

**BLOOD PRESSURE PROFILE AND PREVALENCE OF
HYPERTENSION IN PUNJABI WOMEN**

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ABSTRACT

A cross-sectional sample survey of 294 women aged 15 years and over from randomly sampled households in urban and rural areas of Ludhiana was carried out to find out their levels of blood pressure and compare these levels and the prevalence of hypertension with results from a sample of women from the same area reported in 1977. Results showed the prevalence of hypertension using WHO (1978) criteria to be 7.1 per cent, which was a five-fold increase from results reported earlier on a sample of women from the same area (Keil and Cowan, 1977). The presence of hypertension was observed in younger women aged 21-40 years also, the age groups which were normotensive in the earlier study. The prevalence of hypertension was higher in the urban sample (10.0%) than in the rural (4.2%), but this difference was not statistically significant ($p < 0.09$). The study shows that hypertension is emerging as a problem in both urban and rural women of Ludhiana. This may lead to an increase in the importance of cardiovascular disorders as a cause of ill health in this population.

Cardiovascular disorders account for 16 per cent of deaths in the developing countries and 48 per cent in the developed ones. Diseases of the circulatory system have been the fifth leading cause of mortality in the country in the 1980s, accounting for about 9-10 per cent of all deaths². Some evidence of increase in the incidence of cardiovascular disorders in India, particularly coronary heart disease, is available from hospital records. Data from the Christian Medical College Hospital, Vellore, indicate a marked increase in coronary heart disease admissions from a mere 4 per cent of all admissions due to cardiovascular disorders in 1960 to about 33 per cent in 1986³.

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To estimate the potential threat from cardiovascular disorders the first step may be the measurement of some of the commonly accepted risk factors. The measurement of blood pressure, therefore, becomes a natural focus for study.

REVIEW OF LITERATURE

Available literature indicates prevalence of hypertension to be widely variable in different population from as low as 1 per cent in some African countries to over 30 per cent in Brazil. It has been observed to increase with time. Genetic and racial factors increasing age, body build, excess salt intake, stress and other psycho-social factors, educational achievement, high density lipoprotein cholesterol levels in the serum and exposure to different diet and environment are amongst the factors incriminated with the pathogenesis of cardiovascular disorders.

The blood pressure levels and prevalence of hypertension in the developing countries are amongst the lowest in the world, with the poorest countries having the lowest prevalence. However, it has been increasing in Egypt as well as in China. Cruz-coke has observed that the prevalence of hypertension in developing countries increases with affluence.

In India, prevalence of hypertension, though amongst the lowest in the world, has also been found to be widely variable in different population. Studies have shown higher prevalence in urban than in rural population, and the more recent studies have revealed higher prevalence rates than previous studies. Even though these studies have been carried out over a period of about 40 years they have been carried out in different parts of the country. There is no information on how rates in the same geographical area are changing with time.

Keil and Cowan noted that since India is a developing country it may provide the laboratory for a natural experiment where the effect of acculturation forces on blood pressure can be observed in a prospective mode. The present study has been carried out in the same urban and rural population. This period has seen much development in the country. Life expectancy at birth has increased from 54.4 years in 1980 to 61.2 years in the period 1991-96, and the per capita Net National Product has increased from Rs.1627 in 1980-81 to Rs.3284 (at current prices) in 1987-88. At the same time inflation, urbanization and political turmoil have added to the stress of life in India. It may be that during this period blood pressure levels and hypertension have increased, and that cardiovascular disorders will become an even more important source of morbidity and mortality in India.

AIMS AND OBJECTIVES

The aim of the present study is to compare current levels of blood pressure in the adult women of urban and rural Ludhiana with those reported in 1977 in the same population.

MATERIALS AND METHOD

Sampled The study was carried out in urban and rural areas served by the Department of Social and Preventive Medicine, Christian Medical College, Ludhiana, Punjab, through its urban health centre in Field Ganj locality and rural hospital in Lalton Kalan village In Ludhiana, Punjab in 1994. The areas were selected by a simple random sampling amongst the five adjacent areas (urban) and four nearby villages (rural) served by the respective health facilities. Households for the study were selected randomly. Females aged 15 years and above within the households were studied. The study included females only because they are available during the day. A 10 per cent sample of female residents aged 15 years and over was selected from each area for inclusion in the study.

Field Work. Blood pressure recordings were made using a portable dial type aneroid sphygmomanometer. Mean of two readings taken approximately one minute apart were recorded. The WHO criteria (SBP $\geq$ 160 mm and/or DBP $\geq$ 95mmHg) as used to identify hypertension.

OBSERVATIONS

The number of respondents examined was 150 (urban) and 144 (rural).

The urban and rural women were similar in respect of the mean SBP, while the mean DBP was significantly higher in the urban women (Table 1). The mean DBP in those over 50 years old the mean SBP in those over 60 years old were significantly higher in the urban women as compared to the rural. The younger urban and rural women were similar in respect of the mean blood pressure levels.

The prevalence of hypertension was 7.1 per cent, 10 per cent in the urban and 4.2 per cent in the rural women (Table 2). It was highest in those aged >60 years (36.4%). Taking the earlier study of Keil and Cowan¹⁰ as reference, the women of Ludhiana are now 5.44 times more at risk of hypertension as evidenced by the odds ratio. The prevalence of hypertension has increased at all ages. The appearance of hypertension was also observed now in the younger women, 21-40 years old, who were normotensive in the earlier study.

TABLE 1
MEAN ARTERIAL BLOOD PRESSURE BY AGE OF URBAN AND RURAL
WOMEN

		Total Sample Mean (S.D.)	Urban Women Mean (S.D.)	Rural Women Mean (S.D.)	Urban/Rural Differences		
					ANOVA (equivalent to Student's t-	BartJett's Test p-value	Kruskal- Wallis Test p-value
<21	n	58	39	19 114(7)	0.66	0.70	0.56
	SBP	115(7)	115(7)	75(5)	0.65	0.38	
	DBP	76(6)	76(6)				
21-30	n	87	48	39 117(9)	0.07	0.14	0.79
	SBP	120 (11)	122(12)	78(6)	0.61	0.02*	
	DBP	78(7)	79(8)				
31-40	n	61	20	41	0.54	0.50	0.43
	SBP	122 (12)	123 (11)	121 (12)	0.63	0.57	
	DBP	80 (9)	81 (8)	79(9)			
41-50	n	40	19 133(25)	21	0.28	0.00*	0.0009
	SBP	129 (19)	88(16)	126 (10)	0.26	0.00*	
	DBP	86(12)		84(8)			
51-60	n	26	11	15 130	0.26	0.26.	0.06
	SBP	133 (13)	136 (10)	(14) 81(9)	<0.02	0.65	
	DBP	85(9)	90 (8)				
>60	n	22	13 150(23)	9	<0.002	0.04	0.04
	SBP	138(24)	93(10)	120 (11)	<0.002	0.09	
	DBP	87 (11)		79(5)			
All ages	n	294	150 125	144	<0.02	0.00*	0.04
	SBP	123 (15)	(17) 81 (11)	121 (12)	<0.03	0.00*	
	DBP	80 (9)		79(8)			

'Bartlett's Test for homogeneity of variance shows the variances in the sample to differ. Mence Kruskal-Wallis Test to be used to assess the significance of urban/rural differences in the sample. Otherwise, the variances being homogeneous with 95% confidence, ANOVA is used.

