

A METHOD OF ESTIMATING BIRTH AVERTED DUE TO MENSTRUAL REGULATION PROCEDURE

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ABSTRACT

This paper presents a method of estimating the number of births averted due to a menstrual regulation procedure by utilizing the data on prospective birth intervals of the woman. Numerical illustration is also given. The benefits of menstrual regulation are much larger, if the operation is followed by the use of a contraceptive of higher effectiveness.

The menstrual regulation (MR) procedure for birth control consists of the extraction of the uterine contents shortly after a missed menstrual . period, regardless of whether or not pregnancy is established. MR is, in fact, the induction of uterine bleeding that has been delayed up to a period of normally 14 days from its anticipated date of onset and can be accomplished mechanically and through the administration of drugs. The most common method of performing MR is by mini vacuum aspiration, implying that the woman who seek MR do not wish to be pregnant²-. However, they may or may not want to know whether they are pregnant. From the medical and psychological point of view, MR has several diagnostic advantages. In many social settings, the word abortion is associated with a type of moral stigma, and MR avoids this kind of emotional connotations². In many countries where abortion laws remain restrictive, menstrual regulation practice is permitted. It is, however, significant that no known cases of prosecution of physicians have occurred anywhere in the world for performing menstrual regulation³. Moreover, in countries where no legal distinction between abortion and menstrual regulation has been established, it would be difficult to prove MR to constitute violation of the abortion law.

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MR is, thus, easy to practice and acceptable to the woman as well as free from any legal botherations. Notwithstanding its demographic effectiveness in preventing a pregnancy, its use might avoid the risk of abortions and several complications thereby. Data on numbers of MR over the period of time may indicate its popularity and also help in ascertaining its role in fertility control programmes as envisaged in most of the developing countries. Statistical analysis of such data may consist of either (i) calculation of measures which relate the number of MR either to the number of women at risk or to the number of births or the pregnancies on the one hand or (ii) assessing the demographic effectiveness of a MR. The efficiency of menstrual regulation as a method of preventing all unwanted births, when it is used either as the only method of fertility control or in combination with contraception practiced at several levels of effectiveness, needs to be determined. A detailed theoretical study has been made in this context by Potter and Fortney⁴. Through a simulation model, demographic efficiency of MR was studied recently by Boggarts and Tietze⁵. Demographers and policy makers, however, may require some techniques at par with those developed for assessing births averted due to use of conventional contraceptives, IUD, sterilization and induced abortions. In this paper we have proposed a technique, which utilizes the data on the prospective contraceptive delays. This kind of data can easily be collected at the time of MR operation by asking the woman about her retrospective contraceptive delay. On the basis of some assumed inputs, numerical calculations showing births averted due to a MR in each age group of the women are done in the last section.

Methodology

The concept of delayed menstruation has practically no meaning in case of those women who have been using oral contraceptives. According to the standard instructions for the most widely used type of pill, which contains estrogen and progestin, each cycle of medication is started on day 5, counting from the onset of the withdrawal bleeding that usually begins. 2-4 days after the last pill of the previous cycle has been taken. In about 1.5 per cent of all pill cycles, withdrawal bleeding does not occur, whereas the probability of a pregnancy for consistent users is less than 0.02 per cent^{6, 7}. In the event of a menstrual cycle is

missed, the woman is instructed to resume medication seven days after the last pill. In fact, in case of women who use the pill according to prescription, it is rather impossible to* observe any delay of menses as early as for 14 days. In case of irregular users of pill, it is difficult to predict anything, if delay occurs. However, in case of women using conventional contraceptives and IUD, delay in the onset of the menses may cause concern and, if they do not want pregnancy MR may help them to a great deal. Again in case of women whose menstrual cycle is not regular, delay in the onset of menstruation cannot be easily identified and hence poses a problem for the woman to opt for MR.

It is, thus, clear that MR can be of more help to those women whose menses are regular and who are not using pill. Even in these cases, by considering the dynamics of human reproduction process, one can easily conclude that one MR avoids much less than one pregnancy and still for less birth. In case of natural delay in menses due to onset of menopause and secondary sterility or abstention, practically, nothing is gained due to menstrual regulation either in terms of avoiding a pregnancy or a birth. In case of delay in the menses due to pregnancy which is destined to end in spontaneous abortion, again not much gain is, achieved due to MR in avoiding the pregnancy; rather it helps in exposing the woman to the risk of pregnancy a bit earlier. In case of the pregnancy destined to end in induced abortion or. Still birth there is, however, gain in terms of avoiding less than one pregnancy (but not birth) because the woman is returned sooner to the fecund-able status to conceive. Though in case of pregnancy destined to end in a live birth, there seems to be yet, one to one gain in averting the birth. This gain is substantially reduced because the woman is returned sooner to the fecund-able status due to MR. Thus, unless the MR is re-in forced with highly effective contraceptive use by the woman, the gains of MR may be substantially reduced. Again, if secondary sterility intervenes, before another pregnancy or birth is possible or the marriage is dissolved either due to death of either spouse or divorce/separation irrespective of the fact that a woman returns sooner to the fecund-able status after the MR is performed, the MR is credited with avoidance of a pregnancy or a birth whichever be the case. The proposed formula for calculating the overall births averted due to menstrual regulation of a woman aged x is as:

$$A_x = [{}^d_x \beta_x - a_x \frac{N}{C_x} - (1-a_x) M_x/C_x] \theta_x \dots (1)$$

where time is 'measured in a unit of year and

A_x = birth averted due to MR for a woman aged x ;

θ_x = the probability that the woman is pregnant at the time of MR Operation;

α_x = probability that pregnancy ends in a live birth;

β_x = probability that the woman aged x survives till the expected date of a live birth delivery from the date of her MR;

N_x = net fecund-able period added by MR to a woman aged x , if the pregnancy was destined to terminate in a live birth;

M_x = net fecund-able period added by MR, if the pregnancy was destined to end in a fontal loss or still birth;

C_x = average closed birth interval of a woman aged x in future.

The Formula (1) is a modification of the result obtained by Pathak and Kataraki⁸. It may be mentioned that prospective number of births in any period N_x or M_x is directly proportional to the length of the period and inversely proportional to the length of the closed birth interval C_x on the assumption that the mean closed birth interval of the women aged x will remain same in the future after the MR is performed. This result may approximately be true. Information about α_x can be obtained from the test of the uterine content for pregnancy usually done before the MR operation and β_x can be obtained from the data on pregnancy history of women in any retrospective study or from a follow-up study of a cohort of the pregnant women; B_x , can be evaluated from a life table for females and a *priori* knowledge of the gestation period associated with a live birth; N_x and M_x can be obtained from the following relations:

$$N_x = I_v \left(\frac{1 + \alpha_x}{2} \right) \dots (2)$$

Where I_x = Gross fecund-able period added by MR, if the pregnancy was destined to terminate in a live

birth in the absence of incidence of death, divorce or secondary sterility;

a_x = Probability that a woman aged x will live at the end of I_x period in the fecund-able state.

$$M_x = J_x \frac{(1+b_x)}{2} \dots (3)$$

where J_x = Gross fecund-able period added due to MR, if the pregnancy was destined to end in a fontal loss (or still birth) in the absence of incidence of death, divorce or secondary sterility.

b_x = Probability that a woman aged x will live at the end of period J_x in the fecund-able state.

Again, I_x and J_x can easily be calculated as below:

$$\begin{aligned} I_x &= G_x^L + H_x^L - 3/2 \\ J_x &= G_x^F + H_x^F - 3/2 \end{aligned} \dots (4)$$

where G_x^L = gestation period associated with a live birth pregnancy.

We assume that MR takes away 3/2 months of gestation, measured from the LMF. The HL is the length of amenorrhea period (in months) following a live birth.

G^F = Weighted mean period of gestation following a x fontal loss.

Suppose that G^F_1 , G^F_2 , G^F_3 are the mean gestation periods associated with spontaneous abortion, induced abortion and still birth with the incident rates of p_1 , P_2 and P_3 respectively among all the pregnancies which do not end in a live birth. Then:

$$G_x^F = \{ p_1 G_{x1}^F + p_2 G_{x2}^F + p_3 G_{x3}^F \} / (p_1 + p_2 + p_3) \dots (5)$$

Similarly,

= weighted mean of the amenorrhea periods associated

with foetal loss i.e. equal to:

$$(p_1 H_x^{F1} + p_2 H_x^{F2} + p_3 H_x^{F3}) / (p_1 + p_2 + p_3) \dots (6)$$

Where H^{F1} , H^{F2} , and H^3 are the periods of amenorrhea following the incidence of spontaneous abortion, induced abortion and still births.

C_x can be estimated from the last closed birth intervals of the women undergoing MR. This information can be obtained in case of married women with parity two and above. However, in case of unmarried woman undergoing MR operation, it is advisable to exclude them from the estimation of birth averted exercise. One of the implicit assumptions in the methodology being presented here is that the woman is married and undergoes MR only after attaining first parity status. However, C_x can be expressed as

$$C_x = G_x^L + H_x^L + (F+1) W_x + F(G_x^F + H_x^F) \dots (7)$$

Where

W_x = waiting time for a conception and it can be approximated by 1 if 7λ is the exposure risk to pregnancy for a non-pregnant fecund woman aged x .

F - expected number of foetal losses between two live births.

In reality it will be difficult to estimate F except through retrospective inquiry into the pregnancy histories of the women. We can calculate, however, the total period wasted due to foetal loss by using the relation:

$$F(W_x + G_x^F + H_x^F) = C_x - H_x^L - W_x - G_x^L = T_x \text{ (say)}$$

From this, the total waiting times associated with conceptions leading to pregnancies that end in foetal losses can be determined.

Assuming that all the foetal losses are spontaneous abortion, the total waiting times out of total non-fecund able

period T_x associated with foetal loss between two live-births will be in proportion to:

$$T_x [W_x / (W_x + H_x^F 1 + G_x^F 1)]$$

Similarly, assuming that all the foetal losses are induced abortions, the total waiting time becomes:

$$T_x [W_x / (W_x + H_x^F 2 + G_x^F 3)]$$

and assuming that all the foetal losses are still births, the total waiting time becomes:

$$T_x [W_x / (W_x + H_x^F 3 + G_x^F 3)]$$

Clearly then the weighted sum of all the waiting times, V_x which is associated with any kind of foetal loss is:

$$V_x = \frac{\sum_{s=1}^3 T_x [W_x / (W_x + H_x^F s + G_x^F s)] P_s}{P_1 + P_2 + P_3} \dots (8)$$

$P_1 + P_2 + P_3$ Further, if $p_1 = P_2 = P_3$ and all H's and G's are equal to H_x^F and G_x^F then

$$V_x = T_x [W_x / (W_x + H_x^F + G_x^F)] \dots (9)$$

Hence,

$$C_x = W_x + G_x^L + H_x^L + V_x + (T_x - V_x) \dots (10)$$

$$C'_x = G_x^L + H_x^L + (T_x - V_x) + (W_x + V_x) \frac{1}{1-E} \dots (11)$$

Where C_x is the closed birth interval when woman uses E per cent effective contraceptive C_x being greater than C_x , it may be verified from expression (1) that the birth averted due to the MR increases as the effectiveness of the contraceptive used after MR increases. Further in the presence of the breast-feeding the impact of the MR is less. Like abortion, MR succeeds in preventing the birth which is imminent but initiates the process of conception earlier than the birth should have.

