Health and Population
- Perspectives & Issues 6 (4) -193-208, 1983

FERTILITY RELATED POLICY IN INDIA

B.B.L. Shsrmaand D. S. Singhal

ABSTRACT

There is a close connection between fertility moderation measures and the changing levels fertility among the Indian States. However, a few States - for example, Orissa Karnataka and Gujarat - provide a typical picture which should be critically analysed.

Marriage laws need to be strictly enforced. The propagation of the legal minimum age at marriage requires to be done through mass media because it has far reaching demographic implications.

Family planning efforts in the States of Uttar Pradesh$_3$ Bihar and Rajasthan should be more vigorously pursued because of their low levels of performance and high levels of fertility and their demographic preponderance in terms of their population.

Although, no formal and comprehensive population policy statement seem to have been declared till 1976, yet the Government of India was the first amongst various governments in the world to adopt fertility moderation as its national policy in 1952. The direct policy programme measures are well reflected through family planning efforts and other indirect endeavours in the country.

This paper attempts to examine the fertility changes occurring amongst the various States of India over a period of time ranging from 1960s to 1980. Efforts have also been made to view the present fertility level and examine the occurred changes in it with reference to direct fertility moderation programme which are expressed in terms of average number of couples protected in various States. The links are located between indirect fertility moderation policy measures such as female age at marriage and the levels and birth rate changes in various States.

A Brief Review of Literature

Almost all the literature on population policy in India revolves around fertility, for which the reasons are well-known. There are few papers which directly addressed to Indian fertility moderation as a part of population policy in India.

Few papers deal with cultural factors in the Indian Society that determine attitudes towards fertility, the development of governmental policy in this regard and the prospects of contraception. Chandrasekaran while reviewing fertility trends and National Policy have also discussed the experience gained in the implementation of the family planning programme in India. In an article in "Economic Times" (1980) it is stated that the population policy in India concerns itself in regulating fertility without sorting the real forces affecting it.

Sharma and Tripathi while documenting the papers on the fertility and population policy aspects reported that papers are primarily concerned with fertility trends, differentials and not directly related to population policy analysis[2].

Internalisation of small family norm for bringing moderation in fertility to various social institutions viz. family social structure etc. could not earlier form a part of population policy.

Sources and Limitation of Data

The fertility levels discussed in this paper are not the absolute, diehard exact levels of vital rates but rather indicative levels of approximations. The time period to which sets of data refer, also at times, may not pointedly be for the particular year but for the nearmost year for which data were uniformly and readily available. The sources of data are Sample Registration System, Family Planning Statistics , reports and papers from Indian Census.

To explain the fertility related policies and.changes in fertility levels - direct programme efforts in terms of couples protected have been used from the computations done by the Department of Family Welfare and female age at marriage estimates were taken from Census of India, 1971.

Fertility Profile of India

The Census of India 1981 recorded the population of India at 685.1 million persons of which 330.8 million were females. The total number of eligible couples as estimated by the Department of Family Welfare on March 1983 are 121.3 million. The birth rate is estimated at 37.1 per thousand population for the decade 1971-80.

Since 1952, when the direct fertility reduction efforts were started as an official policy, the population of the country has increased by about 90 per cent. The pattern of crude birth rate for the periods 1961-70 and 1971-80 have been reflecting considerable variations amongst different Indian States. Highest birth rate have been reported for the State of Uttar Pradesh having maximum population with almost lowest literacy and very low female age at marriage. Contrast in Kerala with one of the lowest birth rates and highest literacy and age at marriage for females in the country. The average feirale age at marriage is 17.2 years for the decade 1961-71 fcr India. The average female literacy is 24.9 per cent according to 1981 Census of India (Table 1).

With this brief fertility background of Indian women, the discussion on the fertility changes *vis-a-vis* fertility related direct and indirect policies of the Government of India is of great implication.

Changes in Fertility in 1961-71

The fertility levels for decades 1961-71 and 1971-80 for the States of India have been given in Table 2. It reveals that Punjab is perhaps the only State where the birth rate declined by 5-10 points in the decade 1960-70. In rest twelve States, birth rate either did not decline or declined by less than 2 points during the same period.

Changes in Fertility in 1971-80

Even today, the two most populous States viz. Uttar Pradesh and Bihar with a population of about 181 million in 1981, have not either shown any decline in birth rate or still continue to remain in less than 2 points decline category of States.

TABLE 1

STATEWISE FERTILITY PROFILE OF INDIA

Name of State	Total population in 1981 (in lakhs)	Female population in 1981 (in lakhs)	Per cent literate females 1981	Females age at marriage 1981	Crude birth rates 1960	1970	1981	Per cent couples effectively protected on March 1983
Uttar Pradesh	1,108.6	520.4	14.4	16.3	41.5	42.5	43.8	13.1
Bihar	699.1	339.8	13.6	16.1	43.4	41.9	41.1	13.7
Maharashtra	627.8	303.7	35.1	18.2	41.2	41.0	29.2	40.0
West Bengal	545.8	260.2	30.3	18.6	42.9	44.3	36.4	25.7
Andhra Pradesh	535.5	264.4	20.5	16.8	39.7	39.2	35.9	28.4
Madhya Pradesh	521.8	252.9	15.5	16.1	43.2	46.6	39.6	23.6
Tamil Nadu	484.1	239.2	34.1	19.7	34.9	36.8	30.4	28.6
Karnataka	371.4	182.2	27.8	18.6	41.6	39.9	37.8	26.7
Rajasthan	342.6	164.1	11.3	15.6	42.7	42.7	40.0	15.7
Gujarat	340.9	165.4	32.3	19.1	45.7	41.6	39.2	36.9
Orissa	263.7	130.6	21.1	18.7	40.2	41.3	34.6	27.5
Kerala	254.5	129.2	64.5	21.3	38.9	37.5	28.7	33.5
Punjab	167.9	78.5	34.1	20.6	44.7	36.9	32.1	34.5
Haryana	129.2	60.1	22.2	17.4	44.7	44.5	37.3	31.5
India	6,851.8	3,307.8	24.9	18.0	41.7	41.2	37.1	25.9

Source: 1. Census of India 1981 Series I India Part II, Special Report and Tables based on 5 per cent sample data.

2. Family Planning Yearbook, 19S2-83, Dept. of Family Welfare.

The State of Punjab joins with Gujarat in the category of 2-5 points decline in birth rate during 1971-80 decade. These two States together with the States of Andhra Pradesh, Karnataka and Rajasthan coming from the category of less than two points decline during 1961-71 decade, have a population of about 175 million in 1981. Thus, seven major States in the category of less than 5 points decline in birth rate have about 356 million (52 per cent) of today's India's population as compared to 464 million (84 per cent) population in the decade 1961-71 for the same decline.

Another seven States *i.e.* Kerala, Tamil Nadu, Haryana, Orissa, Maharashtra, West Bengal and Madhya Pradesh with a decline of over 5 points in birth rate have 292 million (42 per cent) of India's population in 1981 as compared to 13.6 million (2.5 pfcr cent) population in the decade 1961-71.

The recorded changes in fertility levels in 1971-80 decade over the 1961-71 decade suggests that the fertility is undergoing moderation during 1971-80 decade (Table 2).

Fertility Changes and Family Planning Performance

India's population policy related to fertility moderation is Centrally planned. Programme to translate it into reality and action are also Centrally financed. The implementation or execution is totally left in the hands of various States; within the framework of fertility related population policy component prepared Centrally.

For the purpose of seeing whether there exists a close link between family planning programme as a direct weapon in the armoury of Government of India to affect fertility moderation, an attempt has been made to study and analyse the programme efforts in terms of average number of couples effectively protected and changes in birth rate in various States over the period of time.

Fertility decline does provide the main explanation to the changes in fertility levels in all those States where growth rates have declined. As a matter of fact, since mortality conditions have continued to improve during 1970s, the decline in the birth rates may have been pronounced.

TABLE 2

DISTRIBUTION OF STATES ACCORDING TO NUMBER OP "POINT DECLINE" IN CRUDE BIRTH RATE IN THE PERIOD 1960-70 AND 1970-80

Number of points decline in crude birth rate	1960-70 Name of States	Total No. of States	1970- 80 Name of States	Total No. of States	Total popula-tion (in million 1981)	1960-80 Name of States	Total No. of States
Did not decline or declined by less than 2 points order	Maharashtra, Kerala, Andhra Pradesh, Uttar Pradesh,Bihar, Orissa, Karnataka, Rajasthan, Haryana, Tamil Nadu, West Bengal, Madhya Pradesh	Twelve	Bihar, Uttar Pradesh	Two	180.7 (26.4)	Uttar Pradesh	One
Decline in Birth Rate between 2-5 points	Gujarat	One	Gujarat, Punjab, Andhra Pradesh, Karnataka, Rajasthan	Five	175.1 (25.6)	Andhra Pradesh, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Tamil Nadu	Six
Decline in Birth Rate between 5-10 points	Punjab	One	Haryana, Kerala, Tamil Nadu, Orissa, West Bengal, Madhya Pradesh	Six	232.3	Gujarat, Orissa, West Bengal, Haryana	Four
Decline in Birth Rate by more than 10 points	_	Nil	Maharashtra	One	62.7 (8.9)	Maharashtra, Kerala, Punjab	Three
					685.2		

Source: Columns 5,6 and 7 adopted from Table 1. Ibid.

The major States of India grouped into three broad categories depending upon their family planning performance as high level, medium level and very low level of performance emerging out of the average number of couples effectively protected during 1971-80 as shown in Table 3.

A close look at the data shows that Uttar Pradesh, Bihar and Rajasthan fall into group III reflecting very low efforts in terms of fertility moderation policy. Resultantly, these States even today have quite high birth rates in the country. Whereas in case of Uttar Pradesh the birth rate instead of showing any decline appear to have increased over the period of time.

TABLE 3

FAMILY PLANNING EFFORTS IN THE STATES WITH CHANGES IN CRUDE BIRTH RATE IN 1960s, 1970s AND 1980s

Relative level of programme emerging through direct fertility related policies tected in States	Direct programme efforts in terms of number of couples effectively pro-	Crude Birth Rates in		
		1960	1970	1980
High	Maharashtra	41.2	41.0	29.2
	Haryana	44.7	44.5	37.3
	Kerala	38.9	37.5	28.7
	Gujarat	45.7	41.6	39.2
	Punjab	44.7	36.9	32.1
Medium	Tamil Nadu	34.9	36.8	30.4
	Andhra Pradesh	39.7	39.2	35.9
	Orissa	40.2	41.3	34.6
	Karnataka	41.6	39.9	37.8
	West Bengal	42.9	44.3	36.4
Very Low	Bihar	43.4	41.9	41.1
	Uttar Pradesh	41.5	42.5	43.8
	Rajasthan	42.7	42.7	40.0
	Madhya Pradesh	43.2	46.6	39.6

Source: Col. 5,6,7, and 8 adopted from Table 1 ibid.

The most striking feature is that these three States of Uttar Pradesh, Bihar and Rajasthan, with about 31 per cent of India's population in 1981 are the lowest one in the family planning performance. As such these States have hardly triggered with their fertility levels. Notwithstanding the empirical analysis, it can be inferred that fertility related policies of the Government of India have not made any significant dent in fertility reduction in these States and as such require rigorous efforts to bring these States at par with other States. It is not only required because of the fact that there hardly exists any substantial changes in their fertility level but also from the point of view of their demographic preponderance in terms of low rural literacy, of the population in these States.

As a contrast to this category, the high programme performance States are Kerala, Maharashtra, Gujarat, Punjab and Haryana. Amongst these five States, three States have fertility level below 35 while other two oscilate between 35-40 as their birth rate. The States of Haryana and Gujarat where the birth rate oscilate between 35-40, the performance efforts were made more rigorously in mid seventies and as such its effect will be more pronounced in next decade.

Likewise, the third category of intermediary type of States of Tamil Nadu, Andhra Pradesh, Orissa, Karnataka, West Bengal and Madhya Pradesh which recorded on an average level of Family Planning Programme efforts as an integral part of their fertility reduction policies have on an average 24.4 per cent of couples effectively protected in March 1980.

Among this category the State of Tamil Nadu have been consistant in its family planning performance right from the beginning and as such have been able to lower its birth rate comparable to high performance State category as given in Table 3.

As a matter of fact, it can be safely noted that the family planning as a direct fertility moderation policy is having a meaningful role in lowering the fertility levels. In the decade 1951-60, ten States were observed to be.having birth rate of 40 and above. While at present, in a period of 20 years, only three out of 14 States have birth rate of 40 and above. However, on the whole this trend of fertility

moderation broadly indicates the positive results of direct programme efforts of fertility related population policy of the Government of India. The inverse correlation between couples effectively protected and the crude birth rate of various States is observed to be significant (r = -0.7444).