TABLE 2
PREVALENCE OF HYPERTENSION IN PUNJABI POPULATION

Age Range (years)		LUDHIANA1994 (females, present study	LUDHIANA1976 ¹ (females)	LONDON 1980 ^s (Punjabi migrants)
<21	% (n)	0 (58)	0 (51)	0 (42)
21-30	% (n)	1.1 (87)	0 (65)	1.7 (59)
31-40	% (n)	4.9 (61)	0 (31)	11.8 (51)
41-50	% (n)	15.0 (40)	3.1 (32)	51.6 (31)
51-60	% (n)	11.5 (26)	5.0 (20)	66.7 (12)
>60	% (n)	36.4 (22)	6.3 (16)	87.5 (8)
All ages	% (n)	7.1 (294)	1.4 (215)	22.6* (203)
Odds Ratio		5.44	1.00**	16.27

*Adjusted to age distribution of native Punjabi women.

**Reference group for odds ratio.

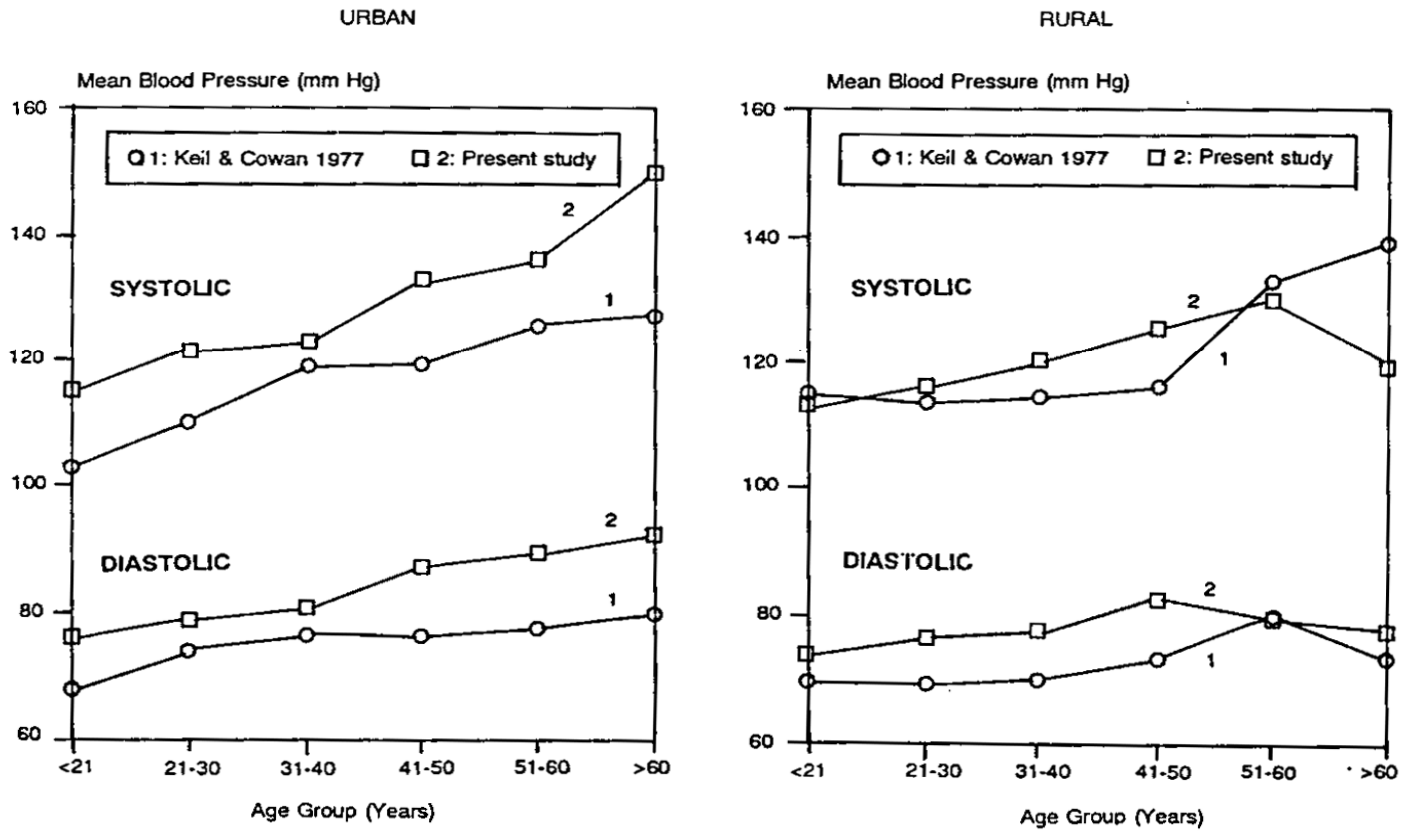
Sources of Data: ¹Keil & Cowan (1977)

²Keitetal (1980)

DISCUSSION

The over 50 years old urban women had higher diastolic blood pressures than their rural counterparts, while the systolic blood pressure was higher in the >60 years old urban women. This may be the cumulative results of their urban environment, and the duration of such exposure since the effects are observed in the older age groups.

FIG. 1
BLOOD PRESSURE BY AGE IN LUDHIANA WOMEN



The prevalence of hypertension in this population has increased to more than five-fold the prevalence reported in the same population in 1977, but is much lesser than that found by Keil et al in Punjabi migrants living in London more than a decade ago (Table 2). These differences may be due to the effects of exposure to different environment and life styles. The magnitude of the increase in the prevalence of hypertension in the present study, and the appearance of hypertension in the younger age groups point towards a definite transition towards higher levels of prevalence of hypertension. Hypertension was more common in the urban women, prevalence 10 per cent compared with 4.2 per cent in the rural women, but this difference was not statistically significant (Yates corrected $X^2 = 2.94$, $df = 1$, $p < 0.09$). Urban blacks in sub-Saharan Africa have been observed to have higher blood pressure levels than rural blacks, whereas the opposite is true for blacks in the United States, while in the West Indies no difference was observed between urban and rural blacks³⁰. Previous studies in India have been carried out in urban and rural population in different geographical areas, but Padmawati and Gupta (1959)²⁰ have demonstrated higher prevalence of hypertension in the urban population as compared to the rural in the same geographical area. The earlier Ludhiana study¹⁰ had only three cases of hypertension in the sample of 215 women, and so urban/rural differences in prevalence of hypertension were not indicated as this would not have been reliable. Hence we cannot comment on changes in the prevalence of hypertension with time in the urban and rural women separately.