It may be remarked that the procedure so far mentioned helps in ascertaining the long term effect of the MR operation by assuming the process of reproduction in the steady state. Further, in case of the MR for a newly married woman, one cannot obtain information regarding her last waiting time or closed birth interval. In such situations, however, one can assign the characteristics of the first parity women who have sought MR operation. The development of the procedure is based on the principle of utilizing minimum and directly relevant data in evaluating the effectiveness of the MR programme. From the data so obtained from the MR cases, we can, however, desire estimates of force of conception λ by applying the following formula (assuming time to be infinite):

$$W_x = \frac{1}{\lambda} \text{ or } \lambda = \frac{1}{W_x}$$

By assuming that the waiting time for conception follows an exponential distribution, one can easily derive the distribution of the number of births during any given period of time, by assuming that a woman adopts MR procedure to end her doubtful pregnancy or not and thereby may obtain year wise effect of MR on births⁹. This method will, however, not be elaborated here.

Numerical Calculations

Assumptions and inputs: For easier computations, we assume:

1. Based on the Indian experience, gestation periods for live births, still births and abortions are nine months, seven months and 3.5 months respectively. The corresponding postpartum amenorrhea periods following still births and abortion/miscarriages are three months and one month, respectively. In case of a live birth postpartum amenorrhea period varies according to the age of mothers (Table 1).
2. Age of the husband is 5 years more than that of his wife.
3. Expectation of life at birth (eg) for males in India is assumed to be 50 years and for females is assumed to be 47.5 years for the period of 1971-75.

4. The value of the closed birth intervals in case of non-contraception woman as well as contraception women are given in Table 2.

5. Probability that a pregnancy will end in an abortion or still birth or live birth is given in Table 3. We assume that abortion includes miscarriages and induced abortion for the purposes of ease for this illustration.

6. Proportion of fecund women in each age group is taken from Pathak¹⁰ and is given below:

Age Group	15-19	20-24	25-29	30-34	35-39	40-44
f_x	.9975	.9909	.9809	.9569	.8997	.3865

TABLE 1

POSTPARTUM AMENORRHEA PERIOD AFTER A LIVE BIRTH BY AGE GROUP OF THE MOTHER

Age Group (in years)	15-19	20-24	25-29	30-34	35-39	40-44
Length of Amenorrhea Period (in months)	7.4	9.4	10.7	12.3	12.9	13.5

Source: R.G. Potter et al., A Case Study of Birth Interval Dynamics, *Population Studies*, XIX, 1965, pp. 81-96.

TABLE 2

CLOSED BIRTH INTERVALS (IN MONTHS) OF WOMEN BY AGE AND LEVEL OF CONTRACEPTION

Age Group (in years)	Effectiveness of Contraception Used (E)		
	E=0 ¹	E=60 ²	E=90 ²
15-19	27.5	43.0	120.7
20-24	27.5	41.1	109.1
25-29	29.6	43.9	115.8
30-34	33.1	49.5	131.5
35-39	35.8	54.2	145.0
40-44	40.9	64.5	182.2

Source: 1. R.G. Potter et al., *op. cit.*

2. Computed

Calculation of births' averted due to an MR: With the help of relation (4) and assumption (1) we have obtained values of I_x and J_x by assuming that there are only two kinds of foetal losses, namely, abortions including miscarriages and still births. Then the joint survival ratio for women in each group for the period equal to I_x and J_x are obtained by using the five year (joint) survival-ship probabilities from the West Model Life Table corresponding to eg mentioned earlier. We have also obtained the probability of remaining fecund at the end of I_x and J_x periods for the women in each age group which after multiplying with joint-

TABLE 3
PROPORTION OF PREGNANCIES ENDING INTO ABORTION, STILL BIRTH AND LIVE BIRTH
ACCORDING TO THE AGE OF THE WOMEN

Age Group (in years)	Probability that		pregnancy ends into	
	Abortion birth	Still	Live birth	Foetal loss
15-19	0.0625	0.1487	0.7888	0.2112
20-24	0.0207	0.1126	0.8667	0.1333
25-29	0.0201	0.0958	0.8832	0.1168
30-34	0.0131	0.1251	0.8618	0.1382
35-39	0.0473	0.1417	0.8110	0.1890
40-44	0.0106	0.2545	0.7349	0.2651

Source: K. Venkatacharya, 1972, Reduction in Fertility due to induced abortion: A Simulation Model, *Demography* '9, p. 352.

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TABLE 4 VALUES OF I_x AND J_x (IN MONTHS)

Age Group	I_x	J_x
15-19	14.9	6.9
20-24	16.9	7.6
25-29	18.2	7.6
30-34	19.8	8.0
35-39	20.4	9.0*
40-44	21.0	9.5

*Adjusted figure

survivorship probabilities become a_x and b_x and hence we could obtain N_x and M_x . Using N_x , M_x and values of C_x given in the Table 2 we have obtained the estimates of births averted due to a MR operation to a woman belonging to different age groups. The figures are given in Table 5.

Number of birth averted due to the MR as given in the above table, though turns out to be much less than corresponding figure in case of an induced abortion, seems to be significant considering the avoidance of the risk of pregnancy, and its termination to which the woman is exposed. In case of the contraceptive use as expected, the benefits of the MR are much larger. Given the value of o_x , birth averted per MR operation can be ascertained by multiplying the figures in the Table 5 with the value of o_x in each group.

TABLE 5
BIRTHS AVERTED DUE TO MR OPERATION AFTER PREGNANCY TEST IS CONFIRMED ACCORDING
AS THE WOMAN USES CONTRACEPTION OF EFFECTIVENESS E.

Age Group of women	Effectiveness of Contraception used			after M.R.
	E=0	E=.60	E=.90	E=1.00
15-19	.29366	.45695	.64345	.78596
20-24	.28435	.46155	.68488	.86298
25-29	.29848	.47324	.69784	.87892
30-34	.30483	.49462	.68801	.85710
35-39	.33266	.47969	.65958	.80608
40-44	.41391	.51616	.63064	.72987

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METHODOLOGY FOR ESTIMATING BED REQUIREMENTS

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ABSTRACT

Providing sufficient number of beds in hospital wards is an important factor for any health centre. In this study queuing analysis has been carried out to estimate waiting times using multi-channel queuing models and to compute the probability that all beds are occupied using Erlang Loss Model which serve as the basis for finding bed requirements. This helps in estimating the number of beds matching the service level desired by the hospital management.

Bed is an exceedingly important resource for any hospital on which its entire facility planning depends⁴. Two important parameters for any bed planning are bed occupancy, i.e., the mean number of beds occupied per day and the average length of stay from which mean arrival rate and service rate can be easily worked out. For economic planning bed occupancy should neither be too low nor be too high¹. Low occupancy results in high costs per patient day which is indicative of reduced hospital resources. High bed occupancy impairs the level of patient care because the existing resources become inadequate². Whenever the bed occupancy fluctuates widely over a period of time planning and matching of hospital resources become a difficult task. The length of stay of patients is another important performance measure. Several factors contribute to variations in the length of patient stay. A shorter stay may mean more pressure for beds or improved health facilities⁶. To a large extent length of stay is also a function of the resources available in a particular hospital. Furthermore, average length of stay serves as an important index for comparing hospitals having similar facilities^{3, 5}.

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Methodology

In the present analysis the multi-channel queuing model and a specific queuing model called Erlang Loss Formula is assumed as a model for hospitalization in wards. Erlang Loss Model provides the probability that the system is full, *i.e.* all the beds are occupied^{4,7}.

Let λ = the number of patients arriving per day.

μ = the number of patients served on each bed per day.

S = the number of beds.

n = the number of patients in system waiting or being served.

In multi-channel queuing system, the probability of zero units in the system at time t is given by

$$P_0 = \left[\sum_{n=0}^{S-1} \frac{1}{n!} \left(\frac{\lambda}{\mu} \right)^n + \frac{1}{S!} \left(\frac{\lambda}{\mu} \right)^S \left(\frac{S\mu}{S\mu - \lambda} \right) \right]^{-1}$$

The average time the patient must wait before being admitted is

$$E_t = \frac{\mu \left(\frac{\lambda}{\mu} \right)^S}{(S-1)! (S\mu - \lambda)^2}$$

The probability P_s of the system, *i.e.*, all the S beds are occupied is given by the Erlang Loss Formula which is

$$P_s = \frac{\frac{1}{S!} \left(\frac{\lambda}{\mu} \right)^S}{\left[1 + \sum_{n=1}^S \frac{1}{n!} \left(\frac{\lambda}{\mu} \right)^n \right]}$$

The above results hold good only under steady Conditions, *i.e.*, $-\infty < 1$. The performance measures E_t and P_s are used to evaluate and compare the various alternatives

with the varying number of beds. It is believed that by providing adequate number of beds, the overall service can be considerably improved².

Analysis and Results

For each of the four wards studied, relevant data dealing the arrival of patients and their length of stay was derived from the hospital admission records and was rearranged to yield λ and μ . On the basis of past one year data, queuing parameters λ and μ were worked out for all the four wards. Although the length of stay is a function of the specific ailment to be cured, the mean stay as estimated from the recorded data was used for computational purposes for the assumed model. For computing λ and μ from the average bed occupancy and mean length of stay, the following relationships were used⁴.

λ = the number of patients arriving per day.

$$= \frac{\text{Average bed occupancy}}{\text{Mean length of stay}}$$

μ = the number of patients served on each bed per day.

$$= \frac{1}{\text{Mean length of stay}}$$

Bed occupancy data pertaining to the female ward is summarized in Table 1. Length of stay data is given in Table 2. Both the parameters, i.e., bed occupancy and length of stay, have been worked out on monthly basis so as to identify the periodic variations in their values. After estimating λ and μ for the different wards individually, queuing characteristics P_0 , E_t and P_s were worked out separately. These characteristics were estimated by varying the number of beds S . The above three characteristics are important as these provide information regarding the probability of no patient awaiting for service, average waiting time for hospitalization and the probability of system being full, i.e., all beds are fully occupied. Recourse to P_s was taken to alleviate the difficulty of basing the bed estimates on the values of E_t alone. This is because it is just possible that the mean waiting time corresponding to the existing number of beds may be exceedingly low suggesting thereby the bed sufficiency.

TABLE 1
PATIENT ARRIVAL DISTRIBUTION IN FEMALE WARD DURING PAST ONE YEAR

Bed Occupancy	Occurrences in Month												Total	Product	Prob.
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
11	7	1											8	88	0.0218
12	2	0											2	24	0.0054
13	5	0											5	65	0.0055
14	2	1	1		1					1			6	84	0.0164
15	4	2	3	2	0	1				1			13	195	0.0355
16	3	3	0	1	0	0				1			8	128	0.0219
17	4	1	0	1	2	2	1		1	1	2		15	255	0.0410
18	2	5	2	1	2	1			1	2			15	270	0.0410
19	1	3	1	1	3	2	1		2	2	1		17	323	0.0465
20	1	1	5	4	6	1			4	0	2	0	24	480	0.0657
21		2	5	6	2	1	1		3	4	2	1	27	567	0.0739
22		4	4	4	6	2	3	0	1	1	1		26	572	0.0712
23		0	2	4	6	3	1		2	2	1		21	483	0.0576
24		2	3	4	2	3	8	1	2	0	3		28	672	0.0766
25		1	1	0	1	3	8	0	0	4	5		23	575	0.0628
26		0	2	1	5		2	2	0	5	3	5	25	650	0.0683
27		2	1		3		4	3	2	1	3	3	22	594	0.0601
28		1			2		2	4	2	2	0	3	16	448	0.0437
29			1	1	1		1	2	1	1	4	5	17	493	0.0465
30							5		3		0	1	9	270	0.0247
31							1	2	3		1	5	12	372	0.0328
32							1	9	4	3	2	8	27	864	0.0737
Total	31	29	31	30	31	30	31	31	30	31	30	31	366	8472	1.0000

