morbidity prevalence 99.04 per 100 population, among these 91.27 per 100 population was for males and 107.72 per 100 population was for females4.

TABLE 1
DISTRIBUTION OF ATTENDANCES ACCORDING TO AGE AND SEX

Age in Years	Male				Female				Both			
	Number	Attendances	%	Rate/100 Population	Number	Attendances	%	Rate/100 Population	Number	Attendances	%	Rate/100 Population
≤ 1	68	232	12.53	341.18	44	199	11.37	452.27	112	431	11.97	384.82
1-4	231	565	30.51	244.59	209	343	19.60	164.11	440	908	25.21	206.36
5-9	325	294	15.87	90.46	274	223	12.74	81.39	599	517	14.35	86.31
10-14	249	202	10.91	81.12	176	121	6.92	68.75	425	323	8.97	76.00
15-24	326	218	11.77	66.87	361	414	23.66	114.68	687	632	17.55	91.99
25-44	466	213	11.50	45.71	419	308	17.60	73.51	885	521	14.46	58.87
45-59	178	72	3.89	40.45	165	79	4.51	47.88	343	151	4.19	44.02
60& above	132	56	3.02	42.42	94	63	3.60	67.02	226	119	3.30	52.65
Total	**1,975**	**1,852**	**100.00**	**93.77**	**1,742**	**1,750**	**100.00**	**100.00**	**3,717**	**3,602**	**100.00**	**96.91**

X^2 - 162.62, df - 7, P < .001

The attendance was highest for children below 5 years *i.e.* 242.57 per 100 population followed by school going children. Dutta and Kale have reported the maximum attendance 118.6 per 100 population in under 5 years of age and Rao reported its frequencies about 487.5 per 100 population1,5. A decreasing trend was observed in the attendance rate as age advanced with the exception of (15-24) years and above 60 years of age groups respectively. A decreasing trend with the age was also seen in both the sexes with the exception of 60 years and above age group for males and of (15-24) and above 60 years of age groups for females respectively. The age-wise attendance between male and female was significantly different. [(X^2=162.62,df=7, P <.001)]

Morbidity Differentials: Table 2 shows the distribution of morbidity according to sex. It was seen that maximum number of patients suffered from either G.I.T. or respiratory diseases. The percentages were 27.90 and 19.71 respectively. Rao reported the Gestro Intestinal Tract and respiratory diseases in 11.9 per cent and 27.2 per cent in 1972 and 28.0 per cent and 32.0 per cent in 1971 respectively5. it was found 17.48 per cent and 19.57 per cent in Pondicherry, 18.7 per cent and 16.1 per cent in Andhra Pradesh, 23.4 per cent and 24.7 per cent in Gujarat studies respectively. Pandey also observed that respiratory diseases were the most common sickness followed by the G.I.T. whereas Rao *et at*, reported the G.I.T. followed by respiratory tract infections4,3. Out of total attendance of patients 4.72 per cent suffered from eye diseases whereas Rao reported 8.5 per cent and Panday 7.29 per cent respectively5,4. A total of 10.19 per cent suffered from skin diseases as compared to Rao 9.7 per cent and Pandey 9.60 per cent, whereas it was found 13.53 per cent in Pondicherry, 9.6 per cent in Andhra Pradesh and 17.0 per cent in Gujarat studies5,4. Nutritional deficiency was found to be in 4.58 per cent whereas Rao reported in 4.1 per cent5. This percentage was' 13.50 in Pondicherry, 9.6 in Andhra and 2.2 in Gujarat. The injury and accidents were found in 2.9 per cent of patients. It was found 5.80 per cent in Pondicherry, 3.6 per cent in Andhra Pradesh and 6.8 per cent in Gujarat studies. Other types of diseases like Pyrexia or Unknown Origin (P.U.O.), irregular menstruation, giddiness, epilepsy and lymphadenitis etc. were found combined together in 16.85 per cent in which P.U.O. was the most common and found to be in 14.77 per cent of the total. It

TABLE 2

DISTRIBUTION OF MORBIDITY ACCORDING TO SEX

Morbidities	Male (N-1975)			Female (N=1742)			Both (N=3717)		
	Number	%	Rate/100 Population	Number	%	Rate/100 Population	Number	%	Rate/100 Population
gastrointestinal Disease	497	26.84	25.16	508	29.03	29.16	1,005	27.90	27.04
Respiratory Disease	383	20.68	19.39	327	18.68	18.77	710	19.71	19.10
Eye Disease	75	4.05	3.80	95	5.43	5.45	170	4.72	4.57
E.N.T. Disease	131	7.07	6.63	116	6.63	6.66	247	6.86	6.65
Skin Disease	212	11.45	10.73	155	8.86	8.90	367	10.19	9.87
Bones and Joints Disease	43	2.32	2.18	70	4.00	4.02	113	3.14	3.04
Dental Disease	13	0.70	0.66	22	1.26	1.26	35	0.98	0.94
Nutritional Deficiency	84	4.55	4.25	81	4.63	4.65	165	4.58	4.44
Injury and Accidents	77	4.16	3.90	28	1.60	1.61	105	2.91	2.83
Parasitic and Infectious Disease	41	2.21	2.08	37	2.11	2.12	78	2.16	2.10
Other Diseases	296 .	15.98	14.99	311	17.77	17.86	607	16.85	16.33
Total	1,852	100.00	93.77	1,750	100.00	100.46	3,602	100.00	96.91

$X^2 = 46.05$, df = 10, $P < .001$

was found 4.11 per cent in Pondicherry, 10.7 per cent in Andhra Pradesh and 6.5 per cent in Gujarat studies. Seal *et al.* also reported that the most important cause of sickness during the year of study was fever of known and unknown origin (34.1%) followed by G.I.T. diseases[6]. The parasitic and infectious diseases like malaria, mumps, filariasis, tetanus, polio etc. all combined together was 2.16 per cent and patients who suffered from E.N.T. diseases were 6.86 per cent. According to actual population also, G.I.T. and respiratory diseases formed the most common illness with attendance rates 27.04 and 19.10 per 100 populations respectively. Excluding other causes, the groups of morbidities of higher attendance in order of magnitude were other types of diseases, skin, ENT and eye which accounted 16.33, 9.87, 6.85 and 4.57 per 100 populations respectively. Sex-wise, in all groups of morbidities, the attendance rates per 100 populations were higher for females than males with the exception of respiratory, skin, injury and accidents. Pandey also observed the higher morbidity rates for females than males .with the exception of the skin and other types of diseases4. The overall differences of morbidity pattern in attendance between male and female was found to be statistically significant [(X^2=46.05,df=10,F <.001)].

By and large, the attendance rate per 100 populations for most of the diseases showed a decreasing trend as age advanced (Table 3). But Seal *et al.* from Talcher reported that the age-wise morbidity rate was highest among persons of 55 years and above followed by (5-15) years of age group while Pandey and Rao *et al.* observed the highest morbidity rate in the age group (1-4) years[6,4,3]. The exceptions for the above age-wise decreasing trend were conditions of G.I.T., nutritional deficiency and other types of diseases for (15-44) years of age group and condition of eye disease for 45 years and above age groups. The bones, dental, parasitic and infectious diseases were more for (15-44) years of age group and minimum in the under 5 years and above 45 years of age groups respectively. Pandey reported that the rates of respiratory, eye and other types of diseases were more for the age groups 55 years and above, whereas G.I.T. and skin diseases were maximum for the age group (1-4) years and for infant's respectively4. The difference of morbidity pattern in attendance among the age groups was found to be statistically significant (x2=279.67,df=27,P <.001).

TABLE 3
DISTRIBUTION OF ORBIDITY ACCORDING TO SEX

Age In Years Morbidity	Upto 4 Yrs.(N-552)		(5-14) Yrs.(N=1024)		(15-44)Yrs.(N-1572)		(45 & above)(N=569)		
	Number	Rate/100 Population	Number	Rate/100 Population	Number	Rate/100 Population	Number	Rate/100 Population	Total
Gastro-Intestinal Tract Disease	514	93.12	165	16.11	260	16.54	66	11.60	1,005
Respiratory Disease	262	47.46	175	17.09	202	12.85	71	12.48	710
Eye Disease	68	12.32	34	3.32	47	2.99	21	3.69	170
E.N.T. Disease	84	15.22	87	8.50	67	4.26	9	1.58	247
Skin Disease	118	21.38	115	11.23	111	7.06	23	4.05	367
Bones and Joints Disease	11	1.99	30	2.93	86	5.47	21	3.69	148
Nutritional Deficiency	59	10.69	35	3.42	60	3.82	11	1.93	165
Injury and Accidents	21	3.80	39	3.81	39	2.48	6	1.05	105
Parasitic and Infectious Disease	9	1.63	19	1.85	41	2.61	9	1.58	78
Other Diseases	193	34.96	141	13.77	240	15.27	33	5.80	607
Total	1,339	242.57	840	82.03	1,153	73.35	270	47.45	3,602