Fertility Changes and Age at Marriage

In the context of fertility related population policy and age at marriage, it is observed-that in India girls marry early and universally. This pattern is due to 'feasibility' and 'desirability' of marriage in a joint family set up in India. By and large, low living Indian conditions, stigma for marrying late, penalties for childlessness and . no economic opportunity and support or in other sense no real economic status for women add to this early and universality of.marriage. The suggestions for raising the age at marriage particularly for females have been made as a population control measures in view of its effect on reproductive span, its effect on fertility schedule which would ultimately result in reduction in birth rate. However, such emphasis has not been noticed in the body of literature on population policy dealing with age at marriage as an important component of population control. In this context, it will be relevant to quote, the working group on Population Policy, which states "we strongly feel that recently enacted law on minimum age at marriage has come in at. a good time specially when the family planning programme is at its lowest ebb and should be implemented with massive educational programmes and specially alongwith literacy programme for girls. Such a scheme can pave the way for creating a small family norm and when the norm is deeply embeded in the minds of the potential mothers, fertility regulation will become a people's programme. Since, the wife is likely to be more mature and exposed relatively to modern ideas, the possibility of couples using the contraception will be higher.

The findings of an analytical field based study (1978) done by National Institute of Health and Family Welfare is worth quoting with reference to age at marriage and public opinion towards it, as a part of most effective implementation of family welfare policy. "It states with regard to increase in minimum age at marriage of girls and boys as per the child restraint (amended) Act 1978, there was an universal approval by the people, and most of the people visualised

no difficulty in abiding by it. The role of voluntary agencies in enforcing the law and educating the people were stressed by the informed group.

The Government of India issued a major population policy declaration in April 1976, in which it was clearly stated that legislation would be passed to raise the minimum age of marriage to 18 for women and 21 for men. The question of making registration of marriages compulsory, the declared action goes on 'is under active consideration'.

The recent slogans on age at marriage issued by Directorate of Advertising and Visual Publicity on behalf of Department of Family welfare is "Maternity needs maturity/No marriage before 18 years (for girls), Demographic implications of these slogans on family planning and reduction of fertility have been examined.

The literature reviewed by and iarge suggest the close links between high fertility and lower age at marriage.

The States have been classified into three major groups belonging to high, medium and very low age at marriage as shown in Table 4. The overall picture which emerges out of this data indicate an association between crude birth rates and female age at marriage amongst various States of India. The general contention that higher the age at marriage, lower is the birth rate is broadly supported by our analysis. Changes in crude birth rate for major Indian States broadly concludes this view in case of female age at marriage (1971) and fertility moderation (1971-30). The correlation between female age at marriage and the birth rates is found to be significant (r = -0.783). Similar observations are recorded in the works of Baravarjappa, and Belvalgided^, Aggarwala^, Chandrasekaran and Talwar 1, Talwar and Seal^.

States identified as having relatively high female age at marriage (say between 18-21 years) are Kerala, Tamil Nadu, Gujarat and Punjab. Among these, three States reflect low crude birth rate while Gujarat indicates birth rate which seemingly fall neither in high :ior in low category as given in Table 4.

The second group of States are those where female age at marriage is neither very high nor low. It is rather

TABLE 4

STATES WITH CHANGES IN CRUDE BIRTH RATES IN 1960s, 1970s AND 1980s WITH REFERENCE TO FEMALE AGE AT MARRIAGE IN INDIA

Relative level of social change emerging through in direct fertility rela ted policies on age at marriage	Name of States with female age at marriage according to level in descending order	Changes in Crude Birth Rate (Years)		
		1960	1970	1980
High	Kerala	38.9	37.5	28.7
(19 years and above)	Tamil Nadu	34.9	36.8	30.4
	Punjab	44.7	36.9	32.1
	Gujarat	45.7	41.6	39.2
Medium (Between 16.5-19 years)	Karnataka	41.6	39.9	37.8
	West Bengal	42.9	44.3	36.4
	Maharashtra	41.2	41.0	29.2
	Orissa	40.2	41.3	34.6
	Andhra Pradesh	39.7	39.2	35.9
Very Low (Below 16.5 years)	Uttar Pradesh	41.5	42.5	43.8
	Bihar	43.4	41.9	41.1
	Rajasthan	42.7	42.7	40.0
	Madhya Pradesh	43.2	46.6	39.6
All India		41.7	41.2	37.1

B.R.: High 40 and above;Medium 55-40; Low Below 35 Source: Col. 5,6 and 7 adopted from Table 1 Ibid.

moderate and medium ranging between 16-18 years. In this group, out of five States three suggest moderate birth rate and while rest other two show somewhat low birth rate.

The remaining four States where not only the female age at marriage is below 16 years of age are Uttar Pradesh, Bihar Rajasthan and Madhya Pradesh. These States have also witnessed high crude birth rate. The States of Uttar Pradesh, Bihar, Rajasthan and Madhya Pradesh which belong to this group, social changes emerging through indirect fertility related policy on age at marriage could hardly contribute to the reduction in fertility in these States.

The changes in fertility level over two decades in various States in terms of the point decline in birth rates in various States have been shown in Table 5. It divides the States into two broad categories. The first group of seven States consisting of Uttar Pradesh, Tamil Nadu and Karnataka, where female age at marriage was ranging from 15.2 to 19.6 years. However, the States of Tamil Nadu and Karnataka need probing. The second group of States consisting of Kerala, Punjab, Maharashtra, Gujarat and West Bengal where fertility decline was of the order of six points or more, the female age at marriage in these States varies from 17.2 to 20.9 years. However, Orissa presents a case where in spite of low level of literacy and low age at marriage, the decline in birth rate is more than six points during the period.

Conclusion

Sixth Plan document records that the age at marriage is an important determinant of fertility. Legislation for raising the age of marriage has been undertaken on the recommendations of the committee of the status of women, the Government of India, passed the law in 1978 raising the marriage age from 16 to 18 for girls and from 18 to 21 years for boys.

The 1971 Census data observed that mean age of the then currently married women was 17.2 for India. The census also revealed that nearly 78 per cent of women were married before attaining the age of 18 while it was 62 per cent among urban women, of course, the situation varied from State to State. (Since the enactment of new legislation in 1978, no

TABLE 5

DISTRIBUTION OF STATES ACCORDING TO NUMBER OF POINT DECLINE IN CRUDE BIRTH RATE IN THE PERIOD 1960-80 WITH REFERENCE TO FEMALE AGE MARRIAGE 1981

Number of points decline in Crude Birth Rate during 1960-80	Number of States	Name of State	Female age at marriage 1981.	Population in States (in lakhs)
Did not decline or declined by less than 3 points	3	Uttar Pradesh	16.3	1,108.6
		Bihar	16.1	699.1
		Raj asthan	15.6	342.6
Declined between 3-6 points	5	Madhya Pradesh	16.1	521.8
		Andhra Pradesh	16.8	535.5
		Karnataka	18.6	371.4
		Orissa	18.7	263.7
		Tamil Nadu	19.7	484.1
Declined by 6 points and more	6	West Bengal	18.6	545.8
		Haryana	17.4	129.2
		Gujarat	19.1	340.9
		Kerala	21.3	254.5
		Maharashtra	18.2	627.8
		Punj ab	20.6	167.9

Source: The grouping has been arrived at by using the data from Table 1 columns 4, 5, 6 and 7 and the sources listed therein (Ibid.).

significant improvement has been recorded, whatever evidence is available it only shows that enforcement of this measure of fertility moderation policy has been very lax). Marriage laws are still violated on massive scale. The marriage law needs to be strictly enforced and made it obligatory for the couples to register their marriage.

In view of the wide disparities in the family planning performance of States in India is the three-fold categorisation of States attempted and discussed in this paper with reference to number of couples protected etc. in various States and also inconformity with the suggestions given by working group on population policy;serious considerations have to be given for variations in family planning performance in regional, sub-regional, Statewise and district to district within the country for each category.

Our analysis also supports that a policy on the lines indicated in the sixth plan document has to be prepared and family planning programme cannot be just on monolithic pattern for whole country.

The direct programme efforts related to fertility moderation policy must particularly take care of Uttar Pradesh, Bihar and Rajasthan consisting of about 31 per cent of India's population. These three States have not witnessed substantial demographic gains in term of fertility reduction as yet. There is poor knowledge in rural masses regarding minimum marriageable age limit as prescribed by the most recent legislation. So the propagation of minimum age at marriage (and particularly in view of its demographic implications) is required to be done more vigorously through mass media.

Acknowledgement

The authors are grateful to Dr. Somnath Roy, Director, NIHFW for his encouragement in contributing this paper. We are also thankful to Prof. P.P. Talwar for the guidance in the analysis for this paper.

Lkkjk'k

जननक्षमता अनुसीमन मापाकों और भारत के विभिन्न राज्यों में बदल रही जननक्षमता के स्तरों के माध्य एक गहरा सम्बन्ध है। इस

पर भी कुछ राज्य–उदाहरणार्थ उड़ीसा, कर्नाटक और गुजरात से एक विशिष्ट तस्वीर सामने आती है जिसका आलोचनात्मक विश्लेषण किया जाना चाहिए।

विवाह सम्बन्धी कानूनों का सख्ती से पालन होना चाहिए। विवाह के लिए न्यूनतम कानूनी आयु का जनसंचार साधनों द्वारा प्रचार किये जाने की आवश्यकता है क्योंकि इसके दूरगामी जननांकिक परिणाम होते हैं।

उत्तर प्रदेश, बिहार और राजस्थान राज्यों में लोगों की जननांकिक बाहुल्यता तथा कम–स्तरीय प्रदर्शन व उच्च–स्तरीय जननक्षमता के कारण परिवार नियोजन के क्षेत्र में अधिक जोर–शोर से प्रसास किए जाने की आवश्कयता है।

REFERENCES

1. CHANDRASEKARAN, C. & TALWAR, PREM P. (1968) Form of age specific birth rates by order of Birth in an Indian Community, *Eugenics Quarterly*, 15;4.

2. SHARMA, B.B.L. & TRIPATHI, A.D. (1981) *Population Policy in India: A Survey of literature.* Ambika Publication, New Delhi, 18_: p. 194.

3. INDIA, PLANNING COMMISSION (1979) *Working group on population policy - Interim Report.* New Delhi, Planning Commission (Mimeo.).

4. TALWAR, PREM P. & SAWHNEY, NIRMAL (1980) *Demographic Implications of slogans in family planning programme.* Paper presented at the Annual Meeting of IASF - Calcutta, ISI (Mimeo.).

5. BASAVURAJAPPA, K.G. & BELVALZIDAD, M.I. (1967) Changes in age of marriage of females and their effect on the birth rate in India. *Eugenics Quarterly*, 14:2.

6. AGGARWALA, S.N. (1965) *Effect on a rise female marriage on birth rate in India.* Proceedings of the World Population Conference.

7. TALWAR, PREM P. & SEAL, K.C (1974) Measurement of effect on fertility of shifts in Age at Marriage, A Case Study of India. *Demography India.* 3:2.

8. TALWAR, PREM P. (1967) A note of changes in age at marriage of females and their effect on the birth rate in India. *Eugenics Quarterly*, 14:4.

Health and Population
- Perspectives & Issues 6(4) -209-225, 1983

A REVIEW OF DIARRHOEAL DISEASE CONTROL PROGRAMME IN INDIA

B. N. Tyagi

ABSTRACT

The National Cholera Control Programme has recently been converted to the National Diarrho-eal Disease Control Programme (NDDC) in accordance with WHO recommendation. This change has been brought in with the aim of reducing morbidity and mortality for all types of diarrhoea diseases.

An attempt has been made in this paper to give historical evaluation and objectives of the programme. The problems of diarrhoeal diseases and their magnitude has also been discussed. The infrastructure in terms of manpower, budget allocation, operational targets, training programmes, monitoring and evaluation mechanism, prevention and control of diseases have also been highlighted.

The Global Problem

Diarrhoeal diseases are a major cause of death in all developing countries. Both the incidence of diarrhoea and the severity of its consequences delcine with increasing age. Children under the age of 5 years bear a major burden of mortality and morbidity. Over half of all the deaths occur in children under 5 years, the age group of 1 to 5 years is at the highest risk for diarrhoea and malnutrition However, children under 2 years of age suffer the greatest impact of diarrhoea and are associated with malnutrition. World-wide investigations have found diarrhoea incidence peaking between the ages of 6 months to 3 years, with an annual rate ranging from 2 to 12 episodes, averaging about 4 per year in most poor communities.