Average Bed Occupancy - $\frac{8472}{366} = 23.14$

TABLE 2
PATIENT LENGTH OF STAY DISTRIBUTION IN FEMALE WARD DURING PAST ONE
YEAR

Stay in Days	Occurrences in Month												Total	Product	Prob.
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec			
0	1	2	0	4	2	1	2	2	1	2	3	3	23	• 0	0.0209
1	3	10	7	12	12	8	7	11	10	3	8	8	99	99	0.0900
2	5	10	7	14	13	9	9	23	11	18	12	10	147	294	0.1337
3	10	7	7	13	7	5	14	17	10	20	9	13	132	396	0.1209
4	7	6	7	4	2	7	6	8	17	8	5	5	82	328	0.0746
5	5	6	7	3	7	8	9	6	10	9	7	5	82	410	0.0746
6	6	3	2	9	5	9	6	10	7	9	12	4	81	486	0.0737
7	1	3	6	2	2	5	7	16	10	16	8	9	85	595	0.0773
8	3	2	6	4	4	3	7	10	6	9	3	7	64	512	0.0582
9	1	3	2	3	3	3	5	12	8	7	4	3	54	486	0.0491
10	2	2	2	2	4	1	5	6	1	1	3	4	33	330	0.0300
11	2	1	2	2	2	0	5	2	3	2	2	7	30	330	0.0273
12	2	4	1	3	1	4	4	4	6	0	2	1	32	384	0.0291
13	2	3	3	1	2	1	0	1	1	5	4	4	27	351	0.0246
14	2	0	6	3	2	2	3	4	1	3	2	2	30	420	0.0273
15	0	2	0	2	1		1	0	0	3	2	1	12	180	0.0109
16	1	0	2	2	2		2	1	2		0	2	14	224	0.0127
17		2	3	1	0		0	1	0		1	1	9	153	0.0081
18			1	4	1	0	1	1	1				9	162	0.0081
19			0	0	1	1	1	0	0				3	57	0.0027
20			0	2	1	0				1	1	1	6	120	0.0054
21	6	1	3	4	5	5	3	1	2	3	6	6	455	945	0.0409
Total	58	67	74	94	76	75	97	136	113	119	94	96	1099	7262	1.0000

Average Length of Stay = $\frac{7262}{1099}$ = 6.60 days

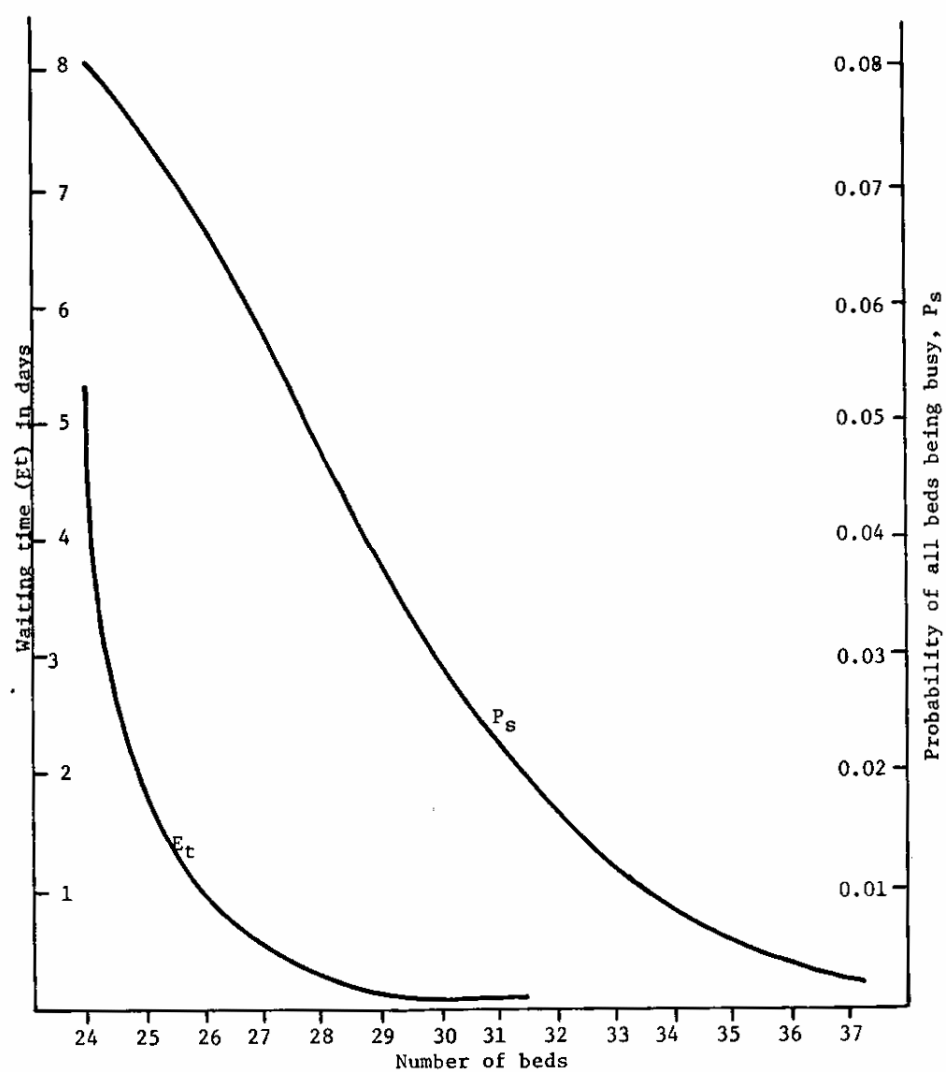


FIGURE 1
 QUEUEING CHARACTERISTICS E_t AND P_s WITH VARYING BEDS FOR FEMALE WARD
 DURING PAST ONE YEAR

However, the beds may be still scarce because of the fact that P_s may still be high. Accordingly, consideration of P_s leads to the provision of additional number of beds. Details of the complete results for P_0 , E_t and P_s are given in Table 3 and plotted in Figure 1. It is to be underscored that E_t becomes exceedingly low after a specific value of S whereas P_s registers the matching low value after increased value of S . The number of beds corresponding to the desired small value of E_t and P_s , therefore, give bed requirements under two separate criterion. Complete results for the optimum bed allocation are given in Table 4. Being similar in approach, herein details of analysis of the other three wards is not given

TABLE 3
QUEUING CHARACTERISTICS WITH VARYING NUMBER OF BEDS IN FEMALE WARD
BASED ON PAST ONE YEAR DATA

No. of Beds	$P_0(t)$	Waiting Time, E_t			Prob. That All Beds Occupied, P_s
		In Days	Hrs	Mts	
24	2.8459×10^{-11}	5.0092	120	13	0.07987
25	4.5209×10^{-11}	1.7170	41	12	0.07393
26	5.6121×10^{-11}	0.8461	20	18	0.06580
27	6.4189×10^{-11}	0.4765	11	26	0.05639
28	7.0485×10^{-11}	0.2838	6	49	0.04661
29	7.5472×10^{-11}	0.1731	4	9	0.03719
30	7.9375×10^{-11}	0.1062	2	33	0.02868
31	8.2337×10^{-11}	0.0650	1	34	0.02141
32	8.3846×10^{-11}	0.0452	1	5	0.01548
33	8.6164×10^{-11}	0.0351		34	0.01086
34	8.7272×10^{-11}	0.0137		19	0.00739
35	8.8010×10^{-11}	0.0079		11	0.00488
36	8.8500×10^{-11}	0.0086		6	0.00314
37	8.8820×10^{-11}	0.0025		4	0.00196
38	8.8014×10^{-11}	0.0013		2	0.00119

λ = The number of patients arriving per day

$$= \frac{23.14}{6.6} = 3.50$$

μ = The number of patients served on each bed per day

$$= \frac{1}{6.6} = 0.1515$$

$$\frac{\lambda}{\mu} = 23.14$$

TABLE 4

OPTIMUM BED ALLOCATION MATRIX

S.No,	Ward	Queuing parameters		Optimum bed mix based on	
		λ	μ	E_t	PS
1	Female	3.50	0.15		
2	Male	3.34	0.18	30	37
3	Maternity	6.15	0.24	26	33
4	Children	4.86	0.23	30	37
				29	35

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INFANT MORTALITY AND ITS CORRELATES IN GREATER BOMBAY

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ABSTRACT

Infant mortality levels and trends have been studied from Bombay Municipal Corporation records, for the years 1960-76. It was observed that various mortality rates have declined during the period 1960-76. Maximum decline has occurred in infant mortality in contrast with general mortality. However, it still continues to be high as it takes away about 22 per cent of the total deaths. Differentials by age and sex have also been studied. Male infant mortality continues to be still high particularly during the first six days of life. Differential declines in mortality for the various age groups have been observed and noted.

Studies have shown that repeated pregnancies, curtailment of breast feeding interval, birth intervals, birth order and socio-economic status are some of the variables which influence infant mortality¹⁻⁸. An analysis of registered data in India revealed that immaturity, congenital malformation and respiratory diseases are major causes of infant deaths⁹. Another study done in Madras during the year 1964 revealed that malnutrition and premature births contributed largest number of deaths under one month (neonatal) and the respiratory diseases after one month (post neonatal)¹⁰. A study done in Greater Bombay for the years 1966-68 has observed that infant mortality rates have fluctuated for less than one month (neonatal) and declined for later period (post neonatal)¹¹. The analysis of causes of infant deaths by age is an important phenomenon of study for demographers and health planners. It would be interesting to study what these causes are, particularly for

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different age groups, sex etc. With these points in view, an attempt has been made to study infant mortality:

- a. according to age at death, causes of death by sex; and
- b. according to father's occupation.

Materials and Methods

Data have been collected from the death certificates of Bombay Municipal Corporation. Information regarding age, sex, cause of death and father's occupation, for all infant deaths which occurred in 1976 has been collected from death certificates. Some more data have been collected from annual reports brought out by the Public Health Department. There is a problem in producing a reliable figure of the current level of overall infant mortality owing to the admittedly poor registration of vital events and the serious non-sampling errors with which the alternative approach of sample surveys suffer¹². Fortunately, unlike other cities in India, Bombay has fairly complete and accurate registration. Registration of births and deaths in Greater Bombay is accurate up to 99 per cent^{11, 13, 14}. Most of the information on cause of death and occupation is recorded by the hospital doctor. This information can be considered fairly reliable. Further nearly all births take place in hospitals and coverage of events and quality of data are better maintained. Disposal of dead body takes place in Crematoria and cemeteries. Entrance to all these places for the disposal of a dead body can only be obtained on the production of the death certificate. The data for the year 1976 show that out of 64,403 deaths in that year, all were certified by the medical practitioners. It further shows that of the total 55,106 (85.6%) were certified by the practitioners of modern medicine, medical officers of hospitals, Commissioner of Police or Coroner. Remaining 9,297 "(14.4%) were certified by *hakims* and *vaidyas* and verified by medical staff of the public health department¹⁵ hence, the rates calculated on the basis of these data can be considered fairly reliable and would be extremely useful in understanding of Greater Bombay mortality picture. Standard procedures were adopted in calculating the rates and ratios¹⁶. Population and vital statistics figures have been taken from the various health reports published by Executive Health Officer, Bombay Municipal Corporation for the years 1970-76¹⁵.