The levels of blood pressure by age in the present study, though still low by Western standards, demonstrate a significant rise from levels reported in this population in 1977, in both urban and rural women. The mean SBP in the rural women aged >51 years were found to be lower in this study. However, the higher levels of mean SBP in this age group in the earlier study may have been due to the fact that the blood pressure recordings were taken by an unfamiliar, white (American) researcher, and this fact affects the readings in other age groups in a similar manner.

CONCLUSION

The present study shows higher levels of blood pressure and a higher prevalence of hypertension now as compared to levels reported in 1977 in the same population. This, coupled with the appearance of hypertension in the younger women aged 21-40 years, the age groups which were normotensive in the earlier study, would seem to suggest a positive time trend, the effect of complex acculturation forces, the stress of urbanization and its attendant psychosocial pressures and changing life styles and environment, the increasing life expectancy resulting in more people surviving to old age, and the complex influence of these factors, on the blood pressure. Various environmental risk

factors like urbanization, industrialization, high population density and low socio economic status have been observed to act as "mass influences on ischemic heart disease rates"³¹. With this increasing trend in blood pressure levels and prevalence of hypertension, one is led to anticipate the emergence of cardiovascular disorders, particularly hypertension and those for which hypertension is a known risk factor, as an important future health hazard in this population.

Hypertension, like so many chronic diseases, is not a unitary entity with an unvarying etiology. Its causes must be sought in the total pattern of adaptation of people to their environment. To obtain a more comprehensive view of the blood pressure trends in India, and in view of the socio-cultural, racial and environmental diversities in this country, there is need for population-based multidisciplinary research in this field, of which at present there exists a great paucity in India.

There is evidence to show that control of coronary risk factors is associated with lower age-specific risks³². Further, work needs to be carried out to identify specific factors involved with the increase of blood pressure in this population. Prevention programmes targeted to those factors which are amenable to intervention can then be implemented.

सारांश

लुधियाना के शहरी तथा ग्रामीण क्षेत्रों के परिवारों से यादृच्छिक आधार पर चुनी गई पन्द्रह तथा उससे उच्च आयु वर्ग की 294 महिलाओं पर क्रॉस-सैक्शनल सर्वेक्षण किया गया था। इस सर्वेक्षण का उद्देश्य इन महिलाओं के रक्त चाप के स्तरों तथा अतिसंवेदनशीलता (हाइपरटेंशन) स्तरों का पता लगाकर इनकी तुलना इसी क्षेत्र की महिलाओं के एक सैम्पल पर 1977 में किए गए सर्वेक्षण से प्राप्त परिणामों के साथ करना था। विश्व स्वास्थ्य संगठन (1978) के मापदण्डों के आधार पर इस सर्वेक्षण से प्राप्त निष्कर्षों से पता चलता है कि हाइपरटेंशन की व्याप्ति 7.1 प्रतिशत थी, जो कि इसी क्षेत्र की महिलाओं पर किए गए पूर्व सर्वेक्षण की रिपोर्ट से प्राप्त परिणामों के अनुसार पांच गुना अधिक थी (कैल और कोवान 1977)। 21-40 वर्ष की महिलाओं में हाइपरटेंशन की स्थिति देखी गई थी, जबकि इससे पूर्व किए गये सर्वेक्षण में यह वर्ग सामान्य पाया गया था। ग्रामीण क्षेत्रों

की तुलना में (4.2 %) हाइपरटेंशन की व्याप्ति दर शहरी क्षेत्र (10.0%) में उच्च पाई गई थी। किन्तु सांख्यिकीय दृष्टि से यह अन्तर (10.09) महत्वपूर्ण नहीं है। अध्ययन से प्राप्त निष्कर्षों से पता चलता है कि लुधियाना के शहरी और ग्रामीण, दोनों क्षेत्रों की महिलाओं में हाइपरटेंशन एक समस्या के रूप में उभर रही है। यह समस्या हृदयवाहिका संबंधी विकारों में हो रही है वृद्धि की दृष्टि से बहुत महत्वपूर्ण है तथा इस जनसंख्या समूह की अस्वस्थता का मुख्य कारण है।

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**ACUTE RESPIRATORY INFECTIONS (ARI) IN
CHILDREN: A STUDY OF KNOWLEDGE AND
PRACTICES OF ANGANWADI WORKERS IN RURAL
HARYANA**

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ABSTRACT

In the present study data were collected on knowledge and practices of Anganwadi Workers (AWWs) in Block Beri of district Rohtak for devising a standard management plan. In all 50 AWWs were interviewed. Forty two per cent AWWs recognized pneumonia by fast breathing and 36 per cent recognized severe pneumonia by chest indrawing. Only 16 per cent AWWs knew infective origin of AW. Although most of them were in favour of continuation of breast feeding, 70 per cent of them were advising food restriction. Use of herbal tea was commonly advised. Only 2 per cent knew the correct dose of sulphadimidine and 12 per cent knew the correct dose of paracetamol, the drugs most commonly advised for treatment of ARI.

Acute respiratory infections (ARI) are one of the commonest causes of deaths in children in developing countries. Of the 15 million child deaths in the world annually, ARI alone accounts for around 4 million. Two-thirds of these are in infants¹.

In India, ARI accounts for 14.3 per cent of deaths during infancy and 15.9 per cent of deaths during 1-5 years². Majority of these deaths can be averted if the knowledge and skills of the community in general and of the village based workers in particular regarding recognition, proper management and timely referral of severe cases is improved. Before taking any such step it is essential to gauge the existing level of knowledge and practices among the village based workers.

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With this aim, this study was planned in one of the blocks of Rohtak district in the State of Haryana and carried out from January to April, 1990.

MATERIALS AND METHOD

One block (Block Beri) was chosen In Rohtak district for studying the knowledge and practices of Anganwadi Workers (AWWs) In relation to ARI. Fifty AWWs were selected, ten from each of five sectors by a random sampling method. All the selected 50 AWWs were interviewed on a pre-tested, open ending proforma The proforma mainly contained information regarding recognition and causes of ARI. It also contained information on food and fluid restrictions, types of foods restricted and home remedies advised by AWWs in ARI. The information regarding role of immunization in prevention of certain ARIs and various drugs used by AWWs in ARI (with dosage) was also attempted to be obtained.