$X^2 = 279.67$, df = 27, $P < .001$

Seasonal Differentials: Table 4 shows the distribution of patients according to season and sex. Thus, looking at the season-wise occurrence of attendance, it was observed that least number of attendance rate per 100 population (15.52) was in the winter season which is the harvesting season. The maximum attendance *i.e.* 49.29 per 100 populations was in rainy season followed by the summer season (32.10). Dutta et al. have also reported the maximum attendance in rainy season and minimum in winter season7. According to sex, both in summer and rainy season, the attendance rate per 100 population was higher for females than males, but in summer season this rate was more for males. The sex difference according to seasons in attendance was statistically significant (X^2=11.03,df=2,P *C* .01)-

All the morbidity attendance rates per 100 population were more in rainy season followed by summer season with the exception of the morbidity of bones and joints, injury and accidents which were more in summer season followed by rainy season, dental diseases were more in winter season followed by summer season and parasitic and infectious were more in summer followed by winter season respectively. Statistically, all the morbidity attendances in different seasons were significantly different except dental, parasitic and infectious diseases. The values of X^2 are given in Table 5. The occurrence of morbidity according to sex in different seasons was also observed and it was found that the attendance rates per 100 population for all types of diseases were more in males than females, except G.I.T., bones and joints, dental and other types of diseases in summer season, but in rainy season the attendance rates per 100 population for G.I.T., eye, ENT, bones and joints, dental, nutritional deficiency, parasitic and other types of diseases were more in females. The attendance rate per 100 populations during winter season was more in males for only skin, nutritional deficiency, injury and accidents. The season-wise distribution of attendance was found to be significantly different (X2=969.0, DF=2, P < .001).

Conclusions

In this study, a decreasing trend was seen in attendance rate per 100 population as age advanced except the age groups (15-24) years and above 60 years. Sex-wise also, a decreasing trend was observed in these rates as age advanced with

TABLE 4

DISTRIBUTION OF OUT PATIENTS ATTENDANCE ACCORDING TO SEASON AND SEX

Sex	Male (N=1975)		Female (N=1742)		Both (N-3717)	
Season	No. of Attendance	Rate/100 Population	No. of Attendance	Rate/100 Population	No. of Attendance	Rate/100 Population
Summer (March to June)	644	32.61	549	31.51	1193	32.10
Rainy (July to October)	945	47.85	887	50.92	1832	49.29
Winter (November to February)	263	13.31	314	18.03	577	15.52
Total	1852	93.77	1750	100.46	3602	96.91

X^2 - 11.03, df = 2, P < .01

TABLE 5

DISTRIBUTION OF MORBIDITY ACCORDING TO SEASON AND SEX

Season	Summe r			Rainy			Winter			Grand Total	X^2 for the difference between seasons
Morbidity	Male N-1975	Female N=1742	Total N-3717	Male N-1975	Female N-1742	Total N=3717	Male N-1975	Female N-1742	Total N-3717		
gastrointestinal Tract Disease	168 (8.51)	159 (9.13)	327 (8.80)	262 (13.27)	252 (14.47)	514 (13.83)	67 (3.39)	97 (5.58)	164 (4.41)	1005	201.2, P < .001
Respiratory Disease	117 (5.92)	97 (5.57)	214 (5.76)	191 (9.67)	158 (9.07)	349 (9.39)	75 (3.80)	72 (4.13)	147 (3.95)	710	95.4, P < .001
Eye Disease	35 (1.77)	30 (1.72)	65 (1.75)	35 (1.77)	56 (3.21)	91 (2.45)	5 (0.25)	9 (0.52)	14 (0.38)	170	54.9, P. < .001
E.N.T, Disease	47 (2.38)	40 (2.30)	87 (2.34)	69 (3.49)	62 (3.56)	131 (3.52)	15 (0.76)	14 (0.80)	29 (0.78)	247	65.1, P < .001
Skin Disease	76 (3.85)	51 (2.93)	127 (3.42)	106 (5.37)	75 (4.30)	181 (4.87)	30 (1.52)	29 (1.07)	59 (1.59)	367	63.3, P < .001
Bones and Joints Disease	24 (1.22)	31 (1.78)	55- (1.48)	13 (0.66)	28 (1.61)	41 (1.10)	6 (0.30)	11 (0.63)	17 (0.46)	113	19.8, P < .001
Dental Disease	4 (0.02)	8 (0.46)	12 (0.32)	5 (0.25)	5 (0.29)	10 (0.27)	4 (0.20)	9 (0.52)	13 (0.35)	35	0.3, P < .05
Nutritional Deficiency	30 (1.52)	19 (1.08)	49 (1.32)	32 (1.62)	43 (2.47)	75 (2.02)	22 (1.11)	19 (1.08)	41 (1.10)	165	11.7, P < .01
Injury and Accidents	38 (1.92)	18 (1.03)	56 (1.51)	26 (1.42)	5 (0.29)	33 (0.89)	11 (0.56)	5 (0.29)	16 (0.43)	105	23.2, P < .001
Parasitic and Infectious Disease	18 (0.92)	9 (0.52)	27 (0.72)	13 (0.66)	14 (0.80)	27 (0.73)	10 (0.51)	14 (0.80)	24 (0.65)	78	0.2, P < .05
Other Diseases	87 (4.40)	87 (4.99)	174 (4.68)	191 (9.67)	189 (10.85)	380 (10.22)	18 (0.91)	35 (2.01)	53 (1.42)	607	285.7, P < .001
Total	644 (32.61)	549 (31.51)	1193 (32.10)	945 (47.85)	887 (50.92)	1832 (49.29)	263 (13.31)	314 (18.03)	577 (15.52)	3602	969.0, P < .001

Note: The attendance rate per hundred populations is given in bracket.

the exception of the age group 60 years and above for males and of the age group (15-24), (25-44) and above 60 years for females respectively.

The G.I.T. and respiratory diseases were found to be. Maximum in this rural society under study the high rate of G.I.T. was mostly composed of diarrhea and dysentery which highlights that the health education as well as steps to improve the environmental sanitation is to be geared up. The attendance rate per 100 populations in female children was higher than males for all the morbidities except respiratory, skin, injury and accidents. According to age, the attendance rate per 100 population was more in under 5 years of children for G.I.T., respiratory, eye, ENT, skin, nutritional deficiency and other types of diseases whereas the attendance rate per 100 population was higher in the age group (15-44) years for bones, dental, parasitic and infectious diseases. For injury and accidents, the rate was maximum and the same was in under 5. Years and in school-going children due to their vulnerability

The maximum attendance rate per 100 populations was observed during rainy season followed by summer season. In all the seasons, the attendance rate was higher for females than males with the exception of summer season. The season-wise morbidity attendance was significantly different. The attendance rate per 100 populations was higher in males than females for all the morbidities in summer season except for G.I.T., bones and joints, dental and other types of diseases, while during the rainy season the attendance rate was higher in females than males for all the morbidities except respiratory, skin, injury and accidents. During winter season also, the attendance rate per 100 populations was higher in females than males for all the morbidities with the exception of nutritional deficiency, injury and accidents.

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CHANCES OF DELIVERING FIRST CHILD SINCE AGE AT CONSUMMATION OF MARRIAGE - A LIFE TABLE APPROACH**

C. P. Prakasam*, Y. L. Arora* and Shanta S„ Rao*

ABSTRACT

In this paper an attempt has been made to assess the chances of delivering first child since age at consignation of marriage and for different durations of married life. As the age at consummation of marriage increases, the chances for women having first delivery within a year's period increases, and after five years of consummation of marriage the chances of delivery were found to be highest for 19-21 years cohort. Life Table method has been used to estimate these chances.

The life table was designed to measure and understand mortality trend but now it is being used by public health workers, demographers and other researchers for the analysis of data. Several studies have been undertaken to evaluate the efficacy of contraceptives by using life table1-4. In demographic studies, life table has been used to study the longevity, orphan hood, length of married life, length of working life etc. This method has also been applied in determining the age at menarche5, duration and nature of termination of pregnancies6, 7. The main function of the life table is to assess the probability of reduction from an initial cohort of population at equal intervals of time. Life table, therefore, gives history of a cohort of population as it gradually diminishes over equal intervals of time.

Objectives

The objective of this paper is to estimate the chances

**Institute for Research in Reproduction, ICMR, Bombay,*

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of delivering the first child within a given period after consummation of marriage and also to assess the proportion of women who have not delivered till a certain time period by application of the life table method.

Material and Methods

Using life table method, it is possible to estimate the probabilities of delivering the first child for different ages at consummation of marriage within a given period. Hence, a group of women was followed till their first delivery were recorded. This constituted the basis for subsequent analysis. Knowing the number of women delivering each year after marriage, from our data, the probabilities of delivering the first child after consummation of marriage were calculated. From the above obtained probabilities, the complementary probabilities of not delivering first child within a given duration were also obtained. Standard error and confidence intervals have also been estimated. Confidence intervals predict that in a set of repeated observations under similar circumstances actual chances of delivering the first child lie within this range in 95 per cent of the cases. For this study, data were collected from 1,532 women attending the family welfare clinics of the Institute for Research in Reproduction (IRR). For the present study, data on age at consummation of marriage and the age at first delivery have been utilized. In majority of the cases marriage and consummation took place at the same time. Cases where the age at marriage was less than ten years and those, where marriage was not followed by consummation, have been excluded of the data collected from 1,532 women, 1,499 women were considered for analysis as the remaining had to be excluded from the analysis for the reasons stated above. These women had never used any contraceptives. Hence, this analysis will provide an understanding of natural fertility, waiting time period for the first delivery for different ages at marriage.