Results

Crude death rate has fluctuated from 10.0 in 1960 to 8.8 in 1976 indicating a decline of 12.0 per cent. However, infant mortality rate, defined as the infant deaths per 1,000 live births, was 95.2 in 1960 and has declined to 74.1 in 1976 thereby indicating a decline of 22.2 per cent (Table 1). Decline in general mortality was much lower than the decline in infant mortality. It was also seen that infant mortality rates have gradually declined up to 1964, having a peak in 1965 and then declined thereafter. Still birth ratio, defined as the ratio of still births per 1,000 live births, has declined from 36.7 in 1960 to 30.9 in 1976. Prenatal mortality rate (still births and deaths in the first seven days for 1,000 live births) has also shown a declining trend. Percentage of infant deaths to the total deaths has also declined from 25.2 in 1960 to 22.0 in 1976. When we look at the percentage distribution of deaths for various age groups it was observed that the highest percentage of deaths occurred in the age group of 45+ followed by less than one

TABLE 1
MORTALITY IN GREATER BOMBAY, 1960-76

Year	Crude Death Rate	Infant Mortality Rate	Perinatal Mortality	Still Birth Ratio
1960	10.0	95.2	—	36.7
1961	10.4	95.8	-	36.7
1962	9.2	84.0	-	33.6
1963	9.2	80.9	-	33.8
1964	9.9	85.6	-	35.6
1965	11.7	96.2	65.9	37.4
1966	10.6	85.5	66.3	37.2
1967	11.6	92.1	63.3	35.6
1968	9.4	80.3	61.9	34.7
1969	9.9	84.6	62.7	34.6
1970	9.8	80.6	63.1	34.3
1971	9.5	79.0	63.4	34.6
1972	9.3	80.1	63.2	35.3
1973	9.5	77.5	60.7	33.4
1974	9.1	73.3	57.9	31.9
1975	9.2	76.5	58.7	32.9
1976	8.8	74.1	58.9	30.9

Source: Computed from the Annual Reports of the Executive Health Officer, Municipal Corporation of Greater Bombay, 1974, 1975 and 1976.

year (Table 2). During the period 1960-76, there does not seem to be any significant change in per cent mortality, particularly for the age group 15-24 years. However, contribution of the age group under one year decreased and that of 45+ increased. Picture was different with respect to the age-specific-death-rates (Table 3). Age-specific-death-rates were highest for the first year of life followed by 45+, 1-4, 25-44, 15-24 and least in the age group 5-14. There was a decline in the age-specific-death-rates from 1960 to 1976 for most of the age groups. Maximum decline has occurred in the age group under one year, as discussed earlier and minimum in the age group 25-44. There was also an increase in mortality rate for the age group 45+. The Greater Bombay, however, has one of the lowest mortality rates in India. Neonatal mortality rate defined as the number of deaths occurring during 28 days of life per 1,000 live births is a measure of the intensity, with which endogenic factors affect infant life and exogenic factors cause mortality during the post neonatal periods of infant life. Infant deaths have been divided into those occurring in the first week of life, 72-88 days, and 28 days-3 months, 3-6 months, 6-9 months and 9-11 months. It was found that 37.5 per cent of infant deaths occurred within first six days of life followed by 19.3 per cent in next 21 days and 14.7 per cent in next three months period, the remaining 28.5 per cent of infant deaths have

TABLE 2
PER CENT DEATHS BY AGE IN GREATER BOMBAY 1960-1976

Year	Under 1 yr.	1-4 yrs.	5-14 yrs.	15-24 yrs.	25-44 yrs.	45+ yrs.	Total
1960	25.2	15.1	4.9	5.9	13.7	35.2	100.0
1970	23.2	11.3	3.9	5.3	15.2	41.1	100.0
1971	22.7	11.1	4.0	5.2	15.2	41.8	100.0
1972	22.9	10.7	4.0	5.4	15.2	41.8	100.0
1973	22.6	11.2	3.7	5.3	15.3	41.9	100.0
1974	21.3	10.6	3.9	5.8	16.0	42.4	100.0
1975	21.1	11.6	4.0	5.7	15.6	42.0	100.0
1976	22.0	10.6	3.9	5.8	15.1	42.6	100.0

occurred after three months period (Table 4). Also male infant mortality exceeded female infant mortality during first six days and later on it was found to be otherwise. The explanation could be that the females are biologically stronger at birth and could resist to a greater extent the environmental hazards. But they suffer a major setback due to social neglect in the later ages.

TABLE 3
AGE SPECIFIC DEATH RATES IN GREATER BOMBAY

Year	Age			Group			
	Under 1 yr.	1-4 yrs.	5-14 yrs.	15-24 yrs.	25-44 yrs.	45+ yrs.	All Ages
1960*	95.2	17.4	2.3	2.8	3.9	27.7	10.0
1970	80.6	13.5	1.8	2.5	4.3	32.2	9.8
1971	79.0	12.8	1.9	2.4	4.2	32.0	9.5
1972	80.1	11.8	1.8	2.4	4.1	31.1	9.3
1973	77.5	12.7	1.7	2.3	4.2	31.7	9.5
1974	73.3	11.3	1.7	2.5	4.2	30.7	9.1
1975	76.5	12.5	1.8	2.5	4.2	31.0	9.2
1976	74.1	11.0	1.7	2.4	3.8	30.0	8.8

*Source: Computed from Annual Reports of the Executive Health Officer, Municipal Corporation of Greater Bombay, 1960, 1970-1976.

TABLE 4
PER CENT INFANT MORTALITY BY AGE AND SEX IN GREATER BOMBAY, 1976

Sex/ Age	Less than 6 Days	6-28 Days	28 Days 3 Months	3-6 Months	6-9 Months	9-11 Months	Total
Male	40.9	19.1	14.1	10.3	9.0	6.6	100.0
Female	33.8	19.5	15.3	12.2	11.4	7.8	100.0
Total	37.5	19.3	14.7	11.2	10.1	7.2	100.0

Causes of infant mortality were analyzed by finding out the leading causes of infant mortality (Table 5). It was found that 5 per cent of the total infant deaths were due to "birth injury, difficult labor, and other anoxic and hypoxic conditions" (B43) and about 44 per cent were due to "Other causes of prenatal mortality" (B44). So, in all about half of total infant deaths were caused by prenatal mortality alone. Another leading cause of infant mortality was "Pneumonia" (B32) contributing 24.6 per cent of total deaths. This was followed by "Enteritis and other diarrheal diseases" (B4) , and "Diarrhea of new born" (B44b) , each contributing about 6 per cent of total deaths. Remaining causes like meningitis, bronchitis etc. contributes less than 2 per cent each. There were more male deaths due to "birth injury, difficult labor and other anoxic and hypoxic conditions" (B43) and "other causes of prenatal mortality and diarrhea in new born" (B44b) than female deaths.

Socio-economic status has been identified by fathers' occupation in the death registration certificates. High occupation includes professionals, engineers, doctors, advocates etc. Medium includes teachers, low salaried civil servants etc. and Low includes mazdoor, painter, barber, sweeper etc. It was found that percentage of infant deaths occurring in first month of life are higher in "High" occupation group and those of deaths occurring after one month found to be high in "Low" occupation group (Table 6). An overall test based on χ^2 statistics with 2 degrees of freedom indicated that these three groups differ significantly from one another at 5 per cent level.

Discussion

Infants and preschool children are most vulnerable groups for the risk of death. There is a decline in mortality. Decline is less in overall mortality but more during infancy. However, greatest decline has occurred in the post-neonatal mortality. This is indicative of a general improvement due to infection control. Decline was also observed in still birth ratio, prenatal, and infant mortality rate (Table 1). Prenatal mortality rate defined as deaths in the first seven days of life plus the number of late fetal deaths (still births) divided by the total number of birth (live and still) was much higher when compared to other developing countries¹⁷. Prenatal mortality results from

hazards of the prenatal and intranasal environments. The relevant environment may be considered as: abnormalities of the maternal reproductive tract, hostile influences capable of crossing the placental barrier and abnormalities of birth process¹⁸. As discussed earlier, mortality rates vary by age. These are highest for infants followed by the age group 45+. Changes have also taken place in these groups. In the first six days of life, male deaths exceeded female deaths. Nearly 25 per cent of the infant deaths are due to "prematurity and other causes of prenatal mortality" within six days after birth. The high concentration of infant deaths in the early neonatal period with "endogenous" causes seems to suggest the need to increase the antenatal and postnatal services to pregnant women at the hospitals and to impart knowledge about health aspects of mother and child care.

Infant mortality is affected by nutrition level and environmental factors which may be depended upon socioeconomic factors such as father's occupation, income, family size, water and environmental sanitation, housing conditions etc. In the present study, it was found that when the father's occupation was "low" the infant mortality was high and when fathers' occupation was "high" the mortality was low. A similar study conducted in Greater Bombay, showed that the percentage of deaths under one week was high in "High" occupation group and that of deaths occurring after one month found to be high in "Low" occupation group⁸. The "Low" occupation group people are exposed to poor sanitation, housing and unhygienic conditions and this might be the reason for highest percentage of deaths between one to eleven months. The data from U.S. also showed that infant deaths are 50 to 100 per cent higher in the lowest socio-economic group than middle and upper classes¹⁹. Similarly, it has been observed for those deaths which take place between the ages of one month and one year and where the major causes of death are further removed from the physiological processes of gestation and birth, infant mortality continues to be inversely related to socio-economic status⁷. It is likely that the "Low" economic status people. Do not get adequate nutrition and medical attention which leads to poor health and increasing infant deaths. Apart from poor housing conditions, lack of sanitation and pure drinking water, the mother and children who are exposed to such environmental hazards are the major victims in that society. In an urban

TABLE 5

LEADING CAUSES OF INFANT MORTALITY FOR EACH SEX IN GREATER BOMBAY
1976

Code in 'B' List	Cause of Deaths	Male	Female	All Death
B 43	Birth injury difficult labor and other anoxic and hypoxic conditions	5.8	4.1	5.0
B 44	Other causes of prenatal mortality	45.0	43.0	44.0
B 32	Pneumonia	23.4	26.0	24.6
B 4	Enteritis and other diarrheal diseases	6.0	7.4	6.7
B 44(b)	Diarrhoea of new born	5.7	5.2	5.5
B 18 (b)	All other infective and parasitic diseases	1.8	1.8	1.8
B 24	Meningitis	1.1	1.1	1.1
B 6	Other tuberculosis including late effect	1.1	1.1	1.1
	All other causes	10.1	10.3	10.2
Total		100.0	100.0	100.0

TABLE 6

PERCENTAGE OF NEONATAL AND POST NEONATAL DEATHS BY FATHERS OCCUPATION
(IN BROADER CROUP) IN GREATER BOMBAY FOR 1976

Age	High	Fathers Occupation Medium	Low
Neonatal (Less than one month)	52.9	51.8	44.9
Post neonatal (One month to less than one year)	47.1	48.2	55.1
Tot al	100.0	100.0	100.0

agglomeration like Bombay where majority of people are living in one room tenement and are exposed to polluted air and chronic and infectious diseases, all these factors affect infant and mother more than any other group.

To reduce infant mortality further, programmers and health planners will have to concentrate on control of infection among children and improve the nutritional status of mother. Further, action programmes should be launched to intensify the mobile health services to reach the doorsteps of the poor which will take proper care regarding immunization, child care etc. In a city like Greater Bombay, the high infant mortality rates in the lower strata of society can possibly be attributed not to lack of health services, but to lack of knowledge, negligence and ignorance on the part of mother from lower socio-economic group to avail the public health facilities. Hence, it is necessary to educate the women in poor socio-economic group regarding health and utilization of health services. Proper housing and sanitation facilities need to be provided to all urban residents.

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SOME CORRELATES OF THE OPINION ON IDEAL NUMBER OF CHILDREN IN THE FAMILY

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ABSTRACT

A house to house investigation on couples' opinion on ideal number of children in the family was carried out in a rural community of Jhansi district (Uttar Pradesh). The aim was to study the exclusive role, if any, of some of their personal characteristics viz. - literacy levels of both the spouses, number of total living children with special reference to male, socio-economic status and their age in the determination of family size. All such factors were significantly related with couples' opinion for the purpose. Analysis indicates that about 50 per cent variation of their response on ideal children is explained by demographic factors as against 15 per cent by socio-economic factors. Findings further reveal that aged couples, with low literacy levels having larger number of living children, smaller number of male living children and belonging to low socio-economic groups, by and large, prefer to have more children in their families. Such couples, therefore, need to be motivated with greater emphasis to adopt family planning devices.