RESULTS

Nasal discharge and cough were the two most important signs used to identify an attack of ARI by the AWWs. Only 42 per cent of AWWs could recognize fast breathing (sign of pneumonia) though no one could tell the age wise cut off points of fast breathing. Chest in drawing (sign of severe pneumonia) could be recognized by 36 per cent of the AWWs (Table 1).

TABLE 1

RESPONSES OF ANGANWADI WORKERS REGARDING. RECOGNITION
OF ACUTE RESPIRATORY INFECTIONS, BLOCK BERL ROHTAK
(HARYANA)

Responses	Anganwadi Workers	
	Number (n = 50)	Percentage
a. Nasal discharge	43	86
b. Cough	40	80
c. Fever	29	58
d. Fast breathing	21	42
e. Chest In drawing	18	36
f. Watering/Red eyes	11	22
g. Nausea/Vomiting	11	22
h. Headache/Bodyache	8	16
L Sneezing	4	8
j. Child looks toxic	4	8
k. Expectoration	3	6
L Noisy breathing	2	4
m. Others*	4	8

*Restlessness, change in voice, enlarge lymph nodes.

Table 2 shows that exposure to cold was regarded to be the cause of ARI by most of them but infective etiology was known only to 16 per cent of them.

TABLE 2

RESPONSES OF ANGANWADI WORKERS IN RELATION TO THE CAUSES OF ACUTE RESPIRATORY INFECTIONS, BLOCK BERI, ROHTAK (HARYANA)

Responses	Anganwaol Workers	
	Number (n = 50)	Percentage
a Exposure to odd environment	47	94
b. Consumption of cold things after exertion	21	42
c. Climatic change	19	38
d Micro-organisms	8	16
e. Taking excessive fat/fried foods	7	14
f. If child is not immunised	6	12
g. Others*	12	24

•Contaminated food/water, dust, sour foods, taking water after eating fats.

AWWs advocated unnecessary food restriction during attack of ARI. However, all of them were in favors of continuation of breast feeding during attack of ARI (Table 3).

TABLES

RESPONSES OF ANGANWADI WORKERS IN CONTEXT OF FEEDING OF CHILDREN DURING AN ATTACK OF ACUTE RESPIRATORY INFECTIONS, BLOCK BERI, ROHTAK (HARYANA)

Responses	Anganwadi Workers	
	Number (n = 50)	Percentage
<i>Foods Restricted</i>		
a. Nothing	15	30
b. Cold foods restricted	33	66
c. Sour foods restricted	14	28
d Fat//Fried foods restricted	14	28
<i>Breast Feeding</i>		
a. Should be Continued	50	100
b. Should be stopped	-	-

Home remedies for ARI were advised by the AWWs and the most common home remedy advised was herbal tea, 46 per cent followed by honey with ginger juice 32 per cent (Table 4). The knowledge of AWWs regarding vaccine preventable ARI was also poor (Table 5).

TABLE 4

HOME REMEDIES ADVISED BY THE ANGANWADI WORKERS TO MOTHERS DURING AN ATTACK OF ACUTE RESPIRATORY INFECTIONS IN THEIR CHILDREN, BLOCK BERL ROHTAK (HARYANA)

Responses	Anganwadi Workers	
	Number (n = 50)	Percentage
a. Not given	7	14
b. Herbal tea	23	46
c. Honey with ginger juice	16	32
d. Kadha	15	30
e. Patasae	9	18
f. Churrae	7	14
g. Gargles	6	12
h. Brandy	5	10
i. Garlic	3	6
j. Others*	5	10

*Raw egg in milk, cow's urine, hot fomentation.

TABLE 5

KNOWLEDGE OF ANGANWADI WORKERS REGARDING ROLE OF IMMUNIZATION IN ACUTE RESPIRATORY INFECTIONS, BLOCK BERI, ROHTAK (HARYANA)

Preventable ARIs	Anganwadi Workers	
	Number (n = 50)	Percentage
a. Not preventable	2	4
b. Pertussis	47	94
c. Diphtheria	35	70
d. Tuberculosis	26	52
e. Measles	24	48
f. Don't know	1	2

Forty six per cent of AWWs were referring ARI cases once the child developed fast breathing (by fast breathing they meant faster than normal). Most of them were using sulphadimidine and paracetamol for the treatment of ARI but only 2 per cent knew the correct dose of sulphadimidine and 12 per cent knew the

correct dose of paracetamol as given in the "Guide Book for Anganwadi Workers"¹¹³. Thirty per cent were also advising expectorants for ARI. At the time of the interview 66 per cent of the AWWs had no drug left for treatment of ARI.

DISCUSSION

The fact that more than half of AWWs could not recognize fast breathing (sign of pneumonia) and chest in drawing (sign of severe pneumonia) indicates the poor level of knowledge among the AWWs regarding ARI. Failure to recognize these signs means delay in initiation of appropriate management and therefore high mortality.

Infective etiology was known only to 16 per cent of AWWs. Without this knowledge, the workers cannot educate and persuade the community to seek early specific treatment for ARI. Similar findings were also reported by Kumar, et al⁴

Seventy per cent of the AWWs wrongly advised cold-food restriction since cold is a predisposing factor in ARI. This is in contrast to the findings of Kumar et al⁴, where the percentage was much less. However, all the AWWs were in favour of continuation of breast feeding which is an encouraging finding since it fulfills the much needed fluid and food needs of the child.

Use of cow's urine as a home remedy is a bad practice and all such practices should be discouraged. However, practices like giving herbal tea which has a soothing effect on throat and has been recommended by the WHO⁵ and all such beneficial practices should be encouraged. Practices which are neither useful nor harmful should be left as such.

Poor knowledge of AWWs regarding the correct dose of sulphadimidine and paracetamol is a matter of grave concern and it shows the need for more in-service training to maintain high standard of their skills. Moreover, the supply of drugs should also be regular to ensure dependability.

In short the study has shown poor background knowledge among the AWWs regarding ARI and its management which is a matter of concern since the AWW is not only responsible for management of mild to moderate cases of ARI but also for educating the community about when and where to seek help in case complication arises. Therefore, it is recommended that more in-service training and refresher courses should be organised for AWWs with special emphasis on quality aspect of training. The supply of drugs and other material should be replenished promptly so that faith of the community in the AWW and the health services is maintained.

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**IMPACT OF SOME DEMOGRAPHIC VARIABLES AND
FAMILY PLANNING PROGRAMME ON FERTILITY IN
MADHYA PRADESH THROUGH INDIRECT
TECHNIQUES**

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ABSTRACT

In this paper, an attempt was made to investigate the impact of some demographic variables and family planning programme on fertility change. Indirect statistical tools were used for this purpose. The standardization method was used to play with demographic variables namely, age structure, marital status distribution, age specific marital fertility rate and proportion of women of reproductive ages in the total population and trend analysis was used to play with family planning programme. It was noted that proportion of women of reproductive ages in total population played tremendous role regarding change in crude birth rate. However, there was no significant impact of family planning programme on fertility change.