Magnitude of the Problem in India

It is estimated that in India the rate of illness from diarrhoeal disease is about 500 per thousand per year in in-

fants and about 200 per thousand per year in pre-school.children1. About 1.5 million children under the age of 5 years die of diarrhoeal diseases every year. The incidence of diarrhoeal disease is highest between the age of 3 months and 36 months with a peak incidence between 6 and 9 months.

Unfortunately, Indian data on morbidity and mortality from diarrhoeal diseases is deficient in many ways. The validity of this data is further lost by their fragmentation under sub-heads of cholera, gastroenteritis, dysentry, diarrhoea and parasitic diseases. No separate records/data is available for these disease entities.

The picture of cholera in India has changed radically over the years. Mortality due to cholera has declined steadily. Except for occasional outbreaks, cholera accounts for less than 5 to 10 per cent of all acute diarrhoeal cases in non-epidemic seasons. A greater proportion of the deaths, reported especially amongst children are due to diarrhoea caused bv other pathogens.

The aetiology of diarrhoea is very varied. Until recently aetiology could be determined in only 20 per cent of cases. However, in recent years, several new aetiolo-gical agents, have been detected. It is, now possible to determine the aetiology of diarrhoea in about 65-70 per cent of cases. The important aetiological enteropathogens are E.coli, salmonella, shigella, V. choldera and certain intestinal parasites. Rota virus has also emerged as an important cause of "diarrhoea Ln infants.

Historical Evaluation of the Programme

In the past, diseases such as cholera and typhoid were given high priority in national programmes. Today, cholera accounts for less than 5-10 per cent of all acute diarrhoea, even in areas where it is endemic. More than 90 per cent of instances of cholera are clinically indistinguishable and can be treated in the same manner as other acute diarrhoeas. Significant advances in knowledge have been made in recent years regarding diarrhoeal diseases and this has led to the

---

* Diarrhoeal Diseases Control Programme Plan of Operation. Ministry of Health and Family Welfare.

development of improved and rimplified treatment methods. The following are some of the important research developments:

> (1) the understanding of the pathogenesis of most of the acute diarrhoeas has offered new possibilities for developing better method:? of treatment and prevention, including the development of vaccines;(2) the elucidation of the critical sequence of events that occurs in the development of intestinal immunity against the diarrhoeal pathogens, which now provides better opportunities for the development and study of oral enteric vaccines; (3) the confirmation that the provision of safe water supplies for drinking purposes alone sometimes has a limited impact on the incidence of acute diarrhoeal diseases because persons are exposed to other water sources during bathing, washing and cooking and because not all diarrhoeas are waterborne, has pointed to the need for a comprehensive approach towards environmental control;and (4) it has been shown that, except in the extremely sever cases, dehydration in all diarrhoeas, whatever their aetiology, can be safely and effectively treated and prevented in all age groups by the simple method of oral rehydration with a single solution containing glucose (or sucrose) and salts; in addition, emphasis on adequate feeding has contributed to better weight gain in children

The National Cholera Cortrol Programme, which has been operational in India since the Fourth Plan Period, has recently been converted to the National Diarrhoeal Disease Control (NDDC) Programme in accordance with WHO recommendations. The NDDC Programme ims to reduce morbidity and mortality for all diarrhoeal diseases and does not limit itself to the control of cholera alone.

Objectives of the Programme

The immediate short-term objective of the NDDC Programme is to reduce mortality and diarrhoea related malnutrition in children by means of oral rehydration therapy as a primary health care activity and to promote research to develop improved tools and strategies. The long-term objective of the programme is to reduce morbidity due to diarrhoeal disease by the improvement of child care practices,

epidemiological surveillance, and the provision of simple excreta disposal and water supply facilities together with activities to encourage their acceptance, maintenance and utilisation. Health education should constitute an integral part of each of these strategies.

Achievement of reduction in mortality, a short-term objective, will depend upon the achievement of operational targets. It is expected that the incidence of deaths from diarrhoea can be reduced to less than one per cent not only in hospitals but also in the community, by implementing oral rehydration therapy (ORT). The following targets for percentage reduction in mortality have been specified:

Year	Percentage reduction in mortality due to diarrhoea
1985	35
1990	75
2000	95

Administrative Structure

At the national level, a Cell has been established in the Directorate General of Health Services under the charge of the Assistant Director General (Public Health) (designation as NDDC Manager) and under the overall supervision of the Deputy Director General.(Planning). This Cell is responsible for programme planning, training of manpower, research, general supplies and equipment. The guidelines developed at the centre are forwarded to the Directorate of Health Services of States and Union Territories (UTs) for implementation.

Manpower Development

The objective of manpower development is to impart to various categories of health workers, knowledge and skills in oral rehydration therapy (ORT) and other associated activities, for achieving the objective of reduction of morbidity and mortality due to diarrhoea. In order to achieve this objective training programmes are being organised. Training will be provided to State and district level doctors by organising national seminars on ORT. Fif-

teen such seminars were proposed during 1982-83. At the district level, 408 training courses one for each district, will be arranged for PHC doctors. Other categories of health workers such as the Auxiliary Nurse Midwife (ANM) , Multipurpose Worker (MPW) and the Village Health Guide (VHG), will be trained in the management of diarrhoea with ORT by integrating this training with their regular training courses.

Operational Targets .

It is proposed to cover all health centres and their service areas so that the programme forms an integral part of the primary health care services provided through these centres.

In the year 1981_t there were 5,532 primary health centres and 51,184 sub-centres. The number of primary health centres will be 6,000 and sub-centres 90,000 by the year 1985. The scheme for Village Health Duides (VHGs) envisages that there will be one VHG for a population of 1,000. So far, 1.40 lakh VHGs are inposition and their number is expected, to go upto 3.60 lakhs. The primary health centres are supplied oral rehydration salt (ORS) packets alongwith their supply of drugs. The ANM at the sub-centre level is supplied one hundred packets of ORS per year. In the normal course, the HG is supposed to supply 20 packets per quarter.

The Indian Drugs and Pharmaceuticals Limited (IDPL) in Madras has a present capacity to produce 1,000 ORS packets per day. ORS packets are also being manufactured by the private sector but details of supply through this source are not available. Thus, with a population, of about 83 million children under 5 years of age, 186 million diarrhoea episodes are expected in India annually. A study conducted in Burma and Calcutta indicates that no treatment is required for 90 per cent episodes. Accordingly, annual requirement of 18 million ORS packets per year is estimated. With the estimated increase in population and its coverage, requirement for later years is expected to increase to 20 million ORS packets.

Budget Provisions

A provision of Rs.16.00 lakhs has been made for diarrhoeal

disease control in the national budget for the period 1980-85. Year-wise allocation of this budget is given as under:

Year	1980-81	1981-82	1982-83	1983-84	1984-85
Lakhs (Rs.)	0.1	3.3	3.0	5.3	4.3

This budget provides funds for the supply of health educational material for the HGs at the primary health centre (PHC) level. This allocation is not adequate keeping in view the magnitude of educating the communicates about the diseases, its prevention and control.

Prevention and Control

Measures for the prevention and control of diarrhoeal diseases may be classified to include (i) therapeutic interventions, (ii) improvements in environmental sanitation and household and personal hygiene, and (iii) nutritional interventions .

Therapeutic Interventions

Extensive reviews have documented the scientific basis as well as the efficacy of oral rehydration therapy (ORT) in acute diarrhoea. It is safe, effective, cheaper than intravenous fluid replacement. While the World Health Organisation's ORT formula has proved to be effective and safe in the treatment of millions of cases throughout the world, the greatest emphasis should be given to replacement of the fluid and salt losses associated with diarrhoea early in the illness, before the appearance of dehydration. Thus, availability and acceptability of rehydration measures and accessibility of necessary supplies or ingredients are even more critical than precise composition of the resulting formula. Whenever, possible, the "complete formula" should be provided.

Management of acute diarrhoea involves replacement of fluid lost orally, electrolytes, continued breast-milk feeding, and rapid re-introduction of the diet appropriate for the age. It should be understood that, while ORT will not necessarily reduce volume of diarrhoea (it may sometiir.-s increase for a brief period as hydration is restored), it will prevent dehy-

dration, restore normal fluid electrolyte balance, and improve appetite.

While antibiotics are indicated in cases of dysentery and certain other diarrhoeas with clear bacterial aetiologies, their indiscriminate use can be harmful. Indeed, the typical history of a child with intractable diarrhoea of infancy an often fatal chronic disease, includes cessation of breastfeeding, indiscriminate use of multiple antibiotics, and intermittent or prolonged periods of fasting in response to an initial acute diarrhoeal episode. Effective treatment of acute diarrhoea, is an important means to avoid the emergence of chronic cases.

Environmental Sanitation, Household and Personal Hygiene

While contaminated water plays an important role in the transmission of enteropathogens, many capital-intensive water improvement schemes have often been sigularly ineffective in reducing diarrhoeal morbidity. This is because many diarrhoeal agents are not primarily waterborne; further, it may be the quality and usage pattern of water in the home, not the purity of water at its source, that largely determines the impact of diarrhoeal morbidity on individual members of the community, particularly the children. Therefore, it is of vital importance to limit the consideration of water supplies and the provision of plentiful clean water at a common community source. Effective water improvement schemes should be accompanied by a health education component aimed at improving personal hygiene, with special reference to food hygiene and particularly weaning food preparation.

Safe disposal of human faeces (and the exclusion of animal faeces from the home environment) should logically lead to a major reduction in transmission of many, if not all, of the agents of diarrhoeal disease with a corresponding reduction of morbidity and mortality. In practice, few sanitation schemes have met with success, at least in the short-term. Recurring shortcomings of such schemes include failure to assess disease perceptions and culturally enriched behaviour patterns of relevance in a community; maladaption between sanitary technology and the needs of a specific community education towards optimal use of the facilities; and in general enlisting the active participation of the

community in the programme. Particular, priority should be accorded to the safe disposal of faeces from active diarrhoeal cases, as they contribute the overwhelming proportion of pathogens in the environment. With the exception of infrequent asymptomatic carriers of enteric pathogens, excreta from healthy persons do not transmit disease. It should be recognised that in many communities, even where basic sanitation facilities exist and adults use them, young children are often permitted to defaecate indiscriminately. Because diarrhoea attack rates are highest among children, it is the defaecation in this age group that deserves most attention.

Epidemiological and microbiological evidence has demonstrated that high levels of household contamination play a critical role in diarrhoea disease transmission. Environmental surveillance invariably documents positive cultures for faecal coliforms in utensils, vessels, dishes, fingers and other household sources. The key to the interruption of disease transmission is use of household "technologies" and practices that either reduce the overall level of household faecal contamination or prevent the oral ingestion of faecally contaminated fluids and foods. Excreta disposal is obviously critical in this regard. Other means include simple, low-cost technologies such as "thin-necked" water storage vessels that prevent hand-contamination of drinking water, the use of alkaline limewater to clean child diapers and soiled hands, simple chlorination of water in the home before drinking, and simple gates and fences to segregate animals from living quarters. Such technologies and practices should be developed to be consistent with specific local circumstances. It is also possible that behavioural changes, such as hand-washing, may reduce disease transmission. These behavioural and technological changes can often be achieved at low financial cost.

Nutritional Interventions

Specific measures to promote breast-feeding in communities where it is not universally practiced$_f$ and to support the lactating mother and her milk output, are likely to reduce both the prevalence and the impact of diarrhoea in infants. These measures might include strong efforts at the national level to limit the promotion and inappropriate use of commercial infant formulae. At the community level

health and nutrition interventions during pregnancy may influence birth weight and subsequent milk production, and delay the time at which other foods are required to supplement the diet'of the breast-fed infant. Breast-feeding probably has an important direct role to play in terms of protection against diarrhoea upto the age of 6 months, and also have an indirect effect, by its contribution to the nutrition of young children into the second year of life.

Contaminated weaning foods of all sorts have been identified as major vehicles for the transmission of faecal pathogens during early infancy. This contamination appears to be worst in the earliest weaning foods, often dilute cereal gruels or cow's milk, or formula. Black *et al* have identified three aspects of weaning food technology which should be examined for possible preventive.interventions: (i) bacterial contamination and multiplication can be reduced by developing and using "dry" weaning foods, which are subject to fewer risks of contamination and do not facilitate bacterial growth as readily as wet preparations do in tropical climates;(ii) more complete cooking of food reduces or eradicates pathogens and should be encouraged;and (iii) every effort should be made to reduce the standing time of already cooked weaning foods.

tOral Rehydration Therapy

Dehydration in cases of acute diarrhoea of any aetiology and in all age groups can be treated with oral rehydration therapy (ORT) using a single solution. This solution is prepared by mixing appropriate amounts of glucose, sodium bicarbonate$_t$ sodium chloride and potassium chloride to drinking water to give the optimum concentrations for intestinal absorption of electrolytes and water to replace acute diarrhoeal losses. Although administered orally, the solution is absorbed in the small intestine even in the presence of copious diarrhoea. Numerous studies in adults, children, infants, and neonates have helped to establish the safety and effectiveness of this simple remedy.