Results and Discussion

Mean and Standard Deviation of the waiting time period for first delivery according to different ages of marriage have been calculated (Table 1). Average waiting time for first delivery decreases as the age at marriage increases. Waiting time was about 5-6 years for women married at ages

10-12. it seems that a majority did not deliver before they were 16 years old. This may be due to adolescent sterility. It was, seen that some degree of adolescent sterility extended up to 17 years of age. For later age groups, say 19+, waiting time was 1-1.5 years. Similar findings have been reported in an earlier study conducted in Uttar Pradesh[10]. Waiting time, however, for age at marriage 20+ was more than two years in this study. This is slightly more than what we have. There is a correlation between age at consummation of marriage and waiting time for the first child. Therefore, Life Table has been prepared for different ages at marriage (Appendix I).

Per cent of women having their first delivery within a year (Table 2) of consummation of marriage was low up to 13 years and increased gradually beyond that. However, it was 45.8 per cent for the age 16 years. There was an increase in fecundity till the age group 22. Thereafter, some fluctuations can be seen in these per cents. Making above statement as a basis for the reproduction among fecund women, the per cent of porous women still non-fecund (that is sterile because of adolescence) at different ages was found to be. 92, 87, 60, 42, 30 and 0 for 12, 13, 14, 15, 16, 17 years of

TABLE 1

MEAN AND STANDARD DEVIATION OF DURATION OF FIRST DELIVERY (YEARS) ACCORDING TO AGE GROUPS OF CONSUMMATION OF MARRIAGE

Age Group of Women at Consummation of Marriage	Number of Women	Average Years of First Delivery	Standard Deviation
10 - 12	82	5.29	2.17
13 - 15	367	2.92	2.07
16 - 18	530	1.79	1.19
19 - 21	336	1.46	0.87
22 - 24	135	1.54	1.07
25 - 29	47	1.29	0.59
30 - 32 ,	2	-	-
Total	1,499		

ages. Pooling data for the women who had married 19+, it was seen that 70.4 per cent had first delivery within a year of married life. In another study, it was seen that 51 per cent had their first birth within a year of married life for women marrying at age 19+9. There could be various reasons for these differences; one of them could be that their spacing patterns may be different.

Proportion of women delivering their first child according to years after consummation of marriage (Table 3) and for different ages at consummation of marriage (Table 4) has been calculated. The women constituting about 50 per cent had their first child within a year of marriage (Table 3). Also 47 per cent and 52 per cent are lower and upper confidence limits for the actual chances of delivering the first child. It was seen that 94 per cent of the women have had first delivery within five years of marriage. This shows that in a general population, under similar circumstances normally 94 per cent of women will deliver at least once within a five year period after marriage and the remaining 6 per cent can be considered to be sterile.

As the age at consummation of marriage increased the proportion of women having their first delivery within a year's period increased from 27 per cent for 13-15 years to 68 per

TABLE 2

PERCENTAGE OF PAROUS WOMEN IN WHOM PREGNANCIES TERMINATED IN ONE YEAR AFTER CONSUMMATION, FOR DIFFERENT AGE AT CONSUMMATION COHORTS

Age at Consummation	Percentage	Age at Consummation	Percentage
12	5.26	18	54.12
13	8.33	19	70.68
14	25.83	20	66.67
15	38.04	21	74.65
16	45.79	22	78.72
17	61.18	23	74.47
		24	51.22

TABLE 3

LIFE TABLE ANALYSIS FOR CALCULATION OF THE RISK OF FIRST DELIVERY ACCORDING TO DURATION OF CONSUMMATION OF MARRIAGE

Year after Consignation of Marriage	Number of Women at the begin-ning of each dura-tion	Delivered during the interval	No. of dropped out for reasons other than pregnancy	No. of women exposed for the risk of delivery	Pro-por-tion deli-vered	Pro-por-tion not deli-vered	Cumulativ proportion not deli-vered	Cumu-lative propor-tion delivered	Standard error	Lower 95% confi-dence limit	Upper 95% confi-dence limit
X, X+n	1_X	T_X	W_X	$1'_X$	Q_X	P_X	P_{OX}	Q_{OX}	Q'_X	L	U
1	2	3	4	5	6	7	8	9	10	11	12
0-1	1,499	751	0	1,499.0	.5010	:4990	.4990	.5010	.0129	.4757	.5263
1-2	748	349	0	748.0	.4666	.5334	..2662	.7338	.0114	.7115	.7561
2-3	399	180	0	399.0	.4511	.5489	.1461	.8539	.0091	.8361	.8717
3-4	219	75	0	219.0	.3425	.6575	.0961	.9040	.0076	.8891	.9189
4-5	144	58	0	144.0	.4028	.5972	.0574	.9426	.0060	.9308	.9544
5-6	86	38	0	86.0	.4419	.5581	.0320	.9680	.0045	.9592	.9768
6-7	48	19	0	48.0	.3958	.6042	.0193	.9807	.0035	.9738	.9876
7-8	29	13	0	29.0	.4483	.5517	.0107	.9893	.0027	.9840	.9945
8-9	16	7	0	16.0	.4375	.5625	.0060	.9940	.0020	.9901	.9979
9-10	9	6	0	9.0	.6667	.3333	.0020	.9980	.0012	.9956	-
More than 10	3	3	0	3.0	1.000	.0000	.0000	1.0000	.0012	.9976	-

cent for 22-24 years cohort. When the marriage duration increased, the proportion of women having first delivery was found to be highest in 19-21 cohorts.

Within five years of consummation of marriage, if a woman had not delivered, then she had only 6 per cent chance in future. Similarly, if we considered these chances according to age at marriage these were 10 per cent for 13-15, years, 2.3 per cent for 16-18 years, .6 per cent for 19-21 years and 3 per cent for 22-24 years cohort. This means that chances of women not delivering at least once within five years' time was found to be more for the age group 13-15, minimum for 19-21 years and was found to increase beyond 21 years. Presence of adolescent sterility explains high per cent in the earlier cohort. This may be the reason for lower chances of delivery in the earlier cohort. Further presence of non-fecundity among women 22-24 years of age would account for a higher per cent not delivering within a five years' time period. This analysis is indicative of the fact that fecundity varies by age. Survey data from eastern Uttar Pradesh reveals that about 28 per cent of females had their first delivery within two years of married life and another 28 per cent during next two years. More than half of females became mothers within four years of their effective married life[11]. In our study, the per cent of females becoming mothers was found to be higher. This could be due to the fact that the above referred study is based on a large survey data and the present study was based on a small sample in an altogether different situation.

TABLE 4

PROPORTION OF PAROUS WOMEN IN WHOM PREGNANCIES TERMINATED AFTER CONSUMMATION OF MARRIAGE, FOR DIFFERENT AGE AT CONSUMMATION

Years after Consummation of Marriage	Age at Consummation of Marriage				All Ages
	13-15	16-18	19-21	22-24	
One Year	.2725	.5340	.6994	.6889	.5010
Two Years	.5204	.8280	.8958	.8889	.7338
Five Years	.8992	.9774	.9940	.9704	.9426

Summary

Life Table is a mathematical model and its main function is to estimate the probability of reduction of the population in given cohort at an equal interval of time. In the present study, a cohort of women assumed to have been exposed to the risk of pregnancy and the chances of first delivery within a given duration after consummation of marriage was estimated. It was found that as the age at consummation of marriage increases the chances of first delivery decreased. Per cent of women who delivered in the first year of their married life was more than later years. As the age at consummation of marriage increased, the proportion of women having first delivery within a year's 'period increased. After five years of consummation of marriage the chances of not delivering- even once was found to be highest in 13-15 cohort, decreased at 19-21 years and later increased in 21-34 years cohort. The lower chances of delivering in 13-15 cohort and higher chances in 21-24 cohort could be attributed to adolescent and primary sterility respectively. In the light in age at marriage which has been emphasized in new population policy may lead more women to have early deliveries and increased number of couples for acceptance of family planning methods, if proper motivation is provided. On the contrary, increasing age at marriage beyond 21 years may lead to more number of non-fecund women and create a negative attitude towards. the programme.

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APPENDIX I

Life Table Calculation 4, 8:

Column 1 Years after consignation of marriage, X,X+n is the interval, where n = one year in this study.

2 l_X Number of married women at X.

3. T_X The number of married women delivered first child during the interval X to X+n.

4 W_X Number of married women withdrawn from the study for reasons other than pregnancy. (Widowhood, divorce and separated, etc.) Since women who have delivered at least once were considered. This column will have no data.

5 l'_X Number of women exposed to the risk of first delivery after consummation of marriage.

$l_X = l_X - ({}^W x/2)$. Since ${}^W x$ is zero $l_X = l_X$ in this study.

6 q_X Proportion of women who have delivered first child during the interval

$q_X = T_X/l_X$.