Madhya Pradesh is situated in the heart of the country. It is the sixth most populous State of the country. The population of the State, according to 1981 census, was enumerated as about 52 million whereas according to 1991 census it was more than 66 million. During 1971-81, the growth rate of the State was observed as 25.27 per cent which was little higher than the all India average 24.66 per cent. However, during 1981-91, it was 26.75 per cent in comparison to all India average 23.50 per cent. As it is well known, persistent growth rate and increasing population are mainly due to persistent high fertility. However, figures indicating wider use of contraception among the couples have not given rise to a decline in fertility in case of Madhya Pradesh. It can, therefore, be said that some of the variables especially demographic variables, which are directly or indirectly associated with the adoption of contraceptives, also play an important role in fertility. In view of the foregoing brief discussion, main objective of this paper is to

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Study the impact of some demographic variables and family planning programme on fertility In Madhya Pradesh.

MATERIALS AND METHOD

In the present paper for the analysis point of view, data were collected from various sources. Data regarding fertility indicators for 1971 and 1991 for Madhya Pradesh were obtained from SRS regular report 1970-75, 1981, and 1991; and social and cultural tables of census 1971 and 1981. The age specific marital fertility rate (ASFR) and total marital fertility rate (TMFR) for Madhya Pradesh for 1971 were estimated with the help of estimated ASFR (SRS) and proportion of currently married women from respective census whereas those for 1991 were taken from SRS report 1991. To study the impact of some demographic variables on fertility change during 1971-1991, an indirect technique known as standardization method was used (United Nations, 1979; Rao, 1973). The data used for analysis by standardization method have been presented in Table 1. It may however be noted that the respective data of 1972 have been accommodated for 1971 whenever they are not traced out easily. The demographic variables considered here are proportion of women J reproductive ages in total population; age structure of women of reproductive ages; marital status distribution and marital fertility. The proportions of women of reproductive ages in total population during 1971 and 1991 were 21.47 per cent and 23.73 per cent respectively. Also, respective general fertility rates were 165.6 and 182.6 per thousand women.

TABLE 1
THE DATA USED FOR ANALYSIS BY STANDARDISED METHOD

Age Group	A ₁	A ₂₁	M ₁₁	M ₂₁	F ₁₁	F ₂₁
15-19	0.1680	0.2114	0.7788	0.4840	0.1432	0.2574
20-24	0.1573	0.1650	0.9637	0.8800	0.2736	0.3269
25-20	0.1734	0.1667	0.9714	0.9560	0.2644	0.2444
30-34	a 1563	0.1321	0.9565	0.9520	0.2144	0.1511
35-30	a 1296	0.1220	0.9287	0.9440	0.1529	0.0812
40-44	0.1104	0.0894	0.8575	0.9110	0.0762	0.0357
45-49	0.0870	0.0915	0.7391	0.8600	0.0395	0.0154

A₁ and A₂: Proportion of woman in age group 1 among all women of reproductive ages during 1971 and 1991 respectively.

M₁ and M_a: Proportion of married women of age group 1 among women in age group 1 During 1971 and 1991 respectively.

F₁ and F₂: Age specific marital fertility rates in age group I during 1971 and 1991 respectively.

As described in UN (1979), respective demographic characteristics/measures for the years 1971 and 1991 may be denoted as (i) proportion of women in age group i among all women of reproductive ages as A_{1i} and A_{2i} ; (ii) proportion of married women of age group i among all women in age group i as M_{1i} and M_{2i} ; (iii) age specific marital fertility rates in age group i as F_{1i} and F_{2i} ; (iv) proportion of women of reproductive ages in the total population as W_1 / P_1 and W_2 / P_2 ; (v) crude birth rates as CBR_1 and CBR_2 ; and (vi) general fertility rates as GFR_1 and GFR_2 . We therefore have:

$$\begin{aligned} GFR_1 &= \sum_i A_{1i} M_{1i} F_{1i} \\ GFR_2 &= \sum_i A_{2i} M_{2i} F_{2i} \\ CBR_1 &= (GFR_1) W_1 / P_1 \\ CBR_2 &= (GFR_2) W_2 / P_2 \end{aligned}$$

Accordingly, under the method of standardisation, change in crude birth rate due to above four components may be obtained as:

- a. due to proportion of women of reproductive ages in total population

$$= GFR_1 \left(\frac{W_2}{P_2} - \frac{W_1}{P_1} \right)$$

- b. due to age structure of women of reproductive ages

$$= \frac{W_1}{P_1} \sum_i (A_{2i} - A_{1i}) M_{1i} F_{1i}$$

- c. due to marital status distribution

$$= \frac{W_1}{P_1} \sum_i A_{1i} (M_{2i} - M_{1i}) F_{1i}$$

- d. due to marital fertility

$$= \frac{W_1}{P_1} \sum_i A_{1i} M_{1i} (F_{2i} - F_{1i}); \text{ and}$$

e. due to the extent of the joint effects, sometimes referred to as a form of Interaction, which will be addition of I, II and III defined as:

I. joint effects of age structure and marital status, that is,

$$(b) + (c) - \left(\sum_i A_{2i} M_{2i} F_{1i} - \sum_i A_{1i} M_{1i} F_{1i} \right) \frac{W_1}{P_1};$$

II. joint effects of marital status and marital fertility

$$(c) + (d) - \left(\sum_i A_{1i} M_{2i} F_{2i} - \sum_i A_{1i} M_{1i} F_{1i} \right) \frac{W_1}{P_1};$$

III. joint effects of age structure and marital fertility

$$(b) + (d) - \left(\sum_i A_{2i} M_{1i} F_{2i} - \sum_i A_{1i} M_{1i} F_{1i} \right) \frac{W_1}{P_1}$$

Thus, total change in crude birth rate will be addition of (a), (b), (c), (d) and (e).

Trend analysis is also an indirect method of estimating programme impact on fertility. It does not demand any knowledge of acceptors of the programme. The rationale behind the method for estimating the impact in a year is to project or estimate the expected fertility of the population in the absence of the programme in that year and then subtract from it the corresponding observed fertility. The estimation of expected fertility is made on the basis of the fertility of the population in the immediate period prior to initiation of the programme. This is done by fitting an appropriate mathematical curve, often a simple straight line, to the data. The inherent assumption in the trend analysis method is that all the factors which were responsible for setting up a particular trend or pattern in the fertility of a population in the pre-programme period would not change their behaviour to produce any abrupt changes in the fertility even after introduction of the programme. In this article, a straight-line is applied to see the changes in crude birth rate since it is an important indicator of fertility. Looking towards the data on annual birth rate from 1970 to 1982 and taking into consideration the effective role of emergency period regarding family planning programme, the period of 1970-75 (pre-emergency period) was considered as pre-programme period and the period of 1976-82 (emergency and its immediate post-period briefly known as "emergency period")

Was considered as programme period. The data utilized in the present analysis have been presented in Table 2.