Composition of Oral Rehydration Solution

The formulation recommended by WHO has been in use for several years and the accumulated experience has clearly shown that it can be administered effectively and safely for the

treatment of dehydration from acute diarrhoeas of all causes and in all age groups7.

Ingredients	Grams/per one litre water
Sodium chloride	3.5
Sodium bicarbonate	2.5
Pottasium chloride	1.5
Glucose	20.0

Controlled trials in a number of countries have shown that in cholera and non-cholera diarrhoeas in all age groups sucrose can be an adequate substitute for glucose, although its use is associated with slightly lower success rates. Especially in patients with profuse diarrhoea, and perhaps with more vomiting, which is thought to be related to its sweater tests studies. In order to obtain the same osmolarity as glucose, sucrose concentration in grams per litre was twice that of glucose.

Nutritional Benefits of Oral Rehydration

Hospital studies initially suggested that children who receive early and prompt correction of dehydration, acidosis, and potassium deplation with ORT resume feeding earlier and more rapidly regain the weight loss associated with diarrhoea. Studies in Philippines, Turkey, Iran, Egypt, Liberia and India have shown higher rate of weight gain in children who received ORT and dietary management during episodes of acute diarrhoea. Pre—packed ingredients conforming to the WHO-recommended formula were used in all these studies. The precise mechanism of weight gain is not clear, although correction of acidosis and replacement of potassium losses probably played a role in hastening the improvement of appetite.

Delivery of Oral Rehydration to the Periphery

Considerable amount of attention is being focussed on extending the delivery of ORT as a primary health care activity, to the village and household levels.

Not only is ORT an eminently suitable tool for application at the primary health care level, it is also an entry point for health education activities to promote other preventive measures. Because of the illness of her child, the mother is likely to be very receptive to such advice.

Developments in India

The Cholera Research Centre in Calcutta has developed a cheap and simple system for dispensing the ingredients (glucose-salt powder) for oral rehydration in sealed polythene packets to facilitate distribution at the community level. Under the name of CHOROSOL - the packets have been successfully used in the field for the managment of a number of cholera epidemics and have been well received by both medical and paramedical staff. As an added innovation the packets of CHOROSOL include separate pouches in the same bag one for sodium bicarbonate and the other for glucose, sodium chloride and potassium chloride. This provides a greater stability and longer life of the packet.

The success of a practical programme of implementation of ORT at the village level would primarily depend on (i) an adequate supply of packets containing the glucose-salt mixture; (ii) extensive training of doctors and paramedical staff; and (iii) development of a suitable strategy for educating mothers and other village-based voluntary workers to ensure effective delivery of the treatment at home.

Supplies

The problem of large-scale production of ORS packets required to treat the heavy load of diarrhoea cases in the country can be approached in two ways. Firstly, a number of pharmaceutical firms operating in the public and private secotrs may be entrusted to supply ORS packets. This will ensure an adequate supply of packets for individual users. Secondly, all hospitals, big as well as small, may be encouraged to prepare oral fluid for their own use. The Infec tious Diseases Hospital in Calcutta and the Fever Hospital in Hyderabad have been preparing oral fluids according to their daily requirement for the last few years.

To meet the immediate requirements, the Government of India is in the process of installing pouching machines;

each capable of producing about 15 million packets a year at the Government Medical Stores Depots in Madras with the collaboration of the UNICEF. Several State governments have also taken interest in producing ORS packets through their public sector drug manufacturing units. A few commercial firms have started marketing ORS packets under different brand names.

Home Delivery

A study on the feasibility of delivery of ORT through mothers with the help of Health Guide (HG) at the village level has been undertaken in collaboration with the WHO. The results of this study are expected to help in developing methodologies for educating mothers and other village-based voluntary workers who are the key personnel for home delivery of ORT.

There is enough evidence to suggest that delivery of oral fluids can reduce death rates considerably. In a recent outbreak of cholera and related diarrhoeas in the State of Manipur, the case-fatality rate was found to be as low as 0.8 per cent. This reduced case-fatality may be linked to the free distribution of the packets of 'CHOROSOL' at the community level.

Training Programmes

An extensive orientation training programme is being organised for physicians working at different levels such as clinicians in hospitals for infectious diseases, paediatricians in medical colleges hospitals, and medical officers of district hospitals and primary health centres. Practical demonstrations on the use of ORT were planned in 1981 by State health departments with support from WHO for approximately 7,000 physicians in about 40Q orientation training courses. These training programmes are expected to extend the use of this safe, simple and effective therapy in the country by medical personnel.

A programme of orientation training of health personnel responsible for the delivery of health and medical care at various levels in the country is being implemented by the Government of India with assistance from WHO in collaboration with the National Institute of Cholera and Enteric Diseases

(formerly, the Cholera Research Centre) in Calcutta. Active participation of State health departments is being sought to ensure the success of this training programme. The tentative targets for training of personnel during 1980-81 were as follows:

STATEMENT SHOWING CATEGORIES AND NUMBER OF PARTICIPANTS, DURATION, NUMBER AND PLACES OF COURSES

Category of staff	No. of Partici-pants	No. of courses in days	Duration of courses	Places of training
Clinicians of infectious diseases hospitals	130	5	3	Calcutta and Hyderabad
Paediatricians of different hospitals including medical colleges hospitals	500	20	3	Calcutta, Delhi, Bhopal Bombay, Lucknow and Hyderabad
Medical officers of the district headquarters	360	15	2	Regional Centres(15)
Medical officers of Primary Health Centres	6000	360	2	District Headquarters (360)

RELATED ISSUES

Programme Organisation

Ideally, diarrhoeal control programmes based on ORT should be part of continuing, comprehensive primary health care services in every community. Central administrative headquarters should disseminate basic guidelines, information supplies, training materials, and supervision throughout the programme right down to the level of the individual household. At the same time, care of children with diarrhoea should proceed in the opposite direction, moving from homes

to village workers or peripheral health workers and is to be fixed with the community health facilities and finally to hospital referral centres, each providing even more specialised care for more severe cases. All the four stages should be involved in the programmes: the family, village workers or peripheral health workers, fixed facilities or primary health centres, referral centres or hopsitals.

EXTERNAL ASSISTANCE

Assistance from the WHO has been primarily through the Diarrhoeal Diseases Control Programme, which is now receiving high priority from the WHO. In 1978 a Technical Advisory Group was formed to develop short and long-term programme objectives and to review, evaluate, and help to implement them. According to a recent WHO publication, the immediate or short-term objective is to reduce mortality and diarrhoea-related malnutrition in children by means of oral rehydration therapy as a primary health care activity and to promote research to develop improved tools and strategies. The long-term objective is to reduce morbidity due to diarrhoeal diseases by the improvement of child care practices, epidemiological surveillance, and the provision of simple excreta disposal and water supply facilities together with activities to encourage their acceptance, maintenance and utilisation.

Programme Monitoring and Evaluation

An officer at the State headquarters is identified and designated for monitoring the DDC Programme in the State. One sentinal PHC has been selected in each district to report morbidity and mortality of diarrhoeal diseases. A simple reporting form should be submitted regularly by the PHC for reporting the morbidity and mortality of diarrhoeal diseases as well as supply and utilisation of ORS packets.

Ad-hoc surveys and studies have been entrusted to State health authorities to evaluate morbidity and mortality due to diarrhoea in representative/selected areas. The resources of the National Institutes such as the National Institute of Communicable Diseases in Delhi, the All-India Institute of Hygiene and Public Health, Calcutta, and National Institute of Health and Family Welfare in New Delhi may be utilised for conducting such surveys and evaluative studies.

Operations research studies are recommended to identify deficiencies in the implementation of the (NDDC) Programme, especially those related to the distribution and utilisation of ORS packets for reducing mortality. Studies have also been proposed to evaluate access and coverage of populations, progress and implementation of the programme and achievement of programme targets6.

Environmental Sanitation

Provision of safe water and sanitation facilities are the long-term strategies for reduction in morbidity and mortality from diarrhoeal diseases. About 2.31 lakhs problem villages have been identified and the objective is to provide at least one safe, assured source of drinking water to all these villages during the Sixth Plan period.

India is a signatory to the United Nations resolution to provide basic minimum facilities of water supply and sanitation to all of its citizens during the decade 1981-90.

This will require a financial investment of Rs.14,600 crores. A provision of Rs.3,900 crores has been made in the Sixth Plan (1980-85). The provision is likely to be further increased in the Seventh Plan. However, even with this amount, it will not be possible to provide 100 per cent cover age for sanitation to the urban and rural population.

Acknowledgement

I am grateful to Dr. Saroj Pachauri, Professor & Head, Department of Planning and Evaluation, National Institute of Health and Family Welfare, New Delhi for critically examining the manuscript, for improving the subject matter of this paper and for her suggestions for presenting the subject matter systematically.

Lkkjk'k

विश्व स्वास्थ्य संगठन की संस्तुति को ध्यान में रखते हुए राष्ट्रीय हैजा नियंत्रण कार्यक्रम को राष्ट्रीय अतिसार रोग नियंत्रण कार्यक्रम में परिवर्तित कर दिया गया है। यह परिवर्तन सभी प्रकार के अतिसारीय रोगों की विकृति तथा मृत्यु–दर को कम करने के उद्वेश्य से किया गया है।

इस लेख में कार्यक्रम के उद्वेश्यों का ऐतिहासिक मूल्यांकन करने का प्रयास किया गया है। अतिसारीय रोगों की समस्या और उनकी तीव्रता की भी विवेचना की गई है। जनशक्ति, बजट आवंटीकरण, कार्यपालक लक्ष्यो, प्रशिक्षण कार्यक्रमों, संचालन व मूल्यांकन के तरीकों, रोगों से बचाव तथा नियंत्रण के संदर्भ में उपलब्ध ढांचे को भी दर्शाया गया है।

REFERENCES

1. MATA, L.J. (1978) The Children of Santa Maria Cauque: A Propsective Field Study of Health and Growth, M.I. T. Press, Cambridge, Massachusetts, and London,England.

2. ROHDE, J.E. & NORTHRUP, R.E. (1976) Taking Science Where the Diarrhoea is in Acute Diarrhoea in Childhood, CIBA Foundation Symposium 42, *Elsevier/Exoerpta Medica,* Amsterdam.

3. MINISTRY OF HEALTH AND FAMILY WELFARE (1982-83) Government of India Diarrhoeal Diseases Control Programme -Plan of Operation.

4. DIRECTORATE GENERAL OF HEALTH SERVICES (1980) Diarrhoeal Diseases. Advances in Management and Control.

5. ROHDE, J.E., EAST, R.A., GUERRANT, R.L., MAHALANABIS, D., MOLLA, A.M. & VALYASEVI, A. (1983) Therapeutic Interventions in Diarrhoea and Malnutrition - Interactions, Mechanisms and Interventions, Chen, L.C., and Scrimshaw N.S. (Eds.), Plenum Press, New York and London, p. 287-

6. BLACK, R.E., CHEN, L.C., HARKAVY, 0., RAHAMAN, M.M. & ROWLAND, M.G.M. (1983) Prevention and Control of Diarrhoeal Diseases in Diarrhoea and Malnutrition -Interactions, Mechanisms and Interventions, Chen, L.C. and Scrimshaw, N.S. (Eds.), Plenum Press, New York and London, p. 297-303.

7. CHEN, L.C, BLACK, R.E., SARDER, A.M., MERSON, M.M., BHATIA, S., YUNUS, M., & CHAKRABORTY, J. (1980) Villaged-based Distribution of Oral Rehydration Therapy Packets in Bangladesh. *American Journal of Tropical Medicine and Hygiene,* 29:2, p. 285-290.

8. WORLD HEALTH ORGANISATION (WHO) (1979) The WHO Diarrhoeal Diseases Control Programme. *Weekly Epidemiological Record*, 54:16, p. 121-123.

Health and Population
- Perspectives & Issues 6 (4) -226-237, 1983

LEGAL LIABILITIES OF A MEDICAL PRACTITIONER IN THE FIELD OF HEALTH AND FAMILY WELFARE

N.N. Sarkar

ABSTRACT

This paper deals with the various enquiries -such as the standard of foreseeability, criteria of a reasonable man, standard of care, standard of consent or disclosure etc. which are frequently taken into account in the course of judicial decision. The merits and demerits of such standards are elucidated in this paper as generally it is put forward by judges while imparting justice to parties of medico-legal disputes in the field of health and family welfare.