7 P_X Proportion of women who have not delivered first child during the interval. $P_x=(l-q_x)$.

8 P_{OX} Cumulative proportion of women who have not delivered first child during the interval.

$Pox = P_l \times P_2 \times P_3 \times \cdots \times P_n-^1$

9 Q_{OX} Cumulative proportion delivered.

10 Q_X Standard error

$$Q'_x = P_{OX} \sqrt{\sum_{X=0}^{X-1} \frac{qx}{l'_x - T_x}}$$

11, 12 Confidence interval

$$Q_{ox} \pm 1.96\, Q'_x$$

The above life table analysis has been applied to 13-15, 16-18, 19-21, 22-24 age groups of consummation of marriage cohort.

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PATIENTS' VIEWS ON STD CAUSATION - A CASE FOR SEX EDUCATION

V. Narayan* and J. V, Singh*

ABSTRACT

Three hundred male STD patients were interviewed to know their views on the disease causation and the preventive measures adopted by them. Only 36 per cent considered the illness due to sex relations with an infected partner and their educational status did not have any significant bearing on these views. About 32 per cent patients had some information of the preventive measures; common ones adopted by a small number being Urinating after the act' and 'Use of Condom. The commonest source of this awareness was friends whose own inadequate knowledge led to irrational concepts in the patients which call for the urgency of a sex education programme.

Indiscriminate sex relations are of paramount importance in the spread of sexually transmitted diseases (STD), but the associated social stigma and lack of sex education are accountable for various reactions of the patients regarding the disease causation. Many of the patients either deny the history of exposure or if admit, they attribute the disease to some unscientific reason. The precautions taken- by the individual also depend upon his knowledge of the disease causation and the preventive measures.

Study Objectives

The present study has been an attempt to know the views of the STD patients regarding the causation of their disease and preventive measures, if any, adopted by them, so as to

**Lecturers Upgraded Department of Social and Preventive Medicine King George's Medical College, Lucknow*

provide a basis for planning an effective programme of sex education.

Material and Methods

Three hundred clinically diagnosed male cases of acquired venereal infections, who attended the STD clinic of K.G.'s Medical College, Lucknow, during the year 1976 were interviewed and their opinion was sought on the causation of their disease condition and also, if they had taken any preventive measures. Only male cases were selected because of the socio-cultural barriers in interviewing female patients by the male researchers. The information's elicited were recorded on a pretested schedule and were then analyzed.

Observations and Discussion

The various sexually transmitted diseases in the patients studied were syphilis (different types) 44 per cent, gonorrhea 26 per cent, cancroids 9 per cent and mixed infections 21 per cent.

The analysis of the patients' views regarding disease causation revealed that only 36 per cent considered that their disease is due to sex relations with an infected partner (scientific). Remaining, 64 per cent had various reasons (Table 1). 'Wearing other's undergarments', 'Sex relations during menstruation, 'Over indulgence in sex and 'Sex in hot weather were the considerations of disease causation of a large number of cases (Table 1A). Thus, it is clear that only about one-third patients were aware about the STD causation and could attribute the disease condition to their knowledge.

TABLE 1

PATIENTS' VIEWS REGARDING THE CAUSATION OF THE DISEASE

Patients' Views	Number	Per cent
Scientific		
Sex relations with infected partner	108	36.0
Base	192	64.0
Total	300	100.0

Only few researchers have included the analysis of patient's views on the causation of disease in their studies. Prasad *et at.* have discussed these under superstitions and reported the patients superstitions as: night discharge (44.8%); social contact with prostitutes or persons visiting prostitutes (16.32%); urinating over hot stone (10.20%); intercourse during menstruation, homo-sexuality, coitus in hot weather (6.13% each); eating of hot things, and over indulgence in sex (4.08% each); and wearing of wet under wears (2.04%)1,

Siddhu *et at.* have analyzed the patient's notions regarding the causation of venereal diseases and concluded that alcohol (7.2%), hot spicy food (10.5%), excess of body heat (0.8%), sexual intercourse with a woman during menses phase (5%),using a urinal or lavatory previously used by a venereal disease patient (3.3%) were the funny notions that .prevailed amongst the cases?.

TABLE 1
A PATIENT's VIEWS REGARDING THE CAUSATION OF THE DISEASE (FACTOR WISE)

Patients' Views	Number	Per cent
Sex during menstruation	32	16.7
Overindulgence in sex	39	20.5
Sex in hot weather	17	8.9
Night discharge	8	4.2
Urinating around religious places	26	13.5
Urinating at dirty places	34	17.7
Eating hot food	22	11.5
Wearing others undergarments	46	24.0
Scratching penis with nails	5	2.6

Gupta has commented that only 5 per cent of the patients gave positive history of exposure and the remaining provided wrong information; while Seth observed that 82 per cent cases were not aware of disease causation and 5 per cent gave doubtful replies3,4. Nayyar *et at,* and Mathur have found that 69 per cent and 56 per cent patients respectively were not aware that their disease was due to sexual contact5,6. The findings of the present study show some similarity with the findings of these researchers. Nair *et at,* have however, reported that 83 per cent of the male patients had the correct idea of the nature of their disease7.

Considering that the educated are better informed about STD, the educational status of the patients was analyzed in relation with their views on disease causation (Table 2). It was observed that the scientific' awareness was. highest in those who had studied up to graduation and above, and was comparatively less in those having formal education up to the middle or high school standard. However, the association between the patients' views on the disease causation and their educational attainments was not found significant ($p > 0.05$), making a strong case for introducing sexual health education at the school level.

TABLE 2
PATIENTS' VIEWS ON CAUSATION OF DISEASE AND THEIR EDUCATIONAL STATUS

Educational	Causation-	-Views	Total	Per cent	Scientific Awareness Percentage
	Scientific	Others			
Illiterate	37	75	112	37.3	33.0
Literate	8	18	26	8.7	30.8
Primary	8	20	28	9.3	28.6
Middle	10	17	27	9.0	37.0
High School	11	23	34	11.4	32.4
Intermediate	10	15	25	8.3	40.0
Graduate and above	24	24	48	16.0	50.0
Total	108	192	300	100.0	36.0

The knowledge regarding the awareness of preventive measures was also elicited, and it was found that 32.7 per cent patients had some information. The precautions adopted by these patients in respect of their present infection are shown in Table 3.

It has been interesting to observe that irrespective of the awareness of the role of coitus as well as the precautions, 21.4 per cent did not take any measures in this direction. Urinating after the act and Use of condom were the precautions adopted by 17.4 per cent and 16.3 per cent cases respectively.

The use of condom has been commented by many workers but has not been analyzed empirically. Prasad e*t at.* studied the measures adopted by STD patients and concluded that 70.7 per cent did not take any precaution while 17.3 per cent washed their genitals with water, 6.6 per cent with soap and 5.3 per cent cleaned the genitals with their own urine1. Chatterji *et .al.* have reported from armed forces that 36.8 per cent used condom and 26.4 per cent attended the P.A. rooms while the remaining did not take any action8. Our findings fall in line with these workers, and it is surprising that there has been no increase in the awareness with the passage of time.

TABLE 3

PRECAUTIONS TAKEN BY THE PATIENTS HAVING INFORMATION ABOUT PREVENTIVE MEASURES

(n = 98)

Precautions	Number	Per cent
Use of condom	16	16.3
Washing of organ	10	10.2
Urination after Act	17	17.4
Use of condom and washing of organ	11	11.2
Use of condom and urination after Act	7	7.1
Washing of organ and urination after Act	16	16.3
None	21	21.4
Total	98	100.0

The main source of the information regarding causation of disease and its prevention as suggested by patients studied were: friends (53.1%), literature (14.3%), films (12.2%), and others (20.4%). The observations of Nayar *et at, are* in conformity with those of this study as they too have found that few of those having knowledge about STD had acquired it from friends and books5.

Conclusion

Since the awareness regarding the STD causation was not found scientific in 64-per-cent of the patients studied and their educational attainments had no association with their knowledge about STD causation, the urgency of introducing sex education needs no emphasis. People not only have inadequate knowledge of sex but also harbor many misconceptions which lead them to immature sex experimentation and thereby exposing themselves to venereal infections. The dilemma of the situation is that even those who know the relationship between promiscuity and STD indulge in such sexual activity. It may be due to their intense sexual urge or because of social and environmental pressures, and in this situation they try to protect themselves with such precautions which do not offer effective prevention. It can be largely attributed to their ill-informed sources as is evident from the findings of the present study.

Sex education can provide an effective answer to this problem but this will have to take the form of an inbuilt process in the educational system so that by the time one attains puberty he is well informed. The education on sex should become an important aspect of social learning in contemporary society.

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ON A PROBABILITY MODEL FOR CLOSED BIRTH INTERVAL

S.N. Singh*, R.C. Yadava and A. Pandey*****

ABSTRACT

A probability model for distribution of r^{th} order closed birth interval to a female with at least r births and a given marital duration has been derived under certain assumptions. The model so derived will be useful for the real situations as it is free from truncation bias and relates to the data of recent past. The model is applied to an observed distribution and it describes the data satisfactorily well.