The need for studies on couples' opinion on ideal family size has been emphasized in recent demographic literature^{1, 2}. The review of some KAP studies indicates that people, by and large, prefer to have smaller number of children in their families than what they actually have³. Further, urbanities' consider three children, on an average, to be ideal while villagers prefer an average of four. It has also been

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observed that the opinion regarding such preference mainly depends upon the background and personal characteristics of the individuals and may thus differ from one population group to the other^{4,5,6}. This opinion, in fact, is the end result of the multitude of several determining factors. Attempts of necessity, establishing exclusive role of each such correlative factor, especially where many variables are involved have been, in fact, very few. This presentation is an attempt in this direction. Such studies would unravel the relative significance of each of such correlative factors in the determination of family size.

Material and Methods

An investigation on fertility which included questions on opinion of respondents on optimum number of children in the family was carried out through house-to-house visits in four villages of Jhansi district (Uttar Pradesh) during April-October, 1976. The sampling unit was a couple with both spouses alive and with husband's age being 15 years or more. The study had included 931 such couples in about 954 families but only 776 (541 husbands and 235 wives) could be contacted and rest about 15 per cent (14.65%) were not covered because of many reasons⁷. Relevant information was collected for each couple by Social Workers on the predesigned schedules and by interviewing either of the two spouses for the purpose.

Various characteristics of the respondents studied have already been reported⁸. Of the many variables, correlated significantly with the respondents opinion on optimum children in the family, only six, viz. - literacy status of husbands and of their wives, number of living children, number of male (only) living children, couple's social status and age of the respondents were considered for the present analysis⁹. Other variables such as - occupation, religion, caste and their knowledge and practice of family planning methods etc. were excluded for the present analysis in view of numerous difficulties in assigning scores and because of their various limitations. Independent scores were assigned to the variables - literacy status in the manner indicated in our earlier similar communication². Rest of the factors considered was already quantitative.

In order to study exclusive role of each considered

correlative factor, multiple as well as partial correlation analyses were applied¹⁰ For simplicity in the analysis, factors viz. - ideal number of children preferred, literacy status of husband and of wives, number of total living children, number of male living children, couples' socioeconomic status and age of the respondents were designated as X_1 , X_2 , X_3 , X_4 , X_5 , X_6 and X_7 respectively.

Results

Analysis of couples' response by sex revealed that male couples, on an average, preferred 3.4 children as ideal number in the family against 3.5 children by female couples; the difference being statistically insignificant ($Z = 1.03$, $P > 0.20$). The responses of couples of the two sexes were, therefore, pooled together for further analysis.

Zero order correlation coefficients amongst seven variables considered in this study are shown in Table 1 (Fig. 1) and their statistical significance is presented in Table 2.

Analysis indicates that all six factors were significantly related with the respondents' opinion on ideal number of children in the family. Literacy levels of husbands and of wives were negatively related, however, correlation of rest of other factors was positive. This indicates that well-literate couples preferred relatively smaller number of children but those who were aged, belonging to higher socioeconomic status, having larger number of living children and/ or male living children preferred a larger number to be an ideal.

Since the studied correlative factors of respondents' opinion on optimum children were also significantly interrelated to each other, their accrued correlations with latter may easily be suspected due to the influence of other factors upon them. For this reason, highest order partial correlations were worked out (Table 2).

It may be seen that the correlation coefficients of the respondents' opinion with three factors viz. -number of male living children, couples' socio-economic status and their age, after eliminating the influence of rest of other factors from them, by turn; are significantly negative. However, such

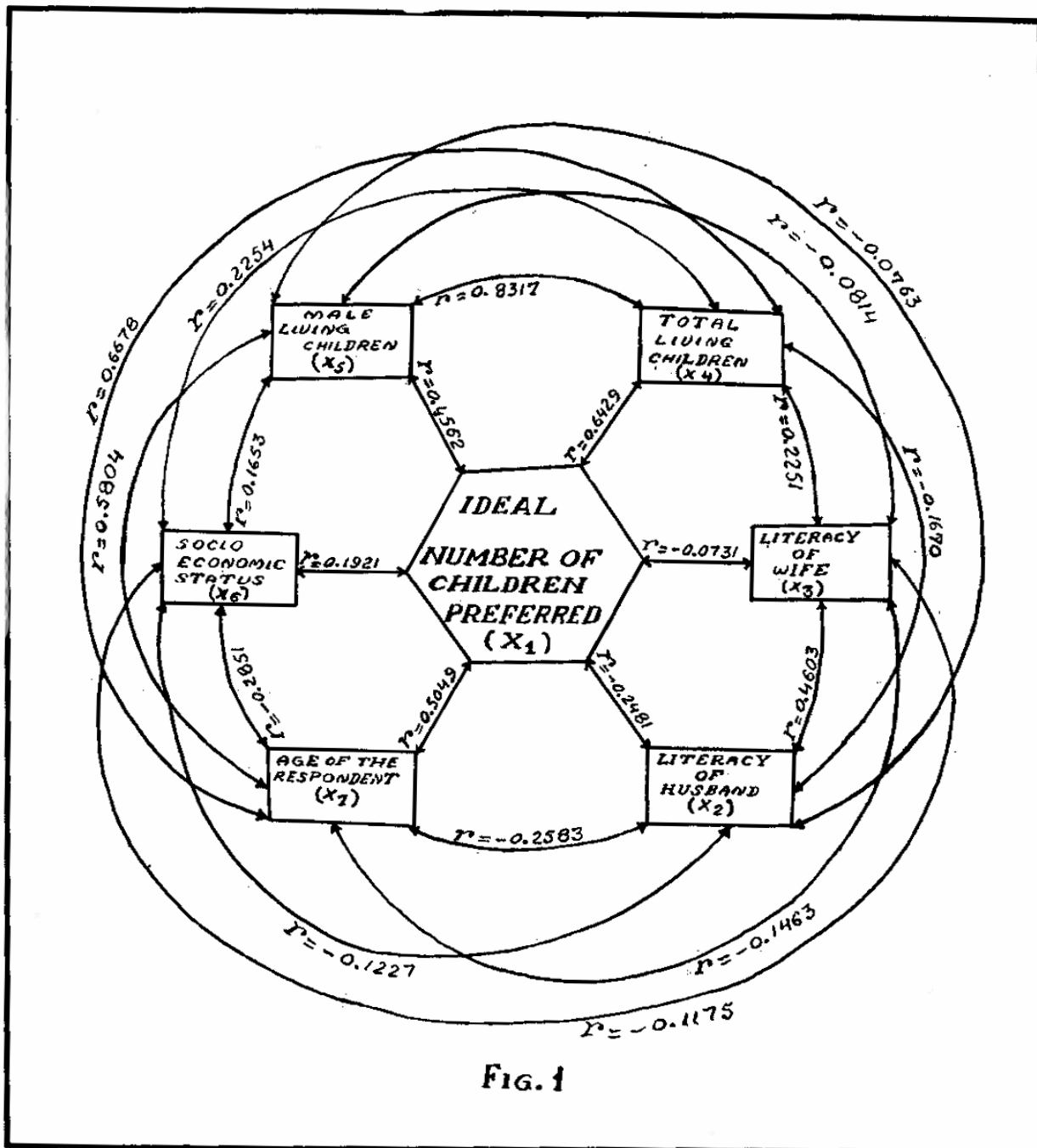


FIG. 1

TABLE 1
CORRELATION MATRIX (ZERO-ORDER CORRELATION COEFFICIENTS AMONGST 7
VARIABLES)

Variables	X ₁	X ₂	X ₃	X ₄	X ₅	x ₆	X ₇
X ₁	1	-0.2481	-0.0731	0.6429	0.4562	0.1921	0.5049
X ₂		1	0.4603	-0.1670	-0.0763	-0.1227	-0.2583
x ₃			1	0.2251	-0.0814	-0.1175	-0.1463
X ₄				1	0.8317	0.2254	0.6678
X ₅					1	0.1653	0.5804
X ₆						1	-0.2851
X ₇							1

TABLE 2
SIGNIFICANCE OF SIMPLE AND HIGHEST ORDER PARTIAL CORRELATION
COEFFICIENTS

	Simple Correlation Coefficient Specification	Statistical Significant		Partial Correlation Coefficient Specifi- cation		Statistical Significant	
	Value	Value of normal variate-Z	P-value	Value	Value variate-Z	Value of normal	P-value
r ₁₂	-0.2481	7.06	< 0.0001	r _{12.34567}	-0.2779	7.91	< 0.0001
r ₁₃	-0.0731	2.05	< 0.0500	r _{13.24567}	-0.4889	14.81	< 0.0001
r ₁₄	0.6429	21.38	< 0.0001	r _{14.23567}	0.5787	18.31	< 0.0001
r ₁₅	0.4562	13.69	< 0.0001	r _{15.23467}	-0.4950	15.02	< 0.0001
r ₁₆	0.1921	5.37	< 0.0001	r _{16.23567}	-0.2526	7.14	< 0.0001
r ₁₇	0.5049	15.44	< 0.0001	r _{17.23456}	-0.2579	7.31	< 0.0001

correlations for the literacy status of both the spouses and for number of living children are significantly negative and positive respectively, as had been observed before. Thus, significant positive correlations for the factors viz. male living children, social status and age, as observed earlier, were essentially due to the influence of other factors upon them. Our findings, further indicate that exclusively, aged couples having larger number of living children and smaller number of male living children, belonging to the low socioeconomic groups and having lower literacy levels, by and large, showed a desire to have larger number of children in their families.

In order to investigate the contribution of socioeconomic and demographic factors separately, the whole set of six independent variables was demarcated according to their nature, into two sets - one containing only socio-economic variables (x2, X3, X5) and the other, only demographic ones (x4, X5, X7). The multiple correlation coefficients (R) and the coefficients of determination (R²) of x₁ (ideal number of children) with the two sets of variables - socio-economic and demographic, were then worked out to enable us to determine variation in response explained due to each set of factors and their interaction.

Multiple analyses, Table 3 reveals that about 50 per cent (50.4%) variation of couples' opinion is determined by

TABLE 3
VARIATION (%) EXPLAINED BY THE TWO GROUPS OF FACTORS - DEMOGRAPHIC AND SOCIO-ECONOMIC AND BY THEIR INTERACTION

Variation in response due to	Variation Explained		Percentage variation explained
	Specification	Value of the parameter	
Demographic factors only	$\left[R^2_{1(234567)} \quad R^2_{1(236)} \right]$	0.5037	50.37
Socio-economic factors only	$\left[R^2_{1(234567)} \quad R^2_{1(457)} \right]$	0.1488	14.88
Interaction	$\left[R^2_{1(234567)} \quad R^2_{1(236)} \right]$ $-R^2_{1(457)}$	0.0563	5.63
All variables	$R^2_{1(234567)}$	0.5962	59.62

only demographic factors, about 15 per cent (14.9%) by only socio-economic factors and about 6 per cent (5.6%) by the interaction of these two sets of factors.

Discussion

The above analysis clearly indicate that considered correlative factors jointly play a significant role in determining the ideal number of children in the family and that the demographic factors viz. age of the couple, number of living children and of male living children are particularly more important. Amongst socio-economic factors, literacy status, particularly of wives, seems to be the significant determinant of opinion on ideal number of children in the family. A change in the attitudes of persons can, thus, be brought about by introducing a relevant change in these associated factors. Further, these factors must be taken into account with due care while motivating couples for opting family planning devices.

The results of the present study are almost in conformity with two other similar studies - one carried out in married employees of Banaras Hindu University and the other, undertaken in neighboring area of Jhansi district (Uttar Pradesh) 1, 2. Both these studies, however, take into account rather limited number of such variables.