With the passage of time, people are becoming more and more knowledgeable as well as rational' in almost every sphere of life. This is because of the rapidly changing circumstances - such as social, economic and political conditions of a country in question, and further due to the continuous growth and development in the field of science and technology. With the effect of the shortening of communication gap, the inhabitants of different countries are coming close to each other to share their thoughts and views. Their critical minds have already been set forth to persue the various contemporary notions and norms of their respective societies. Consequently, a rapid change is observed in many past concepts still prevailing among the people of developing countries, like India, and one of them is the doctor-patient relationship. The devotees of the so-called 'noble' profession are often confronting with the new fetters of ethics and law while encroaching upon the explorative fields of medical sciences especially related to the family planning or family welfare. Thus, the medical ethics is now no longer limited to the individual doctor; it has widened its horizon towards the public and its ambit has, sometimes, been enlarged, specified or limited by the statutory laws legislated by the State to solve the newly emerged problems of the society, or natural rights, or human rights as it is claimed under some International Organisations. As a result, medical practi-

tioners may often be dragged into the Court of Law on the charge of infringement of contractual or tortious liabilities, or for criminal negligence. In this article, attempt has been made to elucidate various aspects of legal liabilities of a medical practitioner in the area of health and family welfare with the help of already awarded decisions in the cases.

Principle of Contract

In determining the nature of relationship between a medical practitioner and a patient, the law of contract is usually involved in the first step of legal analysis. Let us examine first of all what does the law of contract purport. When one person (promisor) signifies his willingness to an other person to do or to abstain from doing anything with a view to obtaining the assent of that person to such act or abstinence, he is said to have made a proposal or an offer. When the person (promisee) to whom the proposal is made signifies his assent to that offer, the proposal is said to be accepted. A proposal when accepted becomes a promise. Every promise or every set of promises, forming the 'consideration' for each other, is an agreement. When, at the desire of the promisor, the promisee or any other person has done or abstained from doing or does, or abstains from doing or promises to do or abstain from doing something, such act or abstinence or promise is called a consideration for the promise.

Thus, for a contract to be constituted, there must be at least two persons: one (promisor) makes an offer which is accepted by another (promisee) and both of them understand the terms of agreement. In addition, each person must promise to exchange something of value (consideration) with the other. After perusing the above description, it seems to be rather difficult to prove the existence of contract between the doctor and patient, yet in the field of medical science, where one relatively uninformed person (patient) is likely to depend on the action and statement of another knowledgeable person (doctor), the law is quick to detect that a contract is made therein. In this way, a request of a prospective patient for medical aid with the desire of payment of fees for that effect may be construed as an implied offer that is implicitly accepted by doctor as soon as he or she resumes counselling with patient for providing either advice or treatment, but the Court often takes contrary view. There will be hardly a situation wherein doctor's duty based solely on contract is recog-

nised. On the contrary, if the doctor promises, as a part of contract to which he or she is a party, to provide a specific services, he or she must comply with the promise. However, disputes are also raised in this aspect. Patients frequently sue the doctor on the charge that their physician guaranteed that the vasectomy in question would prevent any chance of pregnancy or that there was no chance for subsequent children to be born defective in a particular situation. Although Courts do occasionally find that physician promised to achieve certain specified results, yet action for breach of such promise is not generally favoured.

Principle of Tort

The word 'tort' has been derived from the Latin term 'Tortum' which means to twist. The law of tort is based on the maxim, *ubi jus ibi remedium*, that is, where there is a right, there is a remedy. The tort may be defined as a civil wrong which is redressible by an action for unliquidated damages (compensation) and which is other than a mere breach of contract or breach of trust[5]. Thus tort is a legal harm or injury caused by the action of another person. The law of tort may thus encompass intentional wrong doing *e.g.* if consent is not obtained for performing an operation or treatment etc. and unintentional wrong doing *viz.* liabilities without fault of drug companies for adverse side effects of their products. The only remedy against such wrong is the compensation which the Court has to determine according to the fact and circumstances of the case.

In an action for negligence, the plaintiff (person who brings allegation) has to prove (a) that the defendant owed a duty of care to the plaintiff, (b) that the defendant made a breach of that duty, and (c) that the plaintiff suffered damage as a consequence thereof. Whether the defendant owes a duty to the plaintiff or not depends on reasonable foreseeabi-lity of the injury to the plaintiff. To decide culpability, one has to determine what a reasonable man would have foreseen and thus forms an idea of how the reasonable man would have behaved under this circumstances. In deciding as to how much care is to be taken in a certain situation, one useful test applied is to assess how obvious the risk must have been to an ordinary prudent man? In explaining the standard of foresight edness of the reasonable man. Lord MacMillan observed, "the reasonable man is presumed to be free both from over apprehen-

sion and from over confidence, but there is a sense in which the standard of care of the reasonable man involves in its application a subjective element. It is still left for the judge to decide, in the circumstances of the particular case, the reasonable man would have had in contemplation, and what, accordingly, the party sought to be made liable ought to have foreseen.

Party to Doctor's Tortious Act

In the family welfare clinic, either of the couple (generally, husband or wife) will be the actual patient; therefore, the physician's duty usually has towards him or her but in the case of medical termination of pregnancy (not in India) or genetic counselling and screening, besides prospective mother the doctor may also owe a duty towards the prospective father because the father may be injured by the additional support, aid responsibility for a defective child and also by their emotional sufferings. This obligation will be more stronger in a situation where the affected father is also directly involved in the investigation. On the other hand, the Courts have almost in every case rejected the siblings' claims that they are deprived of parental care, being born as a defective child. In determining the question, whether the doctor owes a duty to the defective child or not? In a case in which either of parents or child says that the child should never have been born, the Courts found that in some cases, child comes within the physician's duty of care[12] and in some situation, it does not.

Yardstick to Measure Liabilities

In assessing the liabilities of a person in a given situation, there must be certain criteria laid down on the basis of intelligible differentia and these criteria must be used as a guideline for this purpose so that the decision become just, proper and reasonable, not arbitrary or capricious. Thus, the standard of care and standard of disclosure etc. are taken into account as important enquiries in the investigation of a medico-legal case to ascertain the liability of the party.

Standard of Care

Since, the degree of care is a subjective element, it is generally assumed that to keep the performance upto the stan-

dard, the physician is required to use only that degree of skill and care that would have been exerted by other physicians in the same or similar circumstances. So long, as one meets the appropriate level or degree of care, there can be no legal liability; but the failure to comply with this standard can constitute negligence even if it is an honest mistake. The act of negligence not only incorporates poor performance but also unreasonable failure to act. It is observed, that errors of omission, such as failure to take a family history or to offer a diagnostic test are indeed more common than errors of commission.

One of the demerits to this standard is that skill and knowledge required varies with the extent of the training received by a particular physician. Thus a specialist practising within his or her area of expertise must provide a higher level of medical care than a general practitioner. At the same time, a general physician who has less specialisation in a particular area has a duty to refer the patient to a specialist if there are problems which he or she cannot handle even with due skill and care. Though there is an overwhelming trend to hold specialists to a nationally uniform standard of care, yet many Courts still require non-specialists to exercise only the degree of skill common to general practitioners in their own communities. However, this concept of community nexus is losing ground because of the emerging speciality in family practice and rapid development in communication. Moreover, the national standard (if at all exists in India) is not uniform, because of different ways of approach to deal with a particular problem and are accepted so long as each method of treatment or procedure is espoused by at least a 'respectable minority' of the medical profession. Thus, a medical practitioner may probably be considered to have exercised the necessary degree of care if he or she discloses the risk of a particular matter, *e.g.* amniocentesis with reference to its safety and reliability or its higher risk figures as reported from studies conducted in Canada, America and United Kingdom.

Again, this standard of care may be modified by two ways - by introducing statutory law and by importing negligence. As for example, if the State requires that faeto-protein shall be assayed in all pregnant women (screening test), then such statutory requirement obviously specifies the standard of care in this matter. Thus, all pregnant women become the sub-

ject of protection of State law. If the person is injured therein by violation of this law, i.e. if a woman gives birth to a child with neural tube defect due to the failure to test, negligence could be imposed simply by showing violation of the statutory law. Even if a medical practitioner exercises the same degree or skill of care as other physicians do, he or she may not yet be always immune to the charge of negligence because the Court may find that some tests normally omitted by the 'reasonable practitioner' should have been carried out in this particular case and that failure to do so is amounted to negligence. Such an omission may be taken seriously in a situation wherein the cost and risk of providing service is very low as compared to the severity of the harm to be avoided. As for instance. Supreme Court of Washington held that ophthalmologists should reasonably test for glucoma in all patients, not just those over 40 years of age as it was usual practice.

Standard of Disclosure

In accordance with the doctrine of informed consent, a . reasonable person would want to know before making a decision. At the same time, the duty of the medical practitioner has also extended beyond the mere answering the direct question of the patient, to provide information enough to form the basis for a logical decision, although the ultimate choice of the patient may nor may not be rational. However, in default, justification may be offered for the 'therapeutic previlege[1] which is an exception to the general law of informed consent[32], but then the Court has to look into the merit of the case and accordingly, may or must reject the plea of the physician that the party is knowledgeable about the risk involved in the procedure such as late abortion, amniocentesis etc. On the contrary, the vagueness of the 'reasonable patient" standard, on the face of it, places the patient in an advantageous position and thus it requires that the information conveyed may be more than appropriate[33]. Probably, it also permits the physicians to decide what information should have been disclosed solely on the basis of their own experience[32].

However, the doctrine of informed consent has its own limitation. It focuses on only what information must be conveyed to the patient in a particular situation; but it does no enquire whether the prospective patients have actually under-

stood the information provided therein and are truly free to take their own decision based on the fact and circumstances revealed during the mutual interaction between them and their physician, or whether physician's attitude actually plays a significant role in these decisions. These uninvoked questions are very important and must be considered in-depth especially in the case of genetic counselling. The physicians have a duty to inform their patients about the probably risk involved. If this obligatory action of physicians meets the requirement of the standard of care, then no legal liability can be imposed on them. Even then, if aggrieved patients sue their physician on the ground that the injury in question is due to the failure or omission on the part of their physician for not disclosing a particular information, they have to show (a) that remedy for said injury lies at law, (b) that the risk of this injury is within the reasonable foreseeability of their physician, and (c) that there is a direct nexus or proximate cause between the injury in question and the act or omission of their physician. Under the theory of direct nexus, a negligent act or omission may be a proximate cause though it may not be exact cause of the eventual injury. For instance, in the case of genetic counselling, the underlying cause of disorders is either a gene mutation or a chromosomal error or a defective allele in germ cells of one or both parents, yet the physician becomes liable if the mother can show that she would have avoided this conception or aborted the conceptus in the case of prompt detection or disclosure of genetic information by their physician.

Liability for Defective Technique

The law of limitation specifies the time limit for institution of a suit and thus gives defendants an opportunity to defend themselves while evidences are still available. As a result, in many cases, *e.g.* in the case of amniocentesis or genetic disorder, charge fails because the tortious act or omission may not be discovered until some time lapses and thus the suit may be barred by law of limitation. Keeping this point in view, while imparting justice to aggrieved party many State Legislature and Courts in USA have held that the period of limitation will not begin to run until the claimant knows or should have known of the wrongful act in this situation; however, many Courts differ in deciding the latter point especially in the case of diagnosis of genetic risk. On the other hand, injury caused to the child otherwise to be born

normal and healthy due to substandard technique used by the physician *(e.g.* in amniocentesis etc.) is brought under the traditional personal injury action (in some country) and the compensation is allowed in case the child is subsequently born alive, because this lav is created by judicial decisions. On the contrary, no action lies for wrongful death *i.e.* death of injured foetus before birth as this is covered by wrongful death statue which in majority States of USA, requires that the child should be born alive or, at least, become via-able at the time of negligent act. The Courts of a few-States however say that the negligent act before foetal viability can give rise to **a** cause of action if the injured foetus dies before birth[47,48].

Damages or Compensative Measures

In assigning the compensation for injury in most cases of amniocentesis or genetic risk. Courts often held that no compensation may be given on the ground that injuries are too speculative, too difficult to measure or too atypical to be compensable. In some cases, it goes against the public policy or the claimant's claim has no legal protection. Regarding the claim for compensation by defective children born, many judges and commentators disfavour such claims on the reason that it is impossible to determine whether life with defects is worse than no life at all, or that recognition of such claims simply goes against the public policy. Supreme Court of New Jersey pointed out, in a decision, that the principle -a child has a legal right to begin life with a sound mind and body - should be recognised for the sake of justice. An appellate Court of California has commented in extending this concept that if parents make a conscious choice to go ahead with a pregnancy fully knowing that a seriously impaired infant will be born, there seems to be no public policy which protects those parents from being answerable for the pain, suffering and misery which they have inflicted to their offsprings.