In recent years much attention has been paid by several researchers towards the study of child spacing and consequently the analysis of data on birth intervals. It is due to inverse relationship between the birth rate and the time between successive births. The data on birth intervals are taken as indicators of reproductive performance and differences in observed distributions of birth intervals are considered to reflect differential patterns of reproduc-tionl1,2. Also in underdeveloped countries where literacy is very low, the analysis of birth intervals has a special significance, particularly the data on birth intervals occurring in the recent past.

Various authors have derived probability distributions for closed birth intervals, the closed in the sense that the time closed by two births*, under varying set of assumptions1, 2,3,4,5. All the models mentioned above implicitly

**Professor of Statistics and Head' Department of Mathematics and Statistics, and Director, Demographic Research Centre, Banaras Hindu University, Varanasi. **Reader in Statistics, Department of Mathematics and Statistics, Banaras Hindu University, Varanasi. ***Junior Research Fellow, Demographic Research Centre, Banaras Hindu University, Varanasi.*

assume the continuance of observations for sufficiently long time. As a result, these models are applicable only for the situation where the reproductive period is sufficiently large for all women to have an $(r+l)^{th}$ birth after r^{tn} birth ($r > 0$). Thus, it becomes difficult to include those females who have shorter marital duration. In this context Shapes *et al.* proposed a theoretical continuous time model for closed birth interval of any specific order with a fixed marital duration on the basis of the results of the renewal theory. For practical situations it is desirable to have specific forms of the distribution functions of various components of birth intervals. In this paper we have derived a model for r^{tn} order closed birth interval of a woman with marital duration T under a varying set of assumptions, which may be useful for the real situations. Its application is illustrated to one set of observed data taken from Varanasi Survey (1969-70).

The Model

A probability distribution for describing the variation in the length of rth order closed birth interval of a woman with marital duration T, has been derived under following assumptions:

i. The time interval of first conception after marriage follows an exponential distribution with density function

$$f_O(t) = \lambda e^{-\lambda t}, \quad t > 0, \ \lambda > 0 \quad (2.1)$$

ii. The duration between rth and $(r+1)^{tn}$ conception follows a displaced exponential distribution with p.d.f.

$$f_r(t) = \lambda e^{-\lambda (t-h)}, \quad t > h, \ r = 1,2,3,..(2.2)$$

where A is a constant, called the conception rate and 'h' is the period of non-susceptibility including gestation period and the period of postpartum amenorrhea (PPA).

iii. Every conception results in a live birth.

Though the proportion of fontal losses is significant, we have preferred to ignore them because in the study of fertility it is the live birth which is of importance and the omission of foetal losses from the consideration would mean just lowering of the instantaneous live birth conception rate. Besides the amenorrhea and gestation periods can be then safely regarded as almost constant as a first approximation.

Let X_r denotes the length of the r^{th} order closed birth interval ascertained on or before the survey point T. Then under the above assumptions the p.d.f of X_r is given by

$$k_o(x) = \frac{\lambda e^{-\lambda x}}{G_o(t)} \quad , \quad 0 < x < t-g \tag{2.3}$$

and

$$\underset{(r>0)}{k_r(x)} = \frac{G_{r-1}(t-x)\ \lambda e^{-\lambda (x-h)}}{G_r(t)} \quad ,h < x < t-g, \tag{2.4}$$

$$\text{where } G_r(t) = \begin{cases} 0 & , \quad t < 0 \\ 1 & , \quad r < 0, \quad t \geqslant 0 \end{cases} \qquad \text{(Sheps } et\ al.\text{, 1970)}$$

and g is the gestation period associated with a birth and so that

$$G_o(t) = 1 - e^{-\lambda (t-g)} \ , \tag{2.5}$$

$$\underset{(r > 0)}{G_r(t)} = 1 - e^{-\lambda (t-g-rh)} \sum_{s=0}^{r} \frac{\{\lambda(t-g-rh)\}^s}{s!} \tag{2.6}$$

Thus the expression for mean will be given by

$$E_o(X) = \frac{1}{G_o(t)} \left[\frac{1}{\lambda} - \frac{1 + \lambda (t-g)}{\lambda} \ e^{-\lambda (t-g)} \right] , \tag{2.7}$$

And

$$\underset{(r > 0)}{E_r(X)} = \frac{1}{G_r(t)} \left[\frac{1+ \lambda h}{\lambda} - \frac{1+ \lambda\ (t-g-\overline{r-1}h)}{\lambda} \ e^{-\lambda (t-g-rh)} \right.$$

$$-e^{-\lambda(t-g-rh)} \sum_{s=0}^{r-1} \left\{ \frac{h(\lambda(t-g-rh))^{s+1}}{(s+1)!} + \frac{(\lambda(t-g-rh))^{s+2}}{(s+2)!} \right\} \Big] \tag{2.8}$$

In the above model the duration of non-susceptibility period 'h' after each parity is taken to be constant but in practice it is observed that the period of gestation of a conception resulting in a birth is almost constant and the duration of PPA following the birth varies from female to female, though for the same female the variation over parity may be assumed to be negligible. Thus, if it is assumed that
'H' takes values h1, h2, -----, h_m and,Π1,Π2----Πm are the proportion of females with above respective values of h, the model has presumably an extension. The extended model would be given by

$$k_r^*(x) = \frac{\sum_{i=1}^{m} \pi_i k_r(x/h = h_i) \quad P(j \geq r+1/h=h_i)}{\sum_{i=1}^{m} \pi_i P(j \geq r+1/h=h_i)} \tag{2.9}$$

and

$$E_r^*(X) = \frac{\sum_{i=1}^{m} \pi_i E_r(X/h=h_i) \quad P(j \geq r+1/h=h_i)}{\sum_{i=1}^{m} \pi_i \, P(j \geq r+1/h=h_i)}$$

where

$$P[Y=j] = G_{j-1}(t) - G_j(t)$$

Application

Because of simplicity of probability expressions the model can be applied to any order of birth interval obtained in a survey. The application of the described model is illustrated with data on time between the first and second birth taken from the Varanasi Survey (1969-70). Table 1 gives the frequency distribution of time in years from first birth to second birth for 184 females with marital duration of seven years. We have grouped the females with 7, 8 and 9 years of marital duration and have the required study up to seven years of their marital duration in order to get a considerable number of observations for calculating mean.

In the simplified extended model, the duration of non-susceptibility period 'h' takes m values. For Varanasi data Bhaduri, Singh and Bhaduri have demonstrated that the duration of PPA is biraodel6,7. Thus, if as a first approximation it is assumed that 'h' takes two values h1 and h2 with respective proportion of females II1 and II2 (II1+ II2 = 1) the extended model given earlier is given by

$$k_r^*(x) = \frac{\pi_1 k_r(x/h=h_1)P(j \geq r+1/h=h_1) + \pi_2 k_r(x/h=h_2)P(j \geq r+1/h=h_2)}{\pi_1 P(j \geq r+1/h=h_1) + \pi_2 (j \geq r+1/h=h_2)} \quad (3.1)$$

and

$$E_r^*(X) = \frac{\pi_1 E_r(X/h=h_1)P(j \geq r+1/h=h_1) + \pi_2 E_r(X/h=h_2)\ P(j \geq r+1/h=h_2)}{\pi_1 P(j \geq r+1/h=h_1) + \pi_2 P(j \geq r+1/h=h_2)} \quad (3.2)$$

TABLE 1

OBSERVED AND EXPECTED DISTRIBUTION OFFEMALES ACCORDING TO TIME FROM FIRST BIRTH TO SECOND BIRTH, VARANASI SURVEY (1969-70)

Time in years	Observed frequency	Expected frequency $\lambda = 0.58$
1.0 - 1.5	25	28.39
1.5 - 2.0	40	34.39
2.0 - 2.5	37	38.61
2.5 - 3.0	21	27.84
3.0 - 3.5	25	19.77
3.5 - 4.0	17	13.77
4.0 and above	19	21.26
Total	184	184.00
X^2 at 5 d.f.		5.4649

In the present case for T = 7 years, we have h1 = 1.00 year, h2 = 1.75 years and Π1 Π2 = 0.5[6,7.] The estimate of λ. is obtained by the method of moment using observed mean of interval from first to second birth of Varanasi data (1969-70) and the mean under extended model for r = 1. The mean of the observed distribution is computed as 2.5579 years and after substitution the estimate of λ is found to be 0.58.

Once the estimate of λ is obtained, the expected frequencies in column 3 of Table 1 are computed under extended theoretical model. The calculated value of $x.^2$ is 5.4649 at 5 d.f. which is insignificant at 5 per cent level. This shows that the model describes the data sufficiently well.

The model, however, is based on some simplified assumptions but it is appropriate for the situation where there are high chances of recall lapse for the events occurred much before the survey date.

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A MODIFIED PARITY DEPENDENT PROBABILITY DISTRIBUTION FOR COUPLE FERTILITY AND IT'S APPLICATION

I.J. Singh*

ABSTRACT

In this paper a probability distribution for the number of conceptions to a female during a specified period of time (0,T) of length T since her marriage is derived on the assumptions that the conception rate is a function of parity and proportion of incomplete conceptions of first is more than other order of conceptions. The model is applied to an observed >data for illustrative purpose. Its application in the evaluation of family planning programme is also demonstrated.