OBSERVATIONS

The absolute change observed in crude birth rate due to four important components, namely, proportion of women of reproductive ages in total population, age structure of women of reproductive ages, marital status distribution and marital fertility are given in Table 3. As evident from the table, absolute change in crude birth rate due to these variables was observed as +3.82, -0.35, -2.21 and -0.64 points respectively whereas that due to their interactions was as +0.41 points. They resulted to a total change of +1.03 points in crude birth rate. Thus, proportion of women of reproductive ages in total population played an important role regarding fertility change.

TABLE 2

THE DATA USED FOR ANALYSIS BY TREND ANALYSIS METHOO

Pre-programme Period		Programme Period	
Year	Crude Birth Rate	Year	Crude Birth Rate
1970	39.2	1976	36.4
1971	38.6	1977	37.8
1972	37.8	1978	37.4
1973	36.1	1979	37.8
1974	38.9	1980	37.1
1975	39.5	1981	37.6
		1982	36.5

Results under the trend analysis (Table 4) revealed that both the regression equations, that is, those for pre-programme and programme periods, were fitting the data satisfactorily. Also, regression line for the combined data and subsequent test regarding the equality of above two equations showed that both the regression equations were equal ($p > 0.05$). It may therefore be noted that fertility did not change significantly ($p > 0.05$) during the programme period, that is, during emergency period. In contrast to this, as an example, regression equation for pre-programme period may be used and noted that the programme helped in reducing the birth rate by about three points in 1980.

TABLES 3
CHANGE IN CRUDE BIRTH RATE DURING 1971-91

Components	Absolute change in CBR/1000	Relative change In percentage
Proportion of women of reproductive ages	+3.82	+370.87
Age structure	-0.35	-33.98
Marital status distribution	-2.21	-214.56
Marital fertility	-0.64	-62.14
Interaction	+0.41	+39.81
Total change	+1.03	+100.00

TABLE 4
RESULTS UNDER TREND ANALYSIS

Period	Regression Lines	Observations
Pro-programme (Pre-emergency period)	CBR (t) $-38.96 + 0.0811 t$ where, t- 1 for 1970 6 for 1975	Fitt satisfactory $p > 0.05$
Programme (Emergency period)	CBR (t) $-37.943 - 0.0143 t$ where, t-7 for 1976 13 for 1982	Fit satisfactory $p > 0.05$
Combined (Above both periods)	CBR (t) $- 37.53 - 0.0969 t$ where, t- 1 for 1970 13 for 1982	Above both equations are equal $p > 0.05$

SUMMARY AND CONCLUSIONS

The total change in fertility as a result of the cumulative impact of proportion of women of reproductive ages in the total population, their age

Structure, marital status distribution and age specific marital fertility rate was observed as positive (+1.03/1000). In contrast to this, total observed change in fertility (CBR in 1971: 39.1 and in 1991: 35.8 per 1000 population) was negative (-3.3/1000). It clearly indicates the important role of some other demographic and socio-economic variables in change of fertility. Out of the above mentioned four variables, proportion of women of reproductive ages in the total population played tremendous role regarding fertility change. The negative magnitude of change in fertility due to marital status distribution, as obvious, indicates that rising the age at marriage of women may play an important role in reducing the crude birth rate, that is, the fertility.

As reported earlier, it seems that the programme period helped in reducing the birth rate, that is, fertility by about three points in 1980. However, as concluded through trend analysis, one may have some difficulty in accepting this. Therefore, this useful information emphasizes the need of proper supervision by the concerning agencies/authorities to have the proper impact of the programme.

सारांश

प्रस्तुत लेख में कुछेक जनांकिकीय विभेदकों तथा परिवार नियोजन कार्यक्रम के कारण प्रसवन दर पर पड़ने वाले प्रभावों का विप्लेषण करने का एक प्रयास किया गया था। इस सर्वेक्षण के लिए अप्रत्यक्ष सांख्यिकीय साधनों को प्रयोग में लाया गया था। जनांकिकीय विभेदकों जैसे, आयु-ढाँचा, वैवाहिक स्तर विभाजन, आयु-विशेष प्रसवन दर तथा कुल जनसंख्या में प्रसवन आयु वर्ग की महिलाओं का अनुपात आदि घटकों के बारे में मानकीकृत विधियाँ उपयोग में लाई गई थी तथा परिवार नियोजन कार्यक्रम के संदर्भ में प्रवृत्तिपरक विप्लेषण किया गया था। यहां यह देखा गया है कि अशोधित जन्म दर में परिवर्तन लाने में कुल जनसंख्या में प्रसवन आयु वर्ग की महिलाओं का अनुपात एक अहम भूमिका निभाता है। किन्तु प्रसवन दर में परिवर्तन लाने के संदर्भ में परिवार नियोजन का कोई उल्लेखनीय प्रभाव देखने में नहीं आया था।

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MEDICO-SOCIAL FACTORS AFFECTING VITAMIN A DEFICIENCY AMONG CHILDREN

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ABSTRACT

The prevalence of vitamin A deficiency in a group of children, ranging between 0-6 years, attending the OPD of Pediatrics department of the M.LN Medical College, Allahabad, is assessed in this study. The authors also attempt to associate the multiple medical and social factors such as diarrhea, malnutrition and low socio-economic status with exophthalmia. In addition, the authors in selected cases analyze serum vitamin A levels which found to be on the lower side and significantly associated with the severity of exophthalmia and degree of malnutrition.

Vitamin A deficiency has been recognized to be a major controllable public health problem. An estimated 5-7 per cent of children in India suffer from some form or the other of vitamin A deficiency. Recent reports suggest that even mild deficiency of vitamin A might lead to various types of ocular manifestations and a large number of cases precede the morbid conditions in sub-clinical stages.

The present study is an attempt to assess the prevalence of vitamin A deficiency in a group of children attending the OPD of Pediatrics department of the M.LN. Medical College Allahabad

METHODOLOGY

The present study was conducted on children attending the out-patient clinic of the Pediatrics department of the M.LN. Medical College, Allahabad from June 1988 to May 1989.

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Initially a pilot study was carried out in which a 10 per cent prevalence of vitamin A deficiency was observed. Accordingly a sample size, at 10 per cent prevalence, and 20 per cent error, was calculated which came out to be 864. Thus a random sample of 1182 children was selected, from a total OPD attendance of 8398 children between 0-6 years of age, through established sampling procedures. These children attended the OPD for various reasons such as diarrhea (20.07%), acute respiratory infections (18.83%), infectious diseases (16.45%), nutritional disorders (4.69%), immunization and others (39.96%).