Concluding Remarks

Certain legal system - such as the law of Tort has been developed well in UK and USA. Indian judiciary has also accepted the English Common Law principles and the judges of Indian High Courts and Supreme Court frequently refer the decisions of the Courts of UK, USA, Canada and Australia in the course of theirjudgements, yet the law - through case decisions in the

field of health and family welfare has not developed in India. This is not for the lack of commxtment of injustice or for the lack of substantive or procedural law in our country, but it is certainly for the reason of illiteracy, ignorancy about right and duty, extreme tolerance and overall economic deficiency which finally discourages our common people from instituting costly litigation. Thus, we find a stunted growth of law in this important area although the country is hopefully progressing in the field of human reproduction and control of conception. The basic informations provided herein seem to be very important for both medical practitioners and their prospective patients to understand the ambit of their individual responsibility in the rapidly advancing modern society.

Acknowledgement

Author wishes to thank Dr. R.P. Das, Assistant Professor, and Dr. A. Banerjee, Assistant Professor, for their critical comments, and Dr.(Mrs.) R.K. Narula, Professor and Head, Department of Reproductive Biomedicine for providing facilities to prepare this final manuscript.

Lkkjk'k

इस लेख में दूरदर्शिता का स्तर, एक बुद्धिमान मनुष्य का मापदण्ड, देखभाल का स्तर, सहमति या किसी रहस्योद्घाटन का स्तर आदि ऐसी पूछताछों के विषय में बताया गया है जो किसी भी न्यायिक प्रक्रिया के दौरान अकसर सामने आती है। इन स्तरों की पात्रता और अपात्रता को इस लेख में विस्तार से बताया गया है जो कि स्वास्थ्य एवं परिवार कल्याण क्षेत्र में सामान्यतः मेडिकोलीगल मामलों में न्यायधीशों द्वारा सम्बन्धित पक्षों को न्याय देते समय सामने आते हैं।

REFERENCES

1. The Indian Contract Act 1872, Section 2.

2. WRIGHT, E.E. (1980) The lega] implications of refusing to provide prenatal diagnosis in low-risk pregnancies or solely for sex selection. *American Journal Med. Genet.* 5: p. 391.

3. HAWKINS ***V8.*** McGEE (1929) 84 N.H. 114, 146 A, B 41.

4. SHAHEEN ***VS.*** KNIGHT 11 D&C, 41 (Lyconing City, Pa. CP. 1957).

5. BANGIA, R.K. (1982) The law of Torts, Allahabad Law Agency.

6. VEERAN *vs.* KRISHNAMURTHY, A.I.R. 1966 Ker. 172: p. 176.

7. MYSORE STATE ROAD TRANSPORT CORPORATION ***VS.*** ALBERT DIAS, A.I.R. 1973 Mysore p. 240, 242.

8. GLASGOW CORPORATION ***VS.*** MUIR 1943 A.C 448, 457.

9. BECKER ***VS.*** SCHWARTZ (1979) 46 N.Y. 2d 401, 413 N.Y.S. 2d 895.

10. ANONYMOUS *vs.* PHYSIC7.AN (Cann. Supr. Court 1980) 6 Fam. Law Report 2565.

11. COX *vs.* STRETTON (Supr. Court 1974) 77 Misc. 2d. p. 115, 352 N.Y. 2d p. 834.

12. CURLENDER ***VS.*** BIOSCIENCE LABORATORIES (Cal. App 1980) 165 Cal. Reptr. 477.

13. ELLIOT ***VS.*** BROWN (Ala 1978) 361 S.O. 2d 546.

14. ZOTERELL ***VS.*** REPP (1915) 187 Mich. 319, 153 N.W. 692.

15. BERMAN ***VS.*** ALLEN (1979) 80 N.H. 421, 404 A, 2d 8.

16. HOWAROL ***VS.*** LECHOR (1977) 42 N.Y. 2d 109, 266 N.E. 2d 64, 397 N.Y.S. 2d 363.

17. KARLSONS ***VS.*** GUERINOT (3 977) 57 App. Div. 2d 73, 394 N.Y.S. 2d 933.

18. NACEART ***VS.*** GROB (1970) 384 Mich. 248, 180 N.W. 2d 788.

19. ROBBINS ***VS.*** FOOTER (1977) 553 F. 2d 123, D.C Cir.

20. MANION ***VS.*** TWEEDY (1959) 257 Minn. 59, 100 N.W. 2d 124.

21. SIIRILA ***VS.*** VARRIOS (1975) 58 Mich. App. 721, 228 N.W. 2d 801.

22. SHILKRET ***VS.*** ANNAPOLIS EMERGENCY HOSPITAL ASSOCIATION (1975) 276 Md 187, 349 A 2d 245.

23. BALDOR ***VS*** ROGERS, (Flo. 1955) 81 S.O. 2d 658.

24. HOOD ***VS.*** PHILIPS (Tex. 1976) 537 S.W. 2d 291.

25. MEDICAL RESEARCH COUNCIL (1976) Prenatal diagnosis of genetic disease in Canada: Report of a collaborative study. *Can. Med. Assoc. J.* 115: p. 739.

26. NICHD AMNIOCENTESIS REGISTRY (1978) The safety and accuracy of mid-trimester pregnancy. DHEW publ. No. (NIH) 78-190.

27. REPORT TO THE MEDICAL RESEARCH COUNCIL BY THEIR WORKING PARTY ON AMNIOCENTESIS (1978) An assessment of the hazard of amniocentesis. *Br. J. Obstet. Gynaec.* 85 (Suppl.) (2).

28. PROSSER, W.L. (1971) Hand Book on the Law of Torts, 4th ed. St. Paul, Minn West Publishing Co. p. 190.

29. HELLING ***VS.*** CARAY (1974) 83 Wash, 2d 514, 519 P, 2d 981.

30. CANTERBURY ***VS.*** SPENCE (1972) 464 F. 2d 772 (D.C. Cir) 409 U.S. 1064.

31. COBB ***V8.*** GRANT (1972) 8 Cal. 3d P, 229, 502, 2d 1, 104 Cal Reptr. 505.

32. WILKINSON ***VS.*** VESEY (1972) HQ R.I. 6Q6, 295 A 2d 676.

33. NOTE (1978) Father and mother know best: Defining the liability of physicians for inadequate genetic counselling. *Yale Law J.* 87: p. 1448.

34. KATZ, J. (1977) Informed consent - a fairy tale? Law's vision. *Univ. Pitt Law Rev.* 39: p. 137.

35. SHAW, M.W. (1977) Review of published studies of genetic counselling: A critique. In Lubs H.A., Dela Cruz F. (eds.) Genetic Counselling. New York, Raven Press.

36. JOHNSON ***VS.*** YESHIVA (1976) Univ. 53 App. Div. 2d 523, 348 N.Y.S. 2d 455.

37. SINDELL ***VS.*** ABBOTT LABORATORIES (Supr. Court 1980) 607 P 2d 524, 163 Cal. Reptr. 132.

38. NEW YORK CIVIL PRACTICE LAW (1979.). 244 a, Mexinney.

39. HACKWORTH ***VS.*** HAST (KY 1971) 474 S.W. 2d 377.

40. HAYS *VS.* HALL (Tex. 1972) 488 S.W. 2d 412.

41. PEARSON ***VS.*** BOINES (Del. 1978) 386 A, 2d 651.

42. ROBERTSON, H.B. (1978) Toward rational boundaries of tort liability for injury to the unborn: Prenatal injuries. Preconception injuries and wrongful life. *Duke Law J.* 78: p. 1401.

43. ENDRESZ ***VS.***FRIEDBERG (1969) 24 N.Y. 2d 478, 248 N.E. 2d 901, 301 N.Y.S. 2d 65.

44. JUSTUS ***VS.*** ATCHISON (1977) 19 Cal. 3d 564, 565 P 2d 122, 139 Cal. Reptr. 97.

45. CHRISAFORGEORGIS ***VS.*** BRANDENBERG (1973) Illinois 2d 368, 364 N.E. 2d 88.

46. MONE *vs.* GR. HOUND LINE INC. (1975) 368 Mass 354, 331 N.E. 2d 916.

47. PORTER *vs.* LASSITER (1955) 91 Ga. App. 712, 87 S.E. 2d 100.

48. PRESLEY *VS.* NEWPORT HOSPITAL (1976) 117 R.I. 177, 365 A, 2d 748.

49. JACOBS ***VS.*** THEIMER (Tex. 1975) 519 S.W. 2d 846.

50. COPRON, A.M. (1979) Tort liability in genetic counseling. *Colum. Law Rev.* 79: p. 618.

51. COHEN, M.E., PARK ***VS.*** CHESSIN (1978) The judicial development of the theory of wrongful life. *Am. J. Law Med.* 4: p. 211.

52. SMITH ***VS.*** BRENMAN (N.J. 1960) 157 A, 2d 497.

Health and Population
- Perspectives s Issues 6 (4) -238-249, 1983

PREDICTING AGE AT FIRST MARRIAGE IN THE U.S.A.: A REVIEW OF RECENT MODELS

Vijayan K. Pillai

ABSTRACT

The paper aims to review the recent models of age at marriage among women. For this purpose, the studies on age at marriage among women have been grouped into two levels, the individual and the aggregate. The aggregate level studies have not yet successfully formulated any causal theory. At the individual level, a few multivariate causal models indicate that social norms, social psychological factors, and human capital indicators play a role in explaining age at first marriage. The researches on age at first marriage suffer from a number of drawbacks. Most of the studies are cross sectional. Only a few have examined the individual and the aggregate level variables related to age at marriage in terms of a causal framework. It may therefore, be useful to develop contextual models based on group and individual level characteristics to predict individual level age at marriage.

This paper provides an overview of the theoretical approaches towards an explanation of age at marriage. The age at which one marries has biological as well as sociological significance. From a biological point of view, age at marriage is associated with fecundity whereas, from a sociological point of view the chronological age at marriage is used to set a social time table for starting, spacing and stopping childbearing. The social meaning and implication of age for family formation results from an interplay between demographic and social structural factors. In particular, the age at which one is exposed to the risk of childbirth, the age at first marriage, influences the pace of family formation. The demographic research on age at marriage is biased in favour of females. The scope of this paper is confined to the multivariate studies of female age

at first marriage. An attempt is made to review the theoretical propositions in age at first marriage research.

Importance of the Study

A theoretical overview of age at marriage is important in many respects. It is well known that age at marriage influences the family size and the pace of childbearing. Age at marriage is therefore, an important variable in a processual model of fertility. A reassessment of the theory pertaining to age at first marriage is timely given the availability of rich data sources such as the World Fertility Data. In addition, highly populated countries such as India may need to emphasize age at marriage research for a number of reasons. One reason is that age at first marriage can be varied to control fertility. For example, it can be demonstrated that the postponement of marriage slows the rate of natural increase of population. Thus, from a policy point of view, one needs to understand the role of age at marriage in fertility control.

Measuring Age at Marriage

There are two main types of measures of age at marriage the aggregate level and the individual level measures. The common aggregate level measures are the singulate mean age at marriage, mean age at marriage, median age at marriage and proportion single at specific ages, or in an age range. The individual level measure of age at marriage is the exact age of the person .

Empirical Studies of Age at Marriage

Two types of studies characterize age at marriage research: the aggregate level and the individual level studies. Most aggregate level studies have focussed on the direct impact of various structural factors such as work opportunities on the mean or median age at marriage. On the other hand, the individual level studies, especially the more recent multivariate studies, have examined the direct and the indirect influences of social and demographic variables on age at marriage.

In reviewing the individual level causes of age at marriage, it was convenient to focus on the causal priori-

ties of the variables in various causal schemes. Three categories of variables have been created: the background variables, the intervening variables, and the immediate determinants of age at marriage.

AGGREGATE LEVEL STUDIES

Several structural level variables are associated with age at marriage. These variables may determine the individual level age at marriage and the proportions of persons married at a given age. Most age at marriage studies which incorporate structural level variables predict the proportions married in an age range. Some of the structural variables which affect the average age at marriage are: sex ratio, work opportunities, and mean income earnings.

Sex Ratio

The direction and magnitude of the direct effects of sex ratio on age at marriage differ across studies. In the United States it was found that the sex ratio did not increase the chances that a single woman would marry within two years after the survey interview. Further, a significant positive association was found between cohort average ages at marriage and sex ratios of Standard Metropolitan Statistical Areas in the United States. The notion that sex ratio has a significant positive effect on the proportion of 22-24 year old married females has also been supported by Preston and Richards. However, the effect of sex ration on average age at marriage becomes insignificant when separate analyses are conducted for Whites and Blacks.