During the last two decades, several probability models for couple fertility have been presented. Singh and Pathak derived probability distributions for the number of births on the assumption that there is one to one correspondence between a conception and a live birth1, 2, 3, 4. Sheps and Perrin, Singh and Bhattacharya have considered fontal losses also5,6,7. *in* these models, the fertility parameters such as conception rate and proportion of incomplete conceptions (a conception is called complete if it results in a live birth otherwise, it is called incomplete) are assumed to be constant throughout the period of observation. Empirically, it has been observed that these parameters vary from couple to couple and with age and parity for the same couple. Singh et *at.* Attempted this problem by assuming that conception rate is a function of parity and one to one correspondence between a conception and a live birth8. Singh and Singh derived a probability model assuming conception rate to be parity dependent incorporating complete as well as incomplete conceptions[9] in the above mentioned models, the proportion

* *Statistician, Rural Health Training Centre, Chiraigaon, Department of Preventive and Social Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi.*

of incomplete conceptions is taken as constant throughout the period of observation. However, the model may be more realistic to describe the better fertility phenomenon if, the variation in the proportion of incomplete conceptions is also to be taken into account.

The purpose of this paper is to modify the probability distribution given by Singh and Singh assuming the risk of incomplete conceptions of first in more than that of the other order of conceptions9.

The Model

Let X(T), denote the number of conceptions to a female during the period (0,T) of length T since her marriage. The probability distribution is based on the following assumptions which are the same as given by Singh and Singh9. To elaborate, these are as under:

i. The female is susceptible to conception at the beginning of the observational period and has led a married life throughout the period of observation.

ii. The probability that the first conception occurs during the time interval $(t,t+\Delta t)$ is $m_0 \Delta t + 0(\Delta t)$,$m_0 > 0, t > 0$, where mo is the conception rate in the beginning.

iii. Let Θ be the probability that a conception is complete, so $(1-\Theta)$ is the probability of an incomplete conception.

iv. After a conception, there is no possibility of another conception for constant times h1 and h2 where h1 and h2 are the rest periods associated with incomplete and complete conceptions respectively, which includes the duration of pregnancy and postpartum amenorrhea (PPA).

v. Given X(t)=r, r-1,2,3, the conditional probability of a conception during the time interval $(t,t + \Delta t)$ is $m_r \Delta t+0 (\Delta t)$ if r^{th} conception is complete and has occurred prior to (t-h2) or it is incomplete and has occurred prior to (t-h1); zero otherwise, where m_r is the conception rate after the r^{th} conception.

vi. Let a_0 be the probability that the female is exposed to the risk of conception throughout the observational period so that (l-ag) is the probability that she is primarily sterile. Again, let (l-a_r) be the probability that she becomes sterile following the termination of the r^{tn} pregnancy till the end of observational period. This may be either due to the use of cent per cent effective contraceptive methods or due to secondary sterility.

As explained in Singh and Bhattacharya, the maximum number of conceptions to a female during the given time interval (0,T) cannot be more than n, where n=(T/h1) if (T/h1) = T/h1, otherwise, it is equal to (T/h1) + 1, where (T/h1) stands for the greatest integer not exceeding T/h1^1 < h_2.&

Under the assumptions i-vi H_r+1(T) of X(T) is given by the distribution function H_r^{+1} (T) of X (T) is given by

$$H_{r+1}(T)=a_0a_1\dots a_r\left[\sum_{j=0}^{l_r}\binom{r}{j}\theta^j(1-\theta)^{r-j}\left\{\sum_{s=0}^{r}\frac{\left(\prod_{\substack{i=0\\ i\neq s}}^{r}m_i\right)\left(1-e^{-m_s(T-jh_2-r-jh_1)}\right)}{\prod_{\substack{i=0\\ i\neq s}}^{r}(m_i-m_s)}\right\}\right]$$

$$\text{where } l_r=\min.\left[r,\frac{T-rh_1}{h_2-h_1}\right] \qquad ..(2.1)$$

The method of derivation of this distribution function is given in Singh and Singh9. On taking the proportion of incomplete conceptions of first pregnancy is different from the proportion of other order of conceptions; the distribution function H_{r+1}(T) will be in the following form:

$$H_{r+1}(T)=a_0a_1\dots a_r\left[(1-\theta_1)\sum_{j=0}^{l_{r-1}}\binom{r-1}{j}\theta^j(1-\theta)^{r-j-1}+\theta_1\sum_{j=1}^{l_r}\binom{r-1}{j-1}\theta^{j-1}(1-\theta)^{r-j}\right]$$

$$\left[\sum_{s=0}^{r} \frac{\left(\prod_{\substack{i=0\\ i=s}}^{r} m_i\right)(1-e^{-m_s(T-\overline{jh_2}-\overline{r-j}h_1)})}{\prod_{\substack{i=0\\ i=s}}^{r}(m_i-m_s)}\right] \qquad \ldots\ldots(2.2)$$

where 01 is the proportion of the complete conceptions of first pregnancy. The probability of r conceptions during the observational period (0,T) is given by

$P_r = H_r(T) - H_{r+1}(T)$, r=l,2,3,....,n-l.

$P_n = 1 - P[X(T) \leq (n-1)]$, $H_1(T)=a_0(1-e^{-m_0 T})$, $H_0(T)=1$.

Application

Due to flexibility of the probability expression, we can apply the model for varieties of situations by taking an appropriate relationship between parity and conception rate. For illustration, the probability model has been applied to the observed data from Demographic Survey which was conducted in the year (1969-70) under the auspices of Demographic Research Centre, Banaras Hindu University, and Varanasi. In this survey, the data on the number of conceptions during a specified period were not available to us. However, the probability model can also be applied for other situations with similar characteristics. For example, its application may be seen for the number of births, if births surviving more than a year and dying within a year are accounted separately assuming one to one correspondence between a conception and a live birth. It should be noted that the rest periods following the birth dying within a year will be smaller than that surviving more than a year. For the above survey, an analysis of birth intervals based on life table techniques similar to Sheps has revealed that the average length of intervals for the first few order of births are approximately equal with the exception of the first and length of consecutive birth intervals are comparatively shorter than the first for males with age at marriage between 13 to 16 years10. similar results have been reported by Jain and others11, lick reported that the proportion of first births who survive more than a year is less than the second, third, fourth or fifth12. Further, it has been observed that the use of contraceptives and incidence of secondary sterility prior to age 30 years are almost negligible. Thus the above findings suggest to assume that $(1-a_r)=1$ and $m_r=m$ for r=1,2,3, Under these assumptions, the distribution function becomes:

$$H_{r+1}(T)=a_0\Bigg[(1-\theta_1)\sum_{j=0}^{l_{r-1}}\binom{r-1}{j}\theta^{j}(1-\theta)^{r-j-1}+\theta_1\sum_{j=1}^{l_r}\binom{r-1}{j-1}\theta^{j-1}(1-\theta)^{r-j}\Bigg]$$

$$\left(\frac{m}{m-m_0}\right)^{r}\left(1-e^{-m_0(T-jh_2-\overline{r-j}h_1)}\right)-m_0\left\{\sum_{s=0}^{r-1}\frac{m^s}{(m-m_0)^{s+1}}\left(1-e^{-m(T-jh_2-\overline{r-j}h_1)}\right.\right.$$

$$\left.\left.\sum_{u=0}^{r-s-1}\frac{\{m(T-jh_2-\overline{r-j}h_1)\}^{u}}{u!}\right)\right\}\Bigg] \qquad ....(3.1)$$

If we replace m by dm_0, where d is constant, the distribution function will be reduced in the following form:

$$H_{r+1}(T)=a_0\Bigg[(1-\theta_1)\sum_{j=0}^{l_{r-1}}\binom{r-1}{j}\theta^{j}(1-\theta)^{r-j-1}+\theta_1\sum_{j=1}^{l_r}\binom{r-1}{j-1}\theta^{j-1}(1-\theta)^{r-j}\Bigg]$$

$$\Bigg[1-\left(\frac{d}{d-1}\right)^{r}.e^{-m_0(T-jh_2-\overline{r-j}h_1)}+e^{-dm_0(T-jh_2-\overline{r-j}h_1)}\sum_{s=0}^{r-1}\frac{d^s}{(d-1)^{s+1}}$$

$$\sum_{u=0}^{r-s-1} \frac{\left\{dm_0(T-jh_2-\bar{r}-\bar{j}\bar{h}_1)\right\}^u}{u!} \Bigg] \qquad ....(3.2)$$

Again, if the sample is taken from such a population which is a mixture of two types of population (1) the females have longer duration of postpartum amenorrhea (PPA) in case when the child survives more than a year and it becomes shorter in case of infant deaths. (2) The duration of PPA is shorter and is not affected by the types of deaths *i.e,* infant and non-infant deaths13. Let λ.*and* (1- λ*)* be the respective proportions of the subgroups. Thus

$$P\,[X(T)=r] = \lambda [P\left\{X(T)=r/h_1,h_2\right\}] + (1-\lambda)[P\left\{X(T)=r/h_1',h_2'\right\}]$$

$$\text{where } h_1'=h_2'=h_1 \qquad ....(3.3)$$

In the present case T=9.25 years, because the conceptions occurred after 9.25 years will not produce births within a given period. Here h-^ = 1.00 year (9 months for gestation and 3 months for PPA) h? = 1.75 years (9 months for gestation and 12 months for PPA) , $\lambda = 0.50$, $\theta_1 = 0.75$, $\theta = 0.85$[9,12]. The estimates of remaining parameters a_0,d and m_0 are obtained by equating the mean, variance and the relative frequency of females with no birth of the observed distribution to their respective theoretical expressions:

$$x = \sum_{r=0}^{n} r.P_r = a_0F_1(m_0,d) \qquad ....(3.4)$$

$$s^2 = \sum_{r=0}^{n} r^2P_r - \left\{a_0F_1(m_0,d)\right\}^2 = F_2(a_0,m_0,d) \qquad ....(3.5)$$

$$f_0 = 1 - a_0 + a_0e^{-m_0T} \qquad ....(3.6)$$

where X,s^2 and f0 are the respective mean, variance and the proportion of couples with zero birth for the observed distribution, F1(mθ, d) and F2(a0,mθ,d) are functions of m0, d and a0, m0,d respectively.