During the survey, a few sampled couples were not contacted and as such their wives for the purpose were also **not** studied. The results of this study may, thus, be biased to some extent, as those respondents not included in this report might have shown different responses. Further, the characteristics of respondents generally vary from one population-group to the other and couples in this study were not studied randomly. As the result, these findings can certainly not be generalized. The results of this investigation would, however, hold good for the couples of those areas comparable in nature with that of present one.

Acknowledgement

The authors are grateful to the field staff of their Department for their sincere help in the conduct of this study. The help provided by the Institute for Research in Medical Statistics, New Delhi, in the analysis of data, used

in this communication in part, is also gratefully acknowledged.

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ABORTION IN UNMARRIED GIRLS

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ABSTRACT

The number of unmarried pregnancies seems to be going up steadily after the liberalization of abortions. In a study conducted in K.E.M. Hospital, 422 unmarried pregnant girls were studied. Fear of social stigma, low intelligence and staying in distant places seem to come in the way of these girls reporting early to hospitals for abortions, which results in the intensification of emotional and physical trauma.

This paper discusses the need for spreading awareness of these services, as also how parents and teachers can help in the prevention of this problem.

Abortions were liberalized in India in 1972, as a demographic and health measure, so that women could be prevented from giving birth to unplanned, unwanted children, in case of contraceptive failure and also save themselves from morbidity and mortality at the hands of quacks. Instead, they could go to government approved clinics or hospitals to have safe abortions under aseptic conditions. Another important reason for legalizing abortions, was to save the unmarried pregnant girls from social stigma prevailing in the Indian society, which though changing, still likes to adhere to age-old norms and traditions.

The old Indian agrarian society had people living in small, spread-out villages, now being replaced by industrialized towns and cities. Urbanization has also brought shifting populations, living in slums, which are characterized by poor housing conditions, inadequate water supply, poverty and malnutrition. New values and modes are replacing the hold of religion and caste on the people. The age of

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marriage has gone up. Education and literacy are becoming important to get jobs to improve one's socio-economic status. This is a welcome change but the large joint family with its supervising elders, is fast disappearing and the new social structure with nuclear families is not yet effective to take care of the young, the old and the sick. The pressures in day-to-day life are, therefore, mounting. These changes have put a tremendous strain on the relations between individuals, between sexes and between generations. Since the elders are too busy with their own problems, they have relaxed their control over the adolescents, who, because of the school and college curriculum, have plenty of leisure, with very little idea of how to use it. They get exposed to the gaudy and colourful mass-media of cinema, television and novels with telling effect on their taste and attitude.

To the question, why an unmarried girl becomes pregnant, there may be many answers. Most of these boil down to the plain fact that she was not prepared for contraception and because at that particular moment, overpowered by fiery passions, could not overcome their feeling not knowing perhaps, the natural outcome of their sexual intimacies.

Among other reasons for the girls going astray is emotional deprivation, when feeling lonely and depressed; they mistake the man's sexual advances for tenderness and love. Sometimes they may be revengeful towards adults, who have either been too permissive or too restrictive with them. At other times, those socially isolated and emotionally starved adolescents, tormented by feelings of inferiority, indulge in sex as the last resort.

Materials and Methods

In the Family Planning Centre at K.E.M. Hospital, Bombay pregnancies are terminated up to six weeks by syringe aspiration, *i.e.* menstrual regulation (MR); up to 12 weeks by suction evacuation and from 13-20 weeks in second trimester, by different abortifacients, like prostaglandins, unacredil, saline, etc. administered through various routes.

In 1978, 422 unmarried girls who came to Family Planning Centre, K.E.M. Hospital for terminating their pregnancies were studied by interview and findings were recorded. Most of these girls came from lower socio-economic class, as

K.E.M. is a public hospital surrounded by labor areas and all treatment is given free. This does not mean however, that there were no girls belonging to the upper middle or higher middle class. Some of these had to come to K.E.M. Hospital because they had not told their parents anything and so could not afford the private hospitals.

These girls were interviewed with the aim of helping them to overcome their feelings of guilt and anxiety in relation to the immediate problem of pregnancy. Abortion services were provided to them to enable them to overcome their problems and, to build them up emotionally after giving them sex education, so that they do not fall into the same trap again. Sometimes the putative fathers accompanying them were also available for counseling and sometimes one or both parents had come. But there were some girls who had come to the hospital alone.

Observations

The working status of the girls' parents is shown in Figure 1. It is a common feature in Indian society for the man to be the wage earner and accordingly find 42.89 per cent of the fathers working. The women usually look after the household chores but with the rising prices and increasing demands of growing families, the women (9.95%) were also working when their husbands retired or were jobless. However, 4.94 per cent women were supporting their husband's income as they found it helpful to make both ends meet. The girls who had only one parent alive or staying near them account for 18.96 per cent. Quite a large number (23.22%) did not have both the parents staying near them. Either they were at the native place or were dead. There were two girls who had been brought up by neighbors because they were destitute from the childhood.

The distribution of girls according to religion is shown in Table 1. A majority of the girls (75.83%) were Hindus, followed with Christians (13.51%) and Muslims (10.19%). There were two Parsee girls. The distribution is in keeping with the distribution of the general population according to religion and the occurrence of premarital sex and abortion appears to have no association with the religious affiliation of the girls.

TABLE 1
RELIGION

Religion	Number of patients	Percentage
Hindu	320	75.83
Christian	57	13.51
Muslim	43	10.19
Parsee	2	0.47
Total	422	100.00

Pre-marital sex and abortions seem to have no association with the religious affiliation of the girls.

TABLE 2
SIBLING POSITION OF THE PATIENT

Number of children in the family	<u>Sibling position of the patient</u>					Total
	1	2	3	4	5 or more	
1	15	-	-	-	-	15 (3.55%)
2	14	29	-	-	-	43 (10.18%)
3	21	18	16	-	-	55 (13.04%)
4	32	25	15	23	-	95 (22.51%)
5 or more	49	43	34	28	60	214(50.72%)
Total	131 (31.04%)	115 (27.25%)	65 (15.5%)	51 (12.09%)	60 (14.22%)	422

In 50 per cent of the families where there were 5, 6 children, our patients occupied first and second positions.

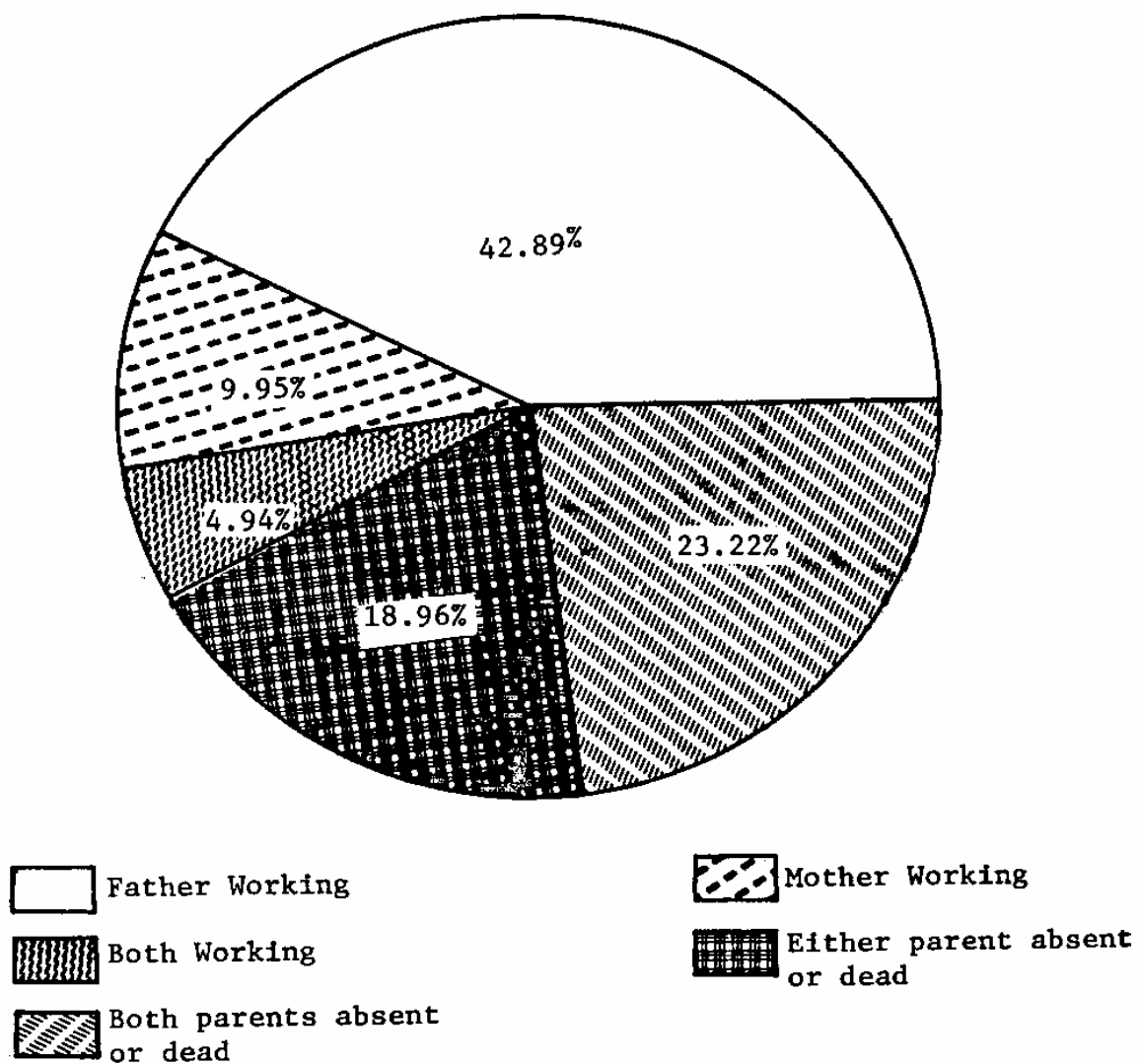


FIGURE 1

WORKING STATUS OF PARENTS

The age of these girls is shown in Figure 2. As is evident from this figure, three young girls who were less than 14 years of age had come for abortion before they understand what is menstruation they had been caught in the first or second cycle Doctors found it difficult to do the gynecological examination for them because of the girls being very tense and anxious. Two of them even had amnesia of the event, making them deny altogether that they had had sexual relations. As the age of marriage is going up the gap between it and the age of menarche is increasing. Proportionately, the risk of girls going in for pre-marital sex is likely to be more. A maximum number of girls (45.02% and 26.54%) are between the ages of 17-20 years and 20-23 years, respectively, when the biological urges are very strong. The biological maturity, if not accompanied by social maturity, is likely to get them into trouble. But 7.58% girls are between 23-26 years and 2.62 per cent are over 26 years, when due to being frustrated at not getting married, they have had the indulgence in sex. Figure 3 gives the level of education in these girls. A high percentage of girls (26.30%) were illiterate and 22.27 per cent had studied up to primary level only. The girls who had studied up to secondary level are 38.46 per cent, which reflects again the low socioeconomic status of their families. Illiteracy and low level of education means difficulty in being gainfully employed, availability of free time and low intellectual and emotional maturity.

The sibling position of our patients and the total number of children in their families is shown in Table 2. Highest percentage of these girls (31.04% and 27.25%) occupies the first and second positions. Most of these girls are expected to look after their young and growing siblings who are five, six or more; or help their mothers in household work.

A majority of the above two categories (32.82% and 41.74%) are working as packers or vendors or as domestic servants, which shows that economically too they are a help to their families (Table 3).

The gestation weeks of these girls are shown in Table 4.