Work Opportunities

Most aggregate level studies suggest that communities which offer women more job opportunities have fewer married women by the ages 22-24 years. In general. Standard Metropolitan Areas with an industrial sector favouring female employment have a lower proportion of 22-24 year old females who are married. The recent trend toward late marriages in the United States is explained with regard to the availability of work opportunities for women. Because women see increasing employment opportunities, they now favour combining marriage and work, but postpone marriage until they are established in the labour force.

Mean/Median Earnings

Mean or median earnings of women have a positive effect on age at marriage. The proportion of married women is positively related to the sex specific relative wages of women at 25 and older, but not for 15-19 years old and 22-24 years old. Female wages have a positive effect on female age at marriage.

INDIVIDUAL LEVEL STUDIES

Early Background Variables Race

Multivariate studies indicate that White women tend to marry earlier than Black women. A longitudinal national sample of over 5000 young women was used for studying the determinants of age at marriage. It was found that net of other factors Black women marry later than White women. In fact, it was reported that Black women are substantially less likely to marry than White women at all the ages they examined between sixteen and twenty nine.

Geographical Region

Very few researchers have examined the effect of the region of birth. Age at marriage norms may vary by region of the country. Teenage women from the South are more likely to marry within a year of the interview than teenage women hailing from other parts of the United States.

Socioeconomic Status

Several bivariate studies have indicated that women from lower or working class backgrounds marry early. A recent multivariate study does not support the above association. Further, no significant relationship was found between parental socioeconomic status and marital timing. Controlling for factors such as present work experience and work expectations for the future, it was found that parental socioeconomic status has no effect on the probability of a single woman marrying within two years after the interview. Parental resources, parent's education and occupational status, are important factors in

determining whether 16-17 and 24-25 year old women would marry within a year of interview.

Parental socioeconomic status may have an indirect effect on age at marriage. Socioeconomic status has an indirect effect on age at marriage through expectations with regard to age at marriage. Several .studies suggest that parental socioeconomic status may affect the degree of parental encouragement. The necessary educational support from parents improves the high school G.P.A., the child's own educational expectations arid the number of friends with high educational expectations. These factors in turn have a positive effect on age at marriage through educational attainment. In general, these findings support the hypothesis that families use their resources to keep their daughters from marrying at an age considered "too young".

Rural/Urban

Studies examining the net relationship between degree of urbanization and age at marriage sometime provide dissimilar results. It was found that urbaneness is positively related to age at marriage. People who reside in larger cities are characterized by late ages at marriage. A similar conclusion that marriage before 18 years of age occurs more often in less densely populated areas was derived by Carlson. In general, it can be argued that degree of urbanization has a positive eff *ict* on age at marriage.

Religion

Religion has a significant direct influence on age at marriage. Catholics marry later than Protestants. Catholics have strong pronatalist norms. These norms encourage Catholic women to marry only if they desire to have a family. Catholic women may postpone marriage until they feel ready to start a family. It appears that the decision to initiate sexual relationships is independent of marital concerns among Catholics. Protestant women may be more likely to have marital sexual relationships.

INTERVENING VARIABLES

The extant literature proposes several variables which mediate the effects of background variables on age at marri-

age. Most of these intervening variables are socio-psycho-logical in nature.

Early Dating

Women who date early, marry early. In addition, it was found that within socioeconomic categories, earlier dating is related to earlier ages at marriage, except for individuals from higher socioeconomic categories. One limitation of the above studies is that they have taken into consideration very few control variables. The net relationship between early dating and age at marriage has also been examined. Findings reveal that several background variables indirectly affect high school dating frequency through their impsct on high school curriculum. Dating frequency has an indirect negative effect on age at marriage through educational expectations and actual educational attainment.

Educational Aspirations

Educational aspirations play an important role in delaying marriage. Several studies indicate that educational aspirations have a positive effect on age at marriage. Separate models for males and females have been estimated. The direct and indirect effects of educational plans on age at marriage have also been examined. The study suggests that several variables such as parents' socioeconomic status, parental encouragement, high school G.P.A, and high school curriculum positively influence respondents' educational aspirations. Educational aspirations have a substantial positive direct effect on educational attainment, which, in turn, has a positive effect on age at marriage. All in all, it can be said that "educational aspiration" is an important variable in the model of marital timing.

Employment Aspirations

Available evidence suggests that employment aspiration has a significant positive effect on age at marriage. A longitudinal survey of approximately 5000 American women was carried out to determine the net relationship between employment aspirations and age at marriage. It was observed that single White women who planned to be housewives at age 35, as opposed to those who planned to be working outside the

home, were more likely to marry within two years after the date of interview. While analyzing the data it was concluded that a preference for paid employment over homemaking substantially decreases the possibility of marriage at the youngest ages, 16 to 17 years, and the oldest ages, 26 to 28 years[16].

Immediate Determinants of Age at Marriage

The impact of the background variables and the social psychological variables on age at marriage may be mediated by a number of variables. These variables indicate the economic and social status of women prior to marriage. In the main, premarital pregnancy and educational attainment directly effect the age at marriage.

Premarital Pregnancy

Women who delay their marriage are less likely to be premaritally pregnant. The impact of premarital pregnancy on age at marriage may vary by age group and race. It was found that bearing an illegitimate child greatly increased the chances of marriage at the youngest ages, but it had no effect after 24 years of age. White premaritally pregnant women are more likely to marry earlier than Black premaritally pregnant women. The reasons for these difference are not well known.

Educational Attainment

Several multivariate studios suggest that educational attainment has a direct positive effect on age at marriage. The relationship between educational attainment and age at marriage was suggested to be stronger for women than for men. The study sample was obtained from a fifteen year follow-up study of male and female high school students in Illinois, U.S.A., (originally sampled in 1957-1958) which included 3433 females and 3065 males. The reciprocal relationship between educational attainment and age at marriage has been examined. The path from educational attainment to age at marriage was found to be stronger than the path from age at marriage to educational attainment. Considering all other factors, 18-19 year old are more likely to marry than the 20-23 year- old women within a two year period after the interview. Overall, most empirical

studies suggest a strong positive association between educational attainment and age at marriage. Education exposes women to ideas and information which lead them to accept contraception or value small families.

Conclusion and Discussion

An attempt has been made to review the aggregate level and individual level studies of age at first marriage among women. The aggregate level studies have emphasized the direct impact of various structural factors on average age at marriage. Research in this area has not yet successfully formulated a causal theory. Most of the individual level studies are descriptive in nature. As a result, causal models of age at first marriage have hot been adequately tested. A few multivariate studies indicate that social norms, social psychological factors, and human capital variables play a part in determining age at first marriage. A causal model of age at first marriage as proposed in various studies is given in figure-1.

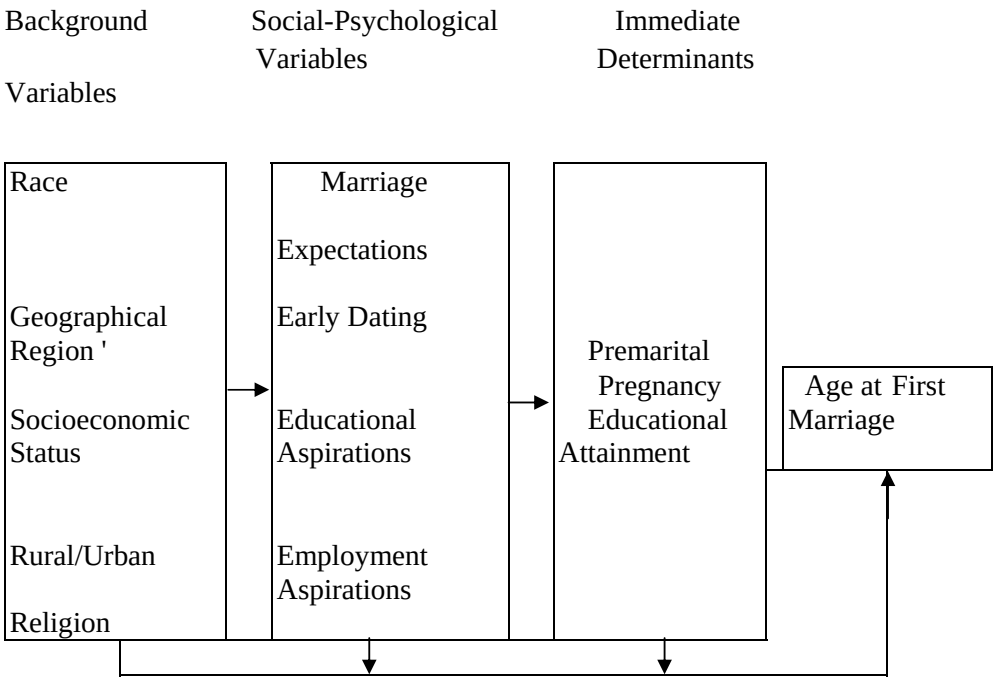

Figure 1. Causal Scheme in Age at First Marriage

The causal model of age at first marriage is not well specified. For example, the literature does not explain why age at marriage differs across regions of the country. Empirical tests of causal models have not yielded consistent results. The direction and magnitude of the effects of the variables in the model differ across studies.

Age at first marriage research has a number of drawbacks. The first is that most of the studies are cross-sectional. Only very few studies have used longitudinal data on age at first marriage. Second, very few studies have analyzed the determinants of age at first marriage in a multivariate framework. Third, the impact of the structural level variables, such as sex ratio and employment opportunities on individual level age at first marriage, is not known. Contextual models which enable us to incorporate group as well as individual level characteristics to predict individual level age at marriage should be developed.

Lkkjk'k

इस लेख में महिलाओं के विवाह के कुछ नमूनों का अध्ययन करने का प्रयत्न किया गया है। इस उद्वेश्य के लिए महिलाओं में विवाह की आयु का अध्ययन करने के लिए उन्हें दो वर्गों में विभाजित किया गया है व्यक्तिगत और कुल योग। कुल योग स्तर के अध्ययनों से अभी तक कोई सफल सिद्धान्त नही बन पाया है। व्यक्तिगत स्तर पर कुछ मल्टीवेरियेट काउसल नमूनों से पता चलता है कि सामाजिक प्रतिमान, सामाजिक मनोवैज्ञानिक कारक और मानव शीर्श सूचक प्रथम विवाह की आयु को स्पश्ट करने में महत्वपूर्ण भूमिका अदा करते हैं। प्रथम विवाह की आुय पर शोधों में बहुत कमियां होती है। इनमें से अधिकांश अध्ययन क्रास–सेक्श्नल होते हैं। केवल कुछ में काउंसल संरचना के संदर्भ में विवाह से सम्बन्धित व्यक्तिगत और योग स्तर परिवर्तनीय की जांच की गई है। इसलिए विवाह की आयु पर व्यक्गित स्तर के लक्षण पर आधारित समूह और व्यक्तिगत स्तरीय सन्दर्भात्मक नमूने विकसित करना लाभप्रद होगा।

REFERENCES

1. BUSFIELD, J. (1972) "Age at marriage and family size: social causation and social selection hypotheses". *Journal of Bio-Sooial Science*, 4, p. 117-134.

2. NAMBOODIRI, K. (1980) "A look at fertility model building from different perspectives." In T. Burch (ed.). *Demographic Behaviour. Colorado:* Westview Press.

3. HENRY, A. and P.T. PIOTROW (1979) "Age at marriage and fertility." *Population Reports, 7,* p. 105-159.

4. HAJNAL, J. (1953) "Age at marriage and proportions marrying." *Population Studies* 6 ,p. 111-136.

5. CARTER, H. and P. GIfICK (1970) Marriage and the Family. Cambridge, Mass. Harvard University Press.

6. MODELL, J. (1980) "Normative aspects of American marriage timing since World War II." *Journal of Fami-ly History* 5 , (Summer) , p. 210-234.

7. PRESTON, S. and A. RICHARDS (1975) "The influence of women's work opportunities on marriage rates." *Demography* 12 May) p. 209-222.

8. CHERLIN, A. (1980) "Postponing marriage: the influence of young women's work expectations." *Journal of Marriage and the Family* 42 (May), p. 355-365.

9. MACDONALD, M. SR. RINDFUSS (1981) "Earnings, relative income, and family formation." *Demography 18* (May), p. 123-136.

10. ALEXANDER, K. ST. REILLY (1981) "Estimating the effects of marriage timing on educational attainments: some procedural issues and substantive clarifications." *American Journal of Sociology* 87 (July), p. 143-156.

11. HOGAN, D. (1978) "The effects of demographic factors, family background, and early job achievement on age at marriage." *Demography* 15 (May), p. 161-175.

12. MOORE, K. & S. HOFFERTH (1980) "Factors affecting early family formation: a path model." *Population and Environment* 3, (Spring) , p. 73-98.