For large T, an approximate expression for the mean of the distribution similar to Singh and Singh can be obtained

$$\bar{x} \simeq a_0 \left[\pi \left\{ 1+\frac{dm_0 T'}{1+dm_0\bar{h}(1-\bar{h}/2T')} \right\} + (1-\pi) \left\{ 1+\frac{dm_0 T''}{1+dm_0 h_1(1-h_1/2T'')} \right\} \right]$$

where $T'=T-\bar{h}-1/m_0, T''=T-h_1-1/m_0,\ \bar{h}=\frac{(\theta_1+\theta)h_2}{2}+\frac{\{(1-\theta_1)+(1-\theta)\}h_1}{2}$

$$\ldots\ldots.(3.7)$$

Now m_0 can be obtained from (3.6) for an assumed value of a0. The estimate of d can be obtained from (3.7) by putting the values of a0 and m0. A set of such values of a_0 m_0 and d which satisfy to (3.5) may be taken as first approximation. Further, the estimates may be refined by subjecting: hem to satisfy (3.4), (3.5) and (3.6). The estimates $\hat{A}_0$ d,, *a*nd m0 of 0, d, and m0 are

$\hat{A}_0$=0.977, *d = 1.63*, m_0= 339

The expected frequencies in column 3 of table 1 are based on these values. For 01 = 9, the model reduces to that Singh and Singh, which has also been applied to the data9. in this case, the estimates of a0,d and m0 are

$\hat{A}_0$ =0.977, d = 1.58, m_0=.339

The expected frequencies in column 4 of table 1 are based on these values. The values of X2's show that the modified parity dependent probability distribution is a better approximation to the situation It is well known that: his proportion of incomplete conceptions of first and of higher parities (6 or above) is higher than the second, third, fourth or fifth births. The model may produce better result, if the risk of incomplete conceptions is to be considered more for higher parities also. But due to applicability of the model and complexity of the probability expression, the present probability model is derived assuming only the proportion of incomplete conceptions of first thirty different from other order of births. However, another functional form in regard to parity may also give the better approximation.

TABLE 1

DISTRIBUTION OF THE OBSERVED AND THE EXPECTED NUMBER OF BIRTHS FOR WOMEN IN TEN YEARS FROM MARRIAGE

No. of Births	Observed No. of Women	Expected Number of Women	
		θ,-0.75, θ=0.85	θ = 0.85
0	36	36.0	36.0
1	62	60.0	62.3
2	143	138.9	145.1
4	165	175.5	172.6
5	101	104.6	100.4
	41	29.2	
6 and over	2	7.8	33.6
Total	550	550.0	550.0
x^2	-	1.70	3.00
Degree of Freedom	-	2	2

TABLE 2

THE PROBABILITIES OF EXACTLY x BIRTHS IN A PERIOD OF 15 YEARS UNDER DIFFERENT SCHEMES

Number of		Probabilities		under the	schemes	
Births	A	B	C	D	E	F
0	.00055	.00055	.00055	.00055	.00055	.00055
1	.00808	.00808	.00808	.00808	.00808	.00808
2	.04930	.04930	.04930	.04930	.04930	.04930
3	.15756	.35369	.47136	.54982	.62827	.74594
4	.28426	.30699	.29062	.26719	.23376	.16486
5	.29040	.19286	.13476	.09883	.06661	.02799
6	.16069	.07298	.03896	.02316	.01217	.00309
7	.04394	.01431	.00596	.00291	.00121	.00019*
8 and over	.00522	.00124	.00041	.00016	.00005	-
Average Number of Births	4.48	3.91	3.63	3.48	3.34	3.16
Percentage Reduction in Births	-	12.72	18.97	22.32	25.45	29.46

*7 or more births

Use of the Model in the Evaluation of Family Planning Programme

The probability model which is derived can be utilized where the couples want to limit their family size just after certain number of births by sterilization or cent per cent effective contraceptive devices. Table 2 illustrates the reduction in the average family size and probabilities for different order of births in first 15 years of marriage to couples with m_0=0.50, θ_l=0.75,θ=0.85, h_1=1.00 year and h_2= 1.50 years under different schemes:

a. No contraception and no sterility *i.e.* a_r=l,m_r=m_O, r=0,l,2,3,...

b. Twenty five per cent of the couples from among the remaining fecund couples becoming sterile or using cent per cent effective contraceptive at each parity following the birth of the third child and onwards *i.e.* a_O=a_l=a_2=l, a_r=0.75, r=3,4,5,... and m_r=m_0 for r=0,l,2,3,...

c. Forty per cent of the couples from among the remain ing fecund couples becoming sterile or using cent per cent effective contraceptive devices at each parity after the birth of the third child and onwards *i.e.* ao=a1=$a_2$$^=$l, a_r=0.60, r=3,4,5,.. and m_r $^{=m}$o, for r=0,l,2,3,....

Similarly, 50, 60 and 75 per cents of the couples from among the remaining fecund couples becoming sterile or using cent per cent effective contraceptive methods at each parity after the birth of the third child and onwards *i.e.* ao=a1=a2=l, a_r=0.50, 0.40 and 0.25 for r = 3,4,5, and m_r=m_0 for r=0,l,2,3,...., which is denoted by the schemes, D, E, and F respectively.

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HEALTH MANPOWER DEVELOPMENT

Shanti Ghosh*

ABSTRACT

This paper deals with issues relating to the development of manpower for the delivery of an effective and low cost package of health services in rural areas.*

Most of the developing countries have experimented with the health delivery system, the training methods and curricula of the developed countries, only to realize several decades later that it does not work, and that the health care of most rural populations has not benefitted in any way. Developing countries have tremendous financial constraints, and even out of their meager health budgets the major proportion was spent on the urban hospitals, which served only a fraction of the population. The infant and childhood mortality thus continued to remain high, as did the maternal mortality and the high fertility. Obviously, this state of affairs could not be allowed to go on, especially when it was discovered that the majority of deaths were due to three or four major causes, often preventable, with malnutrition as the underlying and contributing cause. Maternal deaths were the result of ill-timed repeated pregnancies, malnutrition and anemia and obstetric problems for which no help was available in the village or even within a few kilometers. The strategy of copying the health services of affluent countries has not been conducive to serving the health needs of the developing countries, which have only succeeded in developing a disease-oriented medical technology to serve the urban population.

Package of Health Services

Belatedly most of the developing countries are coming round to the idea of using a lesser trained person to solve

**WH0 Adviser in Family Health, Kabul, Afghanistan.*

the problems of the community, most of which are simple and do not need the services of a highly trained doctor.

We need to answer two questions:

i. what is the package of services that is necessary for health care; and

ii. Who is to deliver that package?

India, along with many developing countries, has a population, forty two per cent under the age of 15 years and 19 per cent under the age of 6 years. The problems of infection and nutrition are more in this group, particularly in children under five, who are experiencing rapid growth and are, therefore, more vulnerable. About 50 per cent of all deaths occur under the age of five years, almost half of them occurring under the age of one year. Prenatal period occupies less than 0.5 per cent of the total life span, yet contributes almost one quarter of the deaths occurring under one year of age. The main immediate causes of death are complications of pregnancy and birth, low birth weight of the infant, and diseases such as diarrheal and respiratory disorders, even though malnutrition is an important underlying cause in most cases. In developing any health plan, therefore, these areas should receive the highest priority and the emphasis should be on diversifying the basic preventive and curative services rather than concentrating on a few big institutions. Unfortunately, the priorities between primary care and hospital care are seldom defined. Primary health care is taken to mean a health approach which integrates at the community level all the elements necessary to make an impact upon the health status of the people. Primary health care must' be available close to people's homes. As the acceptance of many health measures may involve a change in living habits, the community itself must decide on the measures, or at least be a party to the measures suggested, help in carrying them out and evaluate their success. It follows, therefore, that there must be a clearly defined relationship between the two components of front line health care, i.e. activities carried out by Governments and those carried out by the people themselves. Organizing delivery of health care should be such that a part of it should belong to those for whom it is designed to serve. It will have enormous advantages. Local resources can be tapped and the community must be involved to experience the feeling of participation in it.