Few girls (16.82%) came in the first 6-8 weeks of pregnancy, when menstrual regulation (MR) which is the

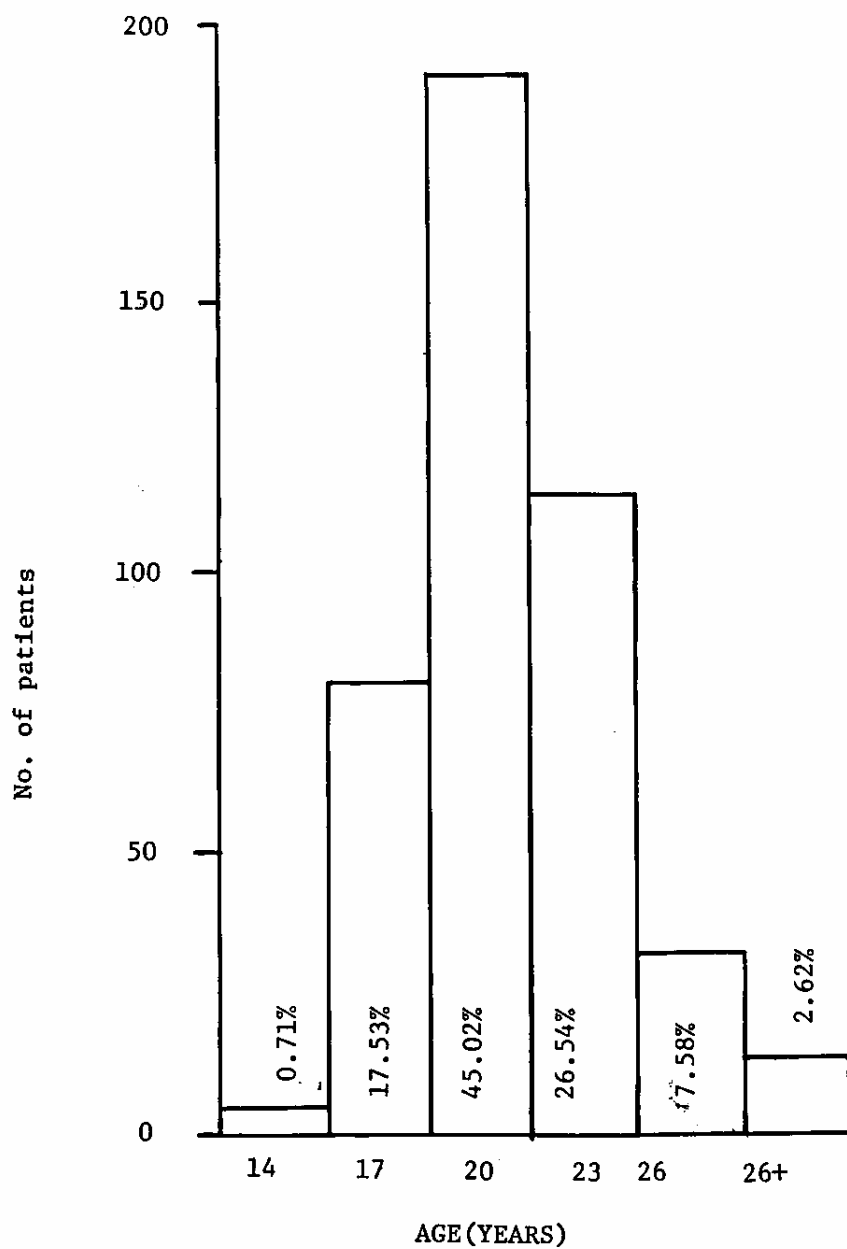


FIGURE 2
AGE DISTRIBUTION

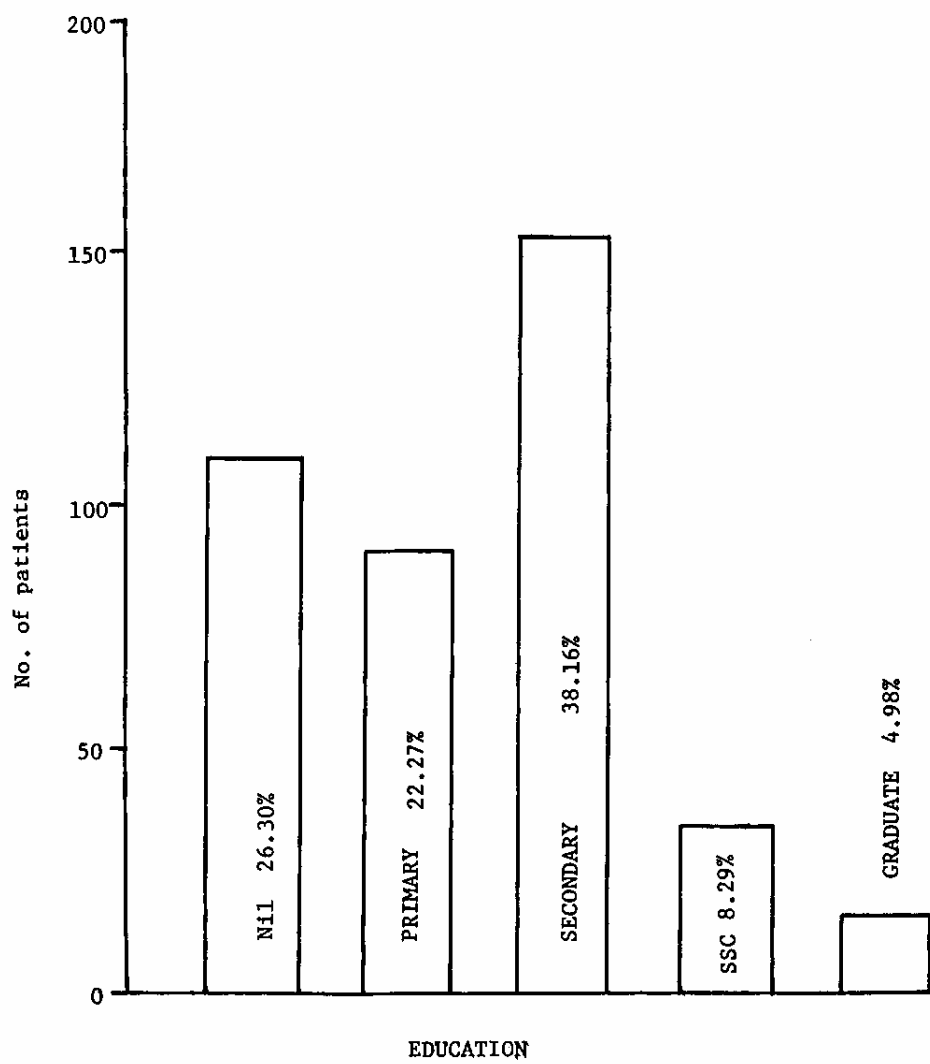


FIGURE 3
LEVEL OF EDUCATION

TABLE 3
POSITION OF THE PATIENT/EMPLOYMENT STATUS

Position	Employed in a company/factory	Domestic servants/ vendors/farmers	Total
1	17	26	43 (32.82%)
2	27	21	48 (41.74%)
3	11	10	21 (32.31%)
4	3	10	13 (25.49%)
5 or above	6	3	9 (15.00%)
Total	70	70	140 (33.18%)

37 per cent of the patients who occupied, first and second positions in their families were gainfully employed.

TABLE 4
GESTATION WEEKS

Gestation weeks	Number of patients	Percentage
6 - 8	71	16.82
8 - 12	126	29.85
12 - 16	80	18.95
16 - 20	77	18.25
20 or more	68	16.13
Total	422	100.00

M.R. could be performed for 16.82 per cent of the girls. 29.85 per cent girls were between 8-12 weeks. But by the time the other girls decided to come to the hospital for abortion they were already in second trimester.

simplest and safest procedure of abortion, could be carried out. These were girls from nearby areas, from fairly literate families. The girls who had come when they were between 8-12 weeks pregnant accounted for 29.85 per cent. This means that abortion services in government approved hospitals are getting to be known. Yet, there is a large number of girls who have come in the second trimester, when the risk of emotional trauma and physical complications is more. They came from remote areas or villages and belonged to low-income families, with no education. A majority of these girls were already in a fairly advanced stage of pregnancy, by the time they decided to have an abortion and succeeded in coming to the hospital. The long term psycho-social and obstetrical histories of these girls need to be studied in their future pregnancies by social workers and doctors. About 16.13 per cent girls came to the hospital when they were 20 weeks pregnant or more, hence 4.53 per cent girls were asked to continue the pregnancy. Sometimes this category of girls gets referred for antenatal care directly from OPDs, so the number does not indicate anything.

The patients according to the reasons for getting involved in pre-marital sex are classified in Table 5. A large percentage (28.44%) girls were permissive, having entered into long term relationships with their boyfriends but did not intend getting married for various reasons like differences in religion, caste or economic status of the families. Many girls today want to experiment with sex, the non-use or misuse of contraceptives leading them to seek abortion.

The girls who got involved with casual acquaintances, neighbors or classmates, due to curiosity are nearly 15.16 per cent. It was not premeditated on their part and most likely they were caught on their first contact. Usually, the trauma of pregnancy and abortion is sufficient to change them.

A large number of girls (14.69%) were officially or unofficially engaged to be married. They had economic or housing difficulties and some wanted to continue education, so could not marry immediately. It is not uncommon though, to see hasty marriages being arranged by the elders to avoid the scandal of illegitimacy although the youngsters hardly had any real, established relationship with each other. Such marriages do not tend to last long, as experience shows.

About 9.95 per cent girls were domestic servants who are very susceptible because of the very nature of their work. They are constantly exposed to the better amenities of life, which they themselves are not supposed to use. Along with this are factors like economic insecurity in life, drab and monotonous routine of household work and bad treatment by employers.

TABLE 5
TYPES OF PATIENTS

Type of patient	Number of patients	Percentage
Permissive	120	28.44
Curiosity/Casual acquaintance	64	15.16
Engaged	62	14.69
Domestic servants	42	9.95
Promiscuous	30	7.10
Low I.Q.	20	4.74
Involved with relatives	20	4.74
Continued pregnancy	19	4.53
Rape	17	4.03
Mentally ill	14	3.31
Incest	8	1.89
False information	6	1.42
Total	422	100.00

The largest percentage of girls were permissive, having long term relationships with their boyfriends. There is a close relationship between the degree of permissiveness in a society, the socio-economic status of women and the rate of illegitimate pregnancies.

The girls (7.10%) were promiscuous. These were the dull girls who came from poor homes where parents are usually quarrelling, may be given to drinking, are living separately or are. Dead Indulgence in sex can usually start by being bored with life in general and may get repeated because it offers a diversion and sometimes money also.

The girls who were pregnant due to sexual relations with their relatives, like cousins or brothers-in-law, who took advantage of the situation because the elders or sisters of these girls were absent from the house, for one reason or the other account for 4.74 per cent. Another 1.89 per cent girls were involved with their near relatives such as their own brothers or cousins. Poor housing conditions prevailing in our towns and cities could be the main cause for this.

Almost 4.74 per cent girls were having very low I.Q. and were a problem for their mothers to manage with. Three out of these were hysterectomies after taking psychiatric opinion and with parents consent. Contraception in most of these girls would have been helpful and advisable, but except in two cases, the parents did not want it and were even eager to find them husbands to whom they could pass-off the load in the hope that this would normalize the girls.

Gardner says, "The greater the psychiatric indications for a legal abortion are, the greater is also the risk of unfavorable psychic sequelae after the operation"¹. This observation applied to at least four girls we know, out of 3.31 per cent of mentally ill unmarried, who came to our hospital. On the other hand, it does not mean that these girls could have been better off carrying through the pregnancies, because that would have put them to a lot of stress and strain.

About 1.42 per cent girls gave false information, either saying that they were married when it turned out to be a marriage without any witness except the temple gods, or saying that they were engaged but had lost their finances in some accidents.