13. FREIDEN, A. (1974) "The United States marriage market." *Journal of Political Economy* 82 (March/April), p. S34-S53.

14. WHITE, L. (1981) "A note on racial differences in the effect of female economic opportunity on marriage rates." *Demography* 18 (August), p. 349-354.

15. KEELEY, M. (1977) "The economics of family formation." *Economic Inquiry* 15 (April), p. 238-250.

16. WAITE, L. & G. SPITZE (1981) "Young women's transition to marriage." *Demography* 18 (November), p. 681-694.

17. MOSS, J. (1965) "Teenage marriage*t* cross-national trends and sociological factors in the decision of . when to marry." *Journal of Marriage and the Family* 27 (May), p. 230-242.

18. BURCHINAL, L. (1965) "Trends and prospects for young marriages in the United States." *Journal of Marriage and the Family 27* (May), p. 243-254.

19. BAYER, A. (1969) "Life plans and marriage age: an application of path analysis." *Journal of Marriage and the Family* 31 (August), p. 551-558.

20. MARINI, M. (1978) "The transition to adulthood: sex differences in educational attainment and age at marriage." *American Sociological Review* 43 (August ,y p. 483-507.

21. CARLSON, E. (1979) "Family background, school and early marriage." *Journal of Marriage and the Family* 41 (May), p. 341-353.

22. LOWRIE, S. (1965) "Early marriage: premarital pregnancy and associated factors." *Journal of Marriage and the Family 27* (February), p. 48-56.

23. BURCHINAL, L. & L. CHANCELLOR (1963) "Social status, religious affiliation, and ages at marriage." *Journal of Marriage and the Family 25* (May), p. 219-221.

24. MOSS, J. & R. GINGLES (1959) "The relationship of personality to the incidence of early marriage." *Marriage and Family Living 21* (November) , p. 373-377.

25. INSELBERG, R. (1961) "Social and psychological factors associated with high school marriages." *Journal of Home Economics* 53 (November) , p. 766-772.

26. CALL, V. & L. OTTO (1977) "Age at marriage as a mobility contingency: estimates for the Nye-Berado model." *Journal of Marriage and the Family* 39 (February), p. 67-79.

Health and Population
- Perspectives & Issues 6*(4) -250-256, 1983*

ROAD TO CRITICAL CARE

M. Srivastava, R. C. Anand and S. S. Saini

ABSTRACT

The progress made in the field of critical care medicine since its inception is remarkable. With the rapidly advancing technology and fast developments in the field of medical science, the concept and practice of resuscitation care has evolved with a complete system of medicine called critical care medicine (CCM).

An attempt has been made to trace the complete history of critical care medicine from its birth to present adult maturity age. The present state and future of intensive care facilities in India have also been outlined.

Florence Nightingale in 1863, 120 years ago said "it is not uncommon to have a recess or small room leading from the operating theatre in which the patients remain until they have recovered, or at least recovered from the immediate effects of the operaticr" which indicates that a century earlier the seeds of concept cf progressive patient care were sown. Florence Nightingale recognised the need and advantages of the concept of progressive patient care and she advocated that the sickest patients in a ward to be kept near to the nursing desk while the convalescing or least ill patients to be placed in beds away from the nursing station.

Progressive patient care (PPC) is considered to be a revolutionary concept and a radical change in medical philosophy but it is not absolutely new, since it is known that the classification of patients according to their medical and nursing needs has been carried cut by the Japanese for centuries. However, global concept emerged in several hospitals in USA in early 1950's and finally named as PPC in 1956.

Progressive patient care (PPC) was defined as the organisation of hospital facilities, services ana staff around the medical and nursing needs of the patient, or tailoring of

hospital services to meet the patient's needs or as the right patient on the right bed with the right services around him.

Under this concept, patients are to be grouped according to their degree of illness and need for care, rather than by traditional hospital grouping to sex, age, type of illness and economic status.

Specially planned, organised, designed and staffed with different objectives , hospitals are to be set up where patients are admitted are assigned tc different units in accordance with their severity of illness and need for care. Thus, progressive patient care is a dynamic concept applicable to hospitals of all sizes and types. Following six elements were incoporated in progressive patient care.

1. Intensive care - should account for 2.0 per cent of the total hospital beds.

2. Intermediate care - should account for 50 to 60 per cent.

3. Self care - should account for 20-25 per cent of total beds of a general hospital.

4. Long-term care - should account for 6.0 per cent of total beds of a hospital.

5. Home care - should account for 2.0 per cent.

6. Out-patient care - should account for 20 per cent.

Intensive Care

Intensive care - one of the elements of progressive patient care developed very rapidly since its inception in 1960's. Intensive care is a concept as old as knowledge of critically ill and injured patients but the concept of 'specific' hospital units for intensive care has emerged only in past 20 years[4].

The evolution of intensive care units occurred from units established and the experiences gained in several wars like casualty reception centres, resuscitation teams and mobile surgical units in second world war. During peace time, con-

cepts of respiratory care units, pre and post-operative recovery rooms evolved. Recovery rooms may be said to be precursers of intensive care units.

Many factors have contributed to the evolution of intensive care units (ICUs) particularly, the post-anaesthesia recovery rooms and respiratory care units.

Modern history of intensive care spans little more than two decades and defies any attempt to define it scientifically. The concept of the intensive care has had many and diverse origins. Its foundations go far back, but thoracic surgeons and polio-physicians must be given due credit for setting the stage for modern era. Intensive care units were started during the decade, following the Copenhagen (Denmark) polio-epidemic of 1952.

During last two decades, the intensive care' units were established by various disciplines of medicine independently and thus form multi-disciplinary intensive care unit (Multi-ICUs), the concept of uni-disciplinary intensive care unit was evolved. And now in modern hospitals, the spectrum of intensive care units, is too vast *e.g.* Coronary Care Unit, Medical Intensive Care Unit, Surgical Intensive Care Unit, Burn Intensive Care Unit, Neo-natal Nursery, Paediatric ICU, Dialysis Unit and Neurosurgery ICU, etc.

Between I960- and 1980, there has been extra-ordinarily rapid advancement and change in the therapeutic approach to critically ill patients all over the world. This has been differently named by various workers in this field including intensive care, critical care and Critical care medicine.

Even the role and the name of simple physician therapists has undergone change from simple physicians to Anaesthesiolo gists to Intensivists and Traumatologist to critical care medicine physician experts. In the recent era, intensive care medicine covers a large range of activities and is so vast that different workers have attempted to define it differently both abroad and in India, report on Delhi Hospitals Committee - Siddhu Committee Report, 1978. However, the intensive care unit (ICU) can be considered as a 'specific area of the hospital where sophisticated monitoring, titrated life support and definite therapy for potentially salvable patients with acutely life-threatening illness or injury can best be provided.

Critical Care Medicine (CCM)

The last two decades have witnessed more or less a revolution in the field of intensive care as witnessed in the care of patient suffering from acute life threatening ailments. CCM is considered to be a triology of (i) Resuscitation; (ii) Emergency Care for life threatening conditions; and (iii) Intensive care.

The term critical care medicine (CCM) was coined in early 1970's as a synonym for acute medicine. Critical care medicine has been described by Society of Critical Care Medicine (1973) as encompassing resuscitation, life support and definitive medical care for the critically ill and injured (a) at the scene of an emergency; (b) during transportation; and (c) in hospital, until management by conventional medical means is appropriate, CCM thus includes both emergency medical care and intensive care, with resuscitation forming an integral part of both aspects.

The gradual growth of ICU has been followed by large integrated multi-disciplinary critical care centres supported by modern sophisticated laboratory.

Rapidly advancing technology has invaded deeply in the field of intensive care very recently by development of sensors to provide new or more reliable information and computer systems to integrate and interpret the vast amounts of information essential to the control of complex therapy in ICU.

Technological advances in critical care have affected few major areas *e.g.* the impact of micro-processors, dysrhythmia monitoring, haemodynamic monitoring, respiratory monitoring and computerised handling and interpreting of data.

The history of the development of critical care gives some indications, about the advances that may be expected in the future. Critical care medicine (CCM) has come to be recognised as a separate super-speciality and critical care experts have started a full time course in critical care medicine abroad and have variously designated themselves Intensivists and Critical care medicine experts.

Progress and Future of CCM in India

In India, CCM is still in the infancy stage. Acute care, resuscitation and critical care medicine are still considered synonymous by most of the people and its practice is considered as child's play of any physician.

In India, it will not be before 2100 A.D. that critical care facilities ingress in the road to the health care delivery system for rural population, if at all a beginning is made in this direction earnestly right now.

Only medical colleges and few large institutions have got the facility for intensive care traditionally managed by ana-esthesiologists. ICU facilities are non-existent at District hospital level.

All agencies involved in health care delivery system have to concentrate their efforts and resources to make these services available and accessible to larger community at a cheaper cost and minimum distance. It should be the endeavour of all concerned to provide intensive care facility minimum at District hospital level by 2000 A.D.

Lkkjk'k

समालोचनात्मक देखरेख चिकित्सा के क्षेत्र में दूसरी शुरूआत के समय से हुई प्रगति उल्लेखनीय है। चिकित्सा विज्ञान के क्षेत्र में तेजी से बढ़ती हुई तकनीकों का विकास के समय में इस चिकित्सा का एक पूरा तंत्र विकसित हो गया है जिसे समालोचनात्मक देखरेख चिकित्सा कहा जाता है।

समालोचनात्मक देखरेख चिकित्सा का इसके जन्म से परिपक्व अवस्था तक पूरे इतिहास को सामने लाने का प्रयत्न किया गया है। भारत में गहन देखरेख सम्बन्धी सुविधाओं की वर्तमान अवस्था व भविष्य के विषय में भी बताया गया है।

REFERENCES

1. LOCKWARQ, H**.J.,** GIDDINGS LANE & THOMS. EDWARD **J.** (1960) Progressive patient care - a preliminary report, *JAMA,* 172: p. 132-137.

2. SPENCER, G.T. (1972) Special care units: In a practice of Anaesthesia - Wylie and Churchill - Davidson - Lloyd Luke (Publishers Ltd.), London.

3. SOFAR, P., KORNFELD, J.K. DE, PEARSON, J.W. & REDDING,J.S. (1961) The intensive care unit. *Anaesth.* , 19:3, p.275-284.

4. BERK, J.L. & SAMPLINER, J.E. (1982) Handbook of critical care (See Edn) - Publishers Little Borwn & Co. (Inc.).

5. SMITH, J. (1963) Hospital design in relation to progressive patient care. *J. of R.C.S. of Edin.* 8:3, p.225-228.

6. SAFAR, P. & GRENVIK, A. (1977) Organisation and physician education in critical care medicine. *Anaesth.* 47:2, p. 82-95.

7. PEELEY, T.W. (1983) Recovery Room - In: Textbook of clinical Frontiers in Anaesthesiology. Publishers Grune and Stratton. Inc III Fifth Avenue, New York, p. 163.

8. HERCUE, V., JOHN STONE, B.J., ROLLINGSON, R.D.A. & HATCHELL, R.E. (1974) Respiratory Unit. *Lancet, 1:* p.1265.

9. WATER, H. & DONALD, C. (1968) The respiratory intensive care unit. *Anaesthetics, Resuscitation and Intensive Care* (2nd ed.) E&S Livingstone Ltd., London, p.147-169.

10. PONTOPPIDAU, H,,, WILSON, R.S., RIE, M.A., SCHNEIDER, R.C. (1977) Respiratory intensive care. *Anaesth.*, 47: p. 96-116.

11. DRIPPS, R.D., ECKENHOFF, J.E. & VANDAN, L.D. (1977) Immediate post-operative period - recovery and intensive care in introduction to Anaesthesia. *The Principles of Safe Practice* (5th Edn.). Publishers WB Saunders Co., Philadelphia, p. 460-476.

12. KINNEY, J.M., BENDIXEN & POWERS, S.R. (1977) Manual of Surgical Intensive Care. Philadelphia, Saunderst,

13. TIMMAPPAYA, A. (1971) Some problems in the organization and management of intensive care unit in hospital, Hournal of Hospital Administration, 8:2, p.117-121.

14. WIKLUND, P.E. (1965) Design of recovery room and ICU, Anaesthesiology, 26: p. 667.

15. BHATTACHARJEE, B.L. (1971) Intensive care unitsin the hospitals. Journal of Hospital Administration, 8:2, p.121-128,

16. LEDINGHAM, I.M.C.A. (1977) Recent advances in intensive therapy. Publishers, Churchill Livingstone, Edinburg.

17. BRIM, J.E. & PETERS, R.M. (1982) Applications of computers and other new techniques- In handbook of critical care. Kinney, J.M. 1982- IInd Ed., publishers Little Brown & Co., Inc.

18. RAMA RAO, K.R. (1965) Intensive care unit. Ind. J. Anaesth., 13:33, p. 296.