Good health must surely be a basic component of economic development and, in turn, social and economic development will contribute to good health. A part of the blame for this neglect rests on the preconception that expenditure on health is a part of consumption and not investment. However, as far as rural preventive health services are concerned, nothing could be far from the truth. Money spent on providing safe drinking water, drainage and effective sewage disposal, maternity and child care, nutrition programmes for infants and very young, children, yields very high returns.

What then should the package of care be? The main aim should be the reduction of mortality among women and young children. This could be achieved through: identifying the pregnant women; knowledge of high risk pregnancy, adequate management and referral family planning; identifying the high risk child; treatment of nutritional deficiencies; management of common childhood diseases; immunization; health and nutrition education; environmental sanitation; and nutrition programmes for selective groups - target orientated and time bound.

Apart from physical and biological environment, disease is a function of human behavior. The most important agent of health care would seem to be the mother, because mother and child is one social and biological unit. The unborn child is entirely dependent on the maternal environment and for several years after birth is dependent on the mother for every kind of care. The young mother substitute is another important agent of health care and must not be forgotten. The child-to-child programme launched during the International Year of the Child has much to recommend it because it tries to face and deal with the situation as it exists in most developing countries.

The most carefully designed infant nutrition programme, if implemented in isolation, would be ineffective if other programmes such as environmental sanitation and improvements, Immunization and health and agricultural policies and health education are not complementary. To this should be added a good level of curative services. In our enthusiasm to focus attention on preventive services we tend to denigrate the curative service, both in the community and the hospital. It must be remembered that treatment of an illness is the felt-need of an individual and family, and an important entry point for delivering the rest of the health package. Unless the need of the family, *i.e.* treatment of the illness is satisfied, there is no chance of the family or the community listening to the noble slogans of preventive care or nutrition education. Major causes of morbidity are malnutrition, vector borne diseases, gastrointestinal diseases and respiratory diseases - themselves the result of poverty, squalor and ignorance. The single most important factor influencing the high mortality in developing countries is the deficient nutritional state of the population, but since malnutrition is the result of a lot of factors rather than deficient food alone, an isolated nutrition supplementary programme is not likely and never has done - to make any dent on the problem.

Health Services Delivery at Low Cost

Many studies have shown that the best results resulted from a total package of services, *i.e.* health services, developmental services, education and food, while food alone gave the least satisfactory results. Nutrition education in isolation without concrete health service and health education has little impact. On the other hand, a high level of health service plus education, plus even a low level of food supplement to the vulnerable group, may have more nutritional impact. Hence health services would appear to be the first priority. What is needed is a network of services, designed to foster the development of effective, low cost delivery system for maternal and child care, nutrition, family planning and other related extension activities in rural areas, and slums through supervised auxiliaries, village level workers, volunteers and indigenous practitioners. Training of the indigenous *Dai,* who is already serving the obstetric needs of the community, would pay dividends in better maternal and child care. To this should be added the indirect services which contribute to health improvement such as education, social action and rural development.

The idea of using such workers is nothing new and has been recommended by many people. More than half a century ago Gandhi ji entreated the doctors and would-be doctors of medicine to think in terms of 700,000 villages in India; and added, "They would then see how great the need was in India of a medical cadre trained not in western style but in the system of rural medicine. They would then adopt many indigenous practices and recipes that had proved successful in India. The true function of the medical profession is not to prescribe cures, whether foreign or indigenous, but to prevent illness by teaching the people to observe the rules of health". He realised the important and vital role of the village level workers and advised them to go to the villages with a message of health, armed with a few basic medicines including quinine and sulphur ointment because he saw a great deal of malaria and scabies around him.

How is such a functionary to be trained and what are his job responsibilities? There are two aspects of this - training and a satisfactory referral system. Inbuilt in this should be supervision and evaluation. The jobs and skills needed at every level of care have to be identified and the necessary expertise and supervisory capacity has to be built into the referral points. Here and there, all over the world examples can be found of a successful health care "project" with a dedicated person as its head and the good results achieved can be attributed mainly to his dedication and personality and can seldom be duplicated. This isolated activity is usually carried out by a voluntary agency in isolation apart from the country's health infrastructure. Such projects even though instrumental in showing the effectiveness and feasibility of the programme, are no answer to the country's health needs in the absence of changes in the whole health delivery system and proper training of personnel.

Training and Education

Training of health workers is not just simplification of teaching meant for a doctor or a nurse. , Seldom is it planned according to priorities and jobs to be done. New approaches in communication have to be developed. Not only is there inadequate basic training, but also inadequate continuing education and supervision which affects the quality of service and the priority needs are not met. Auxiliaries with limited basic education and brief preparation, require periodic refresher courses and more advanced training. This is very seldom available.

Auxiliaries do not mean inferior medical care. Their education and training is a challenging task. Hastily conceived copy book type of auxiliary based health care system may end up by producing a cadre of under-trained, under-supported and unsupervised functionaries working in a lonely manner exposed to the prejudices and beliefs of the community. Health workers in a remote area should feel a part of a bigger community of workers and not isolated individuals who have no one to turn to for help and advice. India has launched one of the world's biggest community health worker training programmes which are already showing its effectiveness and the world is watching with interest.

Even though the health services through some kind of a local health worker, envisages an efficient referral system, it does not mean that referral care must be expanded as a precondition or even accompaniment to the development of most basic facilities such as the health centre and dispensary. The referral system rarely functions effectively in most developing countries. The end point of referral, *i.e.* the hospital is easier to plan, build and staff, and very often in an attempt to satisfy the referral system, this end point of referral which is the apex of the health pyramid gets the priority and serves the urban population while there is denial of the service to the rural masses, because the base of the pyramid is ignored.

There is always a competition between the resources available to a hospital or a health centre, the former are allotted funds while the health centers suffer from lack of them. While the hospitals are necessary one cannot consent to the overwhelming priority being given to their development and functioning. Nor can hospital overcrowding be accepted as proof of the need for more hospital beds. Needs of many of the occupants could be satisfied nearer home, if only a better quality service was available.

The Universities and medical colleges have, by and large, failed to accept the challenge of the time and help produce a functionary more in tune with the requirements of the community. The medical education system and the health care delivery system have each gone their separate ways. Even within the teaching institutions, each discipline goes its own way and there is no co-ordination at all. So diverse skills are taught for dealing with health problems, or rather with diseases, without bringing them together in relation to an individual or more relevant, in relation to a community. Since the major needs of the community are with regard to the vulnerable group of mothers and young children there has to be co-ordination between obstetricians, pediatricians, community medicine and other. The new community oriented physician requires more support from the University and not less. The Universities and medical institutions must continue to extend their boundaries deeper and deeper into the community which they have to serve.

It would seem that the medical profession who should have been in the vanguard of planning and training the community health workers are responsible for most of the hurdles and obstacles in the way of developing this health manpower. They are so conscious of their learning and knowledge and an absolute belief that no health care can be carried out without them that they cannot comprehend another lesser trained but more suitable worker dealing with the common health problems of the community. The objections are - how can you train a health worker in a few months when it has taken us several years to be trained? How can you trust anyone else but a doctor to dispense medicine and write a prescription? If the community selects a worker, will he not be partial to one group or the other? Will the village community leader not choose his nominee? Will the drugs not be misused? Alas, we are willing to overlook all this in the case of an urban situation. Nepotism, groupism, inefficiency and misuse of drugs all goes on in an urban setting but eyebrows are raised in horror if there is even a remote possibility of anything like this happening in a rural community. The reason for this is obvious - the medical profession does not want to part with its professionalism in favor of anyone else who if properly trained would become a competent health delivery agent at the village level.

This is not a new situation and is not peculiar to India. It has happened the entire world over. Fortunately in most countries there have been some enlightened planners and doctors who have laid the seed and helped to foster the idea of a community health worker and make it a reality. Primary health workers locally recruited and supported by their communities should form the front line of the health system and the entry point into it for the population. They are effective, acceptable and inexpensive and they require a much shorter initial training.

Evaluation

Health needs of a community may be assessed by mortality, morbidity, handicapping conditions, immunization status, nutritional status, growth and development and behavioral attributes such as use of health services and prevalence of breast feeding. The question also has to be asked whether the services where they do exist, meet the requirements of health needs. The training has to be geared to the health needs of the community and should include: knowledge of the community - its beliefs, prejudices and taboos, epidemiology and vital statistics; knowledge of nutrition; and social obstetrics, family planning and pediatrics, methodology of evaluating health services. Relevant skills have to be taught for the job requirements. Evaluation of the health needs of the community and a team spirit are extended parts of training. New attitudes have to be created towards solution of a health problem rather than treatment of an illness. There has to be integration of health, socioeconomic and cultural aspects.

The success and effectiveness of health services often lead;; to weakening of the capacity of local communities to solve their own health problems. One of the most challenging areas of research is to learn how to strengthen the capacity of families and communities to solve their own health problems. We need to learn how to provide technical education for family members and village volunteers. We have to work with parents who ultimately are the most important resource in improving the health care of children in every home. They can be helped to become the most important agents of improvement of health status in the community.