The parents were interviewed and the data were recorded on a pretested proforma which included birth order, socio economical status, immunization, nutritional status and other relevant information. The children were subjected to clinical examination of the eyes to detect exophthalmia and wherever necessary slit lamp examination was done to detect the earliest signs of epithelial erosion. Ocular signs were classified according to WHO to evaluate the exophthalmia cases.

Anthropometric examination of the children was done and their nutritional status was assessed and the observations were based on classification suggested by nutrition subcommittee of Indian Academy of Pediatrics. Frank PEM was graded into four groups using 50th percentile of Harvard scale as the reference point. Blood samples for vitamin A level were collected from 55 children (30 xerophthalmic and 25 normal) and the serum levels were determined by spectrophotometric method: (Paterson and Wiggins)¹.

RESULTS

A total of 1182 children were examined. Their ages ranged from 10 to 70 months with mean age being 36.9 months.

On an average these children suffered from 2.6 episodes of diarrhea in the past year and 80 had suffered from measles in the preceding six weeks. Only 544 children (46.02%) were fully immunized.

Of the 1182 children examined, 121 manifested ocular lesions giving a prevalence of 10.23 per cent (Table 1). Higher levels of prevalence were observed in the 2 to 6 years age group with peak prevalence at 4 to 5 years of age. Males showed a higher rate than females (10.96% and 9.36%) but this difference was statistically not significant (Table 1) ($X^2 = 0.0815$ $p > 0.05$ at 1 d.f.).

Table 2 depicts the prevalence of different stages of exophthalmia. It can be observed that conjunctival xerosis (X,A) was the most common manifesting feature, being present in 6.76 per cent of children.

TABLE 1

AGE AND SEX SPECIFIC PREVALENCE OF VITAMIN A DEFICIENCY IN CHILDREN ATTENDING PAEDIATRIC OPD, MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '89 (N =1182)

Age Group (Years)	Number of children			Children with vitamin A deficiency		
	Male	Female	Total	Male	Female	Total
0-1	96	75	171		1(1.3)	1 (0.58)
1-2	82	73	155	7(8.51)	3(4.1)	10(6.45)
2-3	139	108	247	16(11.5)	8(7.4)	24(9.71)
3-4	114	109	223	16(14.0)	12(11.0)	28(12.56)
4-5	117	87	204	20(17.1)	13(14.4)	33(16.18)
5-6	100	82	182	12(12.0)	13(15.4)	25(13.74)
Total	648	534	1182	71(10.96)	50(9.36)	121(10.23)

Figures In parentheses Indicate per cent prevalence.

TABLE 2

PREVALENCE OF DIFFERENT STAGES OF XEROPHTHALMIA IN 1182 CHILDREN ATTENDING PAEDIATRIC OPD, MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '89

Stage of Xerophthalmia	Number of children	Percentage
X N	06	0.50
X ₁ A	80	6.76
X ₁ B	15	1.26
X ₂	06	0.42
X ₂ A/X ₂ B	14	1.16
X S	01	0.08

X N = Night blindness
 X₁A = Conjunctival xerosis
 X₁B = Bitot's spots with conjuncth/al xerosis
 X₂ = Corneal xerosis
 X₃A = Corneal ulceration with xerosis
 X₃B = Keratomalacia
 X S = Corneal scar

Social Correlates

Socio-economic Status (Kuppuswam/s classification): Vitamin A deficiency was observed to be more common in the lower socio-economic group (21.35%) followed by the upper lower group (13.30%). No case was detected in the upper class (Table 3).

TABLES

RELATION BETWEEN VITAMIN A DEFICIENCY AND SOCIO-ECONOMIC STATUS OF 1182 PAEDIATRIC OPD CHILDREN AT MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-HAY '89

Socio-economic Group	Total number of children	Children with Vit A deficiency	Percentage
Upper	209	0	-
Upper Middle	221	10	4.52
Lower Middle	252	23	9.13
Upper Lower	233	31	13.30
Lower	267	57	21.35
Total	1182	121	

Birth Order An increasing trend of hypovitaminosis is observed with increase in the birth order. The maximum number 43 (19.63%) being in the children whose birth order was five or more (Table 4).

TABLE 4

RELATION BETWEEN HYPOVITAMINOSIS A AND BIRTH ORDER OF 1182 PAEDIATRIC OPD CHILDREN AT MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '89

Birth order	Total children	Children with signs of hypovitaminosis	Percentage
One	206	09	4.37
Two	247	12	4.86
Three	283	19	6.71
Four	227	38	16.74
Five or more	219	43	19.63
Total	1182	121	

Literacy Status of Parents: The largest number of children suffering from xerophthalmia, 59, (17.56%) were in the group where both parents were illiterate, while it was least 24 (4.74%) in the group where both the parents were educated (Table 5).

Nutritional Status: The average calorie intake of the children was about 1300 kcal/day. Only 455 (38.49%) children had normal nutritional status. The rest 61.51 % suffered from malnutrition of one grade or the other. Interestingly all cases of xerophthalmia were malnourished (Table 6).

Table 7 depicts the positive correlation observed between the severity of malnutrition and xerophthalmia.

TABLE 5

RELATION BETWEEN LITERACY STATUS OF PARENTS AND XEROPHTHALMIA OF 1182 PAEDIATRIC OPD CHILDREN AT MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '89

Literate parent	Total children	No. of xerophthalmia children	Percentage
Father only	350	38	10.86
Both parents	506	24	4.74
literate	326	59	17.56
Total	1182	121	

TABLE 6

RELATION BETWEEN NUTRITIONAL AND XEROPHTHALMIA OF 1182 PAEDIATRIC OPD CHILDREN AT MLN MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '80

Grade of Nutrition/ Malnutrition	Total	No. of xerophthalmic children	Percentage
Normal	455(38.49)		
Grade 1	366(32.66)	43	11.14
Grade II	282(23.86)	44	15.60
Grade III	48(4.06)	23	47.92
Grade IV	11(0.93)	11	100.00
Total	1182	121	

Figures in parentheses indicate per cent of total children.

In grade I and II malnutrition, conjunctival xerosis (X, A) was the most common presenting sign while corneal afflictions were more common in grade III and IV malnutrition. Grade III malnutrition presented conjunctival xerosis (X,A) and Bitot's spots (X,B) as the most common ocular findings (34.3% each) followed by corneal ulceration (X3A/X3B) (45.4%).

Serum Vitamin A Values: Table 8 gives serum vitamin A levels of 25 well nourished children who served as control and 30 children showing various signs of xerophthalmia.

TABLE 7
RELATIONSHIP BETWEEN SEVERITY OF MALNUTIRION AND
XEROPHTHALMIA OF 121 PAEDIATRIC OPD CHILDREN AT MLN MEDICAL
COLLEGE, ALLAHABAD, and JUNE '88-MAY '89

Grade of PEM	XM	X ₁ A	X ₁ B	X ₂	X ₃ A/X ₃ B	XS	Total
I	2(4.7)	37(86.0)	2(4.7)	-	2(4.7)	-	43
II	3(6.8)	35(79.5)	4(9.1)	1(2.3)	1(2.3)	-	44
III	1(4.3)	7(34.3)	7(34.3)	2(8.7)	6(26.1)	-	23
IV	-	1(9.1)	2(18.1)	2(18.1)	5(45.4)	1(9.1)	11
Total	6(4.95)	80(66.11)	15(12.31)	5(4.13)	14(11.57)	1(0.83)	121

Figures in parentheses indicate percentage. X₂ - 36.07 p<0.05 at 5 df.

TABLE 8
SERUM VITAMIN A VALUES IN CONTROL GROUP AND XEROPHTHALMIC
MALNOURISHED CHILDREN IN 55 PAEDIATRIC OPD CHILDREN AT MLN
MEDICAL COLLEGE, ALLAHABAD, JUNE '88-MAY '89

Status	Total No. of cases	Mean±.SD serum Vit. A (ug/dl)	No. of deficient 10 ug/dl	No. low <20 ug/dl	Normal >20 ug/df
Normal control	25	20.8±4.12	-	11	14
Night blindness (XN)	6	12.8±1.36*	-	6	-
Conjunctival xerosis (X ₁ A)	12	11.27±1.11**	2	10	-
Bitot's spot (X ₁ B)	7	9.77±0.99***	4	3	-
Corneal xerosis (X ₂)	3	7.57±1.06****	3	1	-
Keratomalacia (X ₃ A/X ₃ B)	2	5.7±0.4*****	2	-	-

* 't' Test = 7.33 and p 0.05 at Test 29 df
 ** 't' Test = 10.01 and p 0.05 at Test 35 df
 *** 't' Test = 11.39 and p 0.05 at Test 30 df
 **** 't' Test = 12.27 and p 0.05 at Test 26 df
 ***** 't' Test = 16.53 and p 0.05 at Test 25 df

Statistically significant low levels of serum vitamin A were observed in PEM. 32

The mean serum vitamin A level in the control group was 20.8 ± 4.12 meg/dl. 11 children 44 per cent were biochemically deficient for vitamin A.

It can be observed that in all stages of exophthalmia the serum vitamin A levels are significantly lowered than the determined control values. It is evident that there is a reduction in vitamin A levels with increasing severity of exophthalmia and this is also statistically significant

DISCUSSION

Though keratomalacia has significantly reduced as a public health problem, conjunctival xerosis (and Bitot's spots), despite some decline in recent years, still remains a problem on the public health scale not only among preschool children but among older children as well³.

Our study shows a prevalence of 10.23 per cent. Similar prevalence levels for this part of the country have been reported by Sharma *et al**. Also age group wise, a similar peaking of prevalence was observed by them. The increase in prevalence with increasing age may be explained by the influence of various external factors like immunisation status, diarrhoea episodes and childhood disease on the vitamin A stores of the body.

Our study does not show a statistically significant difference in the prevalence of xerophthalmia among the two sexes whereas Sommer⁵ has reported a higher prevalence in the males.

In our study conjunctival xerosis (X, A) was found to be the most common presenting sign followed by Bitot's spots. Similar findings were observed by Katiyar⁶ and Sharma⁴ while Chopra⁷ reported Bitot's spots as the most common sign.

Social Correlates

Xerophthalmia is found more commonly in the lower socio-economic group which conforms with the observation of earlier studies 4, 8. During a survey in Tunisia retinol and B-carotene consumption was found to increase with socio-economic status* which might to some extent explain the higher prevalence in the lower socio-economic group.

The increase in percentage distribution of xerophthalmia with birth order is obvious (Table 4). Similar observation has been made by Sharma *et al*.⁴. A likely explanation is the increasing depletion of the maternal stores as the birth

Order increases leading to reduced store in infants of higher birth order and consequently greater chances of earlier ocular manifestations of vitamin A deficiency.

Literacy status of both parents seems to play an important role. In our study the highest number of vitamin A deficiency cases were found in homes where both parents were illiterate while it was least where both parents were literate (Table 5). In a study carried out by (CDS at Gorakhpur, prevalence rates of exophthalmia were high when both parents were illiterate or when only father was literate⁴.

The direct relationship between severity of malnutrition and exophthalmia observed in our study is supported by many other studies^{4, 10}. The association of vitamin A deficiency with PEM has long been documented. Initially exophthalmia was thought to be a complication of PEM; subsequently their co-existence was considered a necessary pre-requisite for development of eye lesion.

The relationship between PEM and vitamin A deficiency is more complex than the mere availability of vitamin in the diet. Total fat intake known to be low in such diets and nature of lipid constituents affect the absorption of carotene and retinol.

In our study all children with exophthalmia show PEM and 66.1 per cent children show conjunctival xerosis. Similar observation was noted by Venkatswamy *et al.*¹¹. Roy, *et al.*¹² reported a high prevalence of Bitot's spots (70%) but we found it to be 12.3 per cent only. Dutta *et al.*¹³ have reported the incidence of Bitot's spots as 5.5 per cent in a random sampling of children. The prevalence of keratomalacia in our study (11.6%) is comparable to other reports^{12, 14}; however Venkatswamy *et al.*¹¹ reported a higher figure (14%).

Serum Vitamin A Values

The reduction in vitamin A levels with increasing severity of xerophthalmia is evident (Table 8). As already discussed all the children have PEM also and there is a direct correlation between the severity of malnutrition and the decreasing levels of serum protein and serum vitamin A status^{15, 16}.

Retinol binding protein is required for the release of vitamin A by the liver and for its transport in the blood and absorption at the target tissue. In PEM, hepatic synthesis of this is reduced resulting in a decrease in serum vitamin A levels and consequent manifestation of xerophthalmia.

It is evident from the observations that a multitude of social factors such as poverty, ignorance, pattern of dietary intake and medical factors such as diarrhea, occurrence of vaccine preventable diseases, etc. has been jointly responsible for this ocular morbidity. Therefore, the preventive measures need to include among other social upliftment, improving the literacy status. Strengthening of primary health care especially immunization and diarrheal control. This will automatically preduce the problem to an extent that it will cease to be a public health problem.

सारांश

प्रस्तुत अध्ययन में मोतीलाल नेहरू मेडिकल कालेज, इलाहाबाद के बाल-चिकित्सा विभाग के बहिरंग रोगी विभाग में आने वाले 0-6 वर्ष के आयु वर्ग के बच्चों के एक समूह में विटामिन "ए" की कमी का आंकलन किया गया था। लेखक द्वारा अतिसार रोग, कुपोषण और