In the year 1978, we had eight unmarried girls who went in for repeat abortions. The first easy and safe experience of abortion may be a reason for their repeating it, besides some conscious and unconscious motives, but another obvious reason is lack of contraception.

Discussion

Medical science has advanced sufficiently to make childbirth safe and painless and more effective methods of abortions are being tried out. But all this progress through science and technology to help mankind has little meaning, if we cling to our old fashioned ideas and condemn the girls for their pregnancies out of wedlock. Josephine Butler says, "There would be no immoral women, if there were no immoral men". The criticism and reproachful comments by the elders around may make the girls feel so guilty that it can lead them to seek abortions at the hands of quacks, thus bringing them nearer to misery and death.

This does not mean, however, that we are advocating for unconditional sympathy and an personalized service of abortion for girls involved in pre-marital sex. Each girl is an individual case who needs to discuss her problems with an understanding social worker who in an honest relationship with her, can counsel her with sympathy to arrive at the best possible solution suitable to the particular circumstances in which the girl finds herself at the moment.

It is interesting to note that most of these girls had some elementary knowledge about reproduction but did not understand the cause and effect relationship between sexual intimacy and pregnancy. Some young girls had misconceptions, like one has to be older to get pregnant. Others thought they would not get 'caught' by just one or two exposures. They learnt about their being grown up at the time of menarche, from their mothers or elders, but gathered more scraps of information about the subject from their peer groups. It is deplorable that the positive attitude towards growing up, so essential in forming a mature personality is left to 'chance' in our society.

Out of 422 girls who came to our hospital, 20 accepted IUDs and three girls took oral contraceptives. The rest decided to do without sex till they were married. By accepting contraception, they either felt that they were expected to continue having sex or they had a fear about the side-effects and, therefore, decided not to have it.

Conclusions

Today's society is governed by new values and traditional systems are being discarded. Social studies have shown that illegitimate pregnancies do not occur in homes where parents, love and trust each other and their children. Parents have to set an example by understanding their own individual and social responsibilities and providing the children with 'happy homes' in which to grow and flourish as mature, self respecting citizens of tomorrow.

With the improvement in living standards, it is not so difficult to look after the physical needs of children when they are small but the parents need to know how to meet the demands of growing children, to make their emotional, intellectual and social life satisfactory. This can act as a big safeguard and prevent them from indulging in antisocial activities. Besides, if they have good basic moral values as their armor, they can combat any problem or difficulty on the way.

Sex education should start at home but parents do not feel free to talk about the subject so it can be taken up by teachers who are themselves confident about teaching it in schools from primary classes. Colleges can then take over to teach the youngsters about reproduction, sexually transmitted diseases and contraception.

Acknowledgements

We thank Dr. C.K. Deshpande, Dean, K.E.M. Hospital and Seth G.S. Medical College for allowing us to publish the hospital data.

We also thank Dr. Usha R. Krishna, Hon. Associate Professor of Obstetrics and Gynecology, for her encouragement and guidance.

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PROBLEMS OF HEALTH AND MEDICAL EDUCATION; A DISCUSSION

Sharad Kumar, V. A. Pai Panandikar, M. G. Garg and P. B. Desai

ABSTRACT

This presentation is based on the discussion broadcast by All India Radio, Delhi in September 1979, in their Current Affairs Programme. The participants in this discussion were: Dr. Sharad Kumar then Director, National Institute of Health and Family Welfare; Dr. V.A. Pai Panandikar, Director, Centre for Policy Research; Dr. M.G. Garg, General Secretary of the Indian Medical Association; and Professor P.B. Desai of the Institute of Economic Growth as Moderator.

We are publishing excerpts from the discussion as the subject matter has been dealt with from the national perspective and is of topical interest to our readers.

- Editor

Dr. P. B. Desai as Moderator introduced the subject matter by stating that health is universally recognized as the most basic aspect of development. In fact, in India, our plans have so far made considerable progress in providing adequate health care to the people. Yet, we find that India is among the lowest in the ladder of countries if we arrange it according to the health status of the nation as a whole and, therefore, we must see how we can solve the health problems of the nation. Recently, the Government of India has adopted the Alma Ata declaration which says that we shall be providing for health to all the people in our country by 2000 A.D. Now the problem is that health is not merely a medical problem. It has relationship with almost all aspects of life and here for this discussion we have an eminent social scientist that I request to define the context in which health problems can be tackled.

Dr. Panandikar observed that the problem of health is

intrinsically linked to the question of the quality of life. To provide adequate quality of life to the people, we have to provide adequate quality of health services. The most important demand made everywhere in every village in our country apart from roads and schools, relates to medical services. Curative dimension or the problem of delivery of health services is only one part of the total problem. The two important aspects of the health problem are: (a) the problem of preventive health and providing, therefore, a whole range of those qualities of life which contribute to the development of proper health, for example, nutritional dimension, and (b) the promotive part which may enable people to look after the health needs far better, namely hygienic and other related dimensions. If, you look at the kind of medical care which is being provided today and who gets it, you will find that, by and large, the middle class and a small segment of the upper sections of the community have benefitted a great deal from services that we have developed. We have not yet been able to reach a large number of people, especially those in the lower classes not only in the rural areas, but even in urban areas. This is a very important dimension of the problem.

Commenting in this context of the target of providing health to all persons in India by 2000 A.D. Dr. Sharad Kumar mentioned that it is the first time that we have a draft national health and medical policy. This draft opens with a consideration of the Alma Ata declaration. The draft recommendations in the health policy take into account the targets and the services that have essentially been enunciated in the Alma Ata declaration. First and foremost question, however, would be defining the need of health. When you talk of the need of health, as Dr. Panandikar said, there are few people living in the urban areas and it is largely the middle class who are beneficiary of the existing health services. Even for the common man we have an existing vast infrastructure, but is it being optimally utilized, is it being rationally developed, is it commensurate with the needs at different levels that we have? I think these are the issues to which the health policy has addressed itself.

,On the question of co-relating Government policy with the private sector, Dr. Sharad Kumar explained that the Government recognizes that the private sector has to play an important role, but more than that is the recognition of the

role that the community itself is to play in providing for health services. We have all along viewed the community as a consumer of health services and have never looked upon the community as a resource for providing health services. In this connection a number of projects such as the project at Jamkhed or for that matter a beginning that has been made in respect of national community health volunteers scheme, are very significant leads in that direction.

Continuing the discussion and presenting his view on the Rural Health Scheme, Dr. Garg said that it is not the dearth of medical manpower which is standing in the way of providing health care but the other inputs, such as that the community should involve itself. There is a scheme on mini-health centres advocated by Dr. Sanjivi in Madras where he feels that the community should not just be a consumer but a participant. If the expenses in community health care are to be shared by the community, the State Government and the Central Government, they will then feel more involved.

Dr. Desai referred to the number of medical practitioners and their distribution which is more than two-thirds spread out in urban areas, and invited views whether this number, increasing by 12,000 doctors annually, would be adequate in terms of coverage and whether we could expect them to go to rural areas in the context of their background the social strata they belong to and thus be able to meet health needs for all by 2000 A.D.

Dr. Garg said that so far the doctors are concerned; there is no dearth of them in the country. The Minister had said in the recently held Conference that we have 1, 84,000 doctors in India. He said out of that 68 per cent stay in cities and only 32 per cent go in villages, whereas the population is just in the reverse order. The question, however, is that we have got 5,400 primary health centers and hardly few primary health centers which are without doctors. At the Indian Medical Association conference held at Cochin, some 1,100 qualified doctors gave a written undertaking to the then Prime Minister that they are prepared to take jobs anywhere in the far-flung areas.

Dr. Sharad Kumar, however, felt that even if a doctor is posted in every house, would it be socially justifiable and an economically viable proposition? There are needs of a

certain kind, there are needs that should be satisfied by the individual himself. There would be needs that are taken care of by the family and there should be needs that in terms of health can be met at the community level. Therefore, by and large, the specialist kind of services of doctors needed should certainly be available and should be equitably distributed, but certainly the thinking should not be confined to having a doctor posted at, say, every thousand population or every 500 population, because in my opinion, the health of the people is not dependent on the number of doctors.

Besides this, study after study and experience after experience have demonstrated that they are exclusively for curative services. Is this all that we are trying to do to raise the health of the people? Is the health index commensurate with the treatment or the consumption of drugs that we are going to provide? To this, Dr. Garg reacted by saying that a provision has been imparted in the present system for social and preventive medicine, and thus the preventive aspect is taken care of from the first year up to the last year. It is the question whether there are inputs for them to help in the promotive and preventive aspects. Moreover, whenever there is question of health needs, only the modern system is counted, whereas there is a very large number of Ayurvedic, Homoeopathic and others. When we compute the doctor-population ratio, only doctors trained in modern medicine are taken into account. But when it comes to the recognition and the other structure they have their equal claim.

Continuing, Dr. Sharad Kumar elucidated his point that given different systems, can we manage to give at the intermediate level, a well trained person belonging to any of these systems, which the community will accept or will it accept only the allopathic doctor? A number of States are trying to do it, he added. Gujarat has already done it; they call them '*Jan Swasthya Adhikari*' i.e. the Public Health Officer. They have envisaged a training programme for persons who have had a basic exposure in ten plus two i.e. 12 years followed by about three years, or plus three years, that will adequately train them and equip them with sufficient skills and knowledge to provide that kind of care under discussion.

On the point of having skills of promotive, preventive,

curative aspects in one person and for that matter to have a capsule of short duration courses, Dr. Sharad Kumar said that it does not exist, but certainly it is being proposed. If we look at the general system of education, *i.e.*, ten plus two pattern in which there is a chunk of two year in which we have to stream in vocational and educational aspects. In the National Conference on Medical and Health Education also a scheme was presented, in which in two years stage you can construct units and modules which will meet the requirements of various types of health manpower with both vertical mobility as well as horizontal mobility.

Dr. Desai, however, raised the issue that the MBBS who is a product of the present system is not multi-purpose in the sense that he can also take care of the preventive and the promotive sides and that is why we are looking for a cadre which can, without any right to practice medicine, be a link to a professional highly qualified doctor and Rural Health Worker which we have already suggested.

Dr. Sharad Kumar said that we have in this country about ninety thousand people, who are employed, and are already called the middle level auxiliaries which are being brought as multi-purpose middle level workers. They become one and retire as one. Now when you visualize such a middle level worker, you don't visualize a single stream. There should be a public health nurse who could take up this course, there could even be a lateral fresh entry, there could be an upward movement from this vast army of people who are already providing this service. Their knowledge can be updated and they can be suitably trained.

Further, highlighting his views on the setting up of a commission, Dr. Sharad Kumar said, that: there have been 10 or 12 high powered Commissions and Committees who have been debating on these issues and have made very pragmatic and realistic recommendations. But they have all languished. We have all the time been trying to say that our educational system should be socially relevant, the curriculum content should be changed, the character of internment programme should be changed, but there has been no organization, no permanent structure to initiate any of these changes so far. It is not a one time show; it is an on-going process that goes on changing according to health situations and demands. In this context, it has been thought of to have a permanent organized structure to be set up. The other point is that this function is being done now by certain existing councils now, we have a whole range of manpower. We have nurses, dentists, auxiliaries, pharmacists, and the right hand does

not know what the left hand does. It has been hoped that within the umbrella of this Commission would come up the problems of development of manpower, development and structuring of suitable courses. Further, the existing councils have been essentially regulatory and restrictive to enforce certain standards. They were not designed, essentially to do any promotive and promotional functions. According to me this Commission would have an important role to play in developmental activities.

Concluding, Professor P.B. Desai said that health as well as development will depend to the extent to which we can make the community and individuals help themselves. It is the fundamental principle of all development, including health, that everybody must help themselves. Only then we can hope that some progress can be made over the recommendations of the Conference on Medical and Health Education that was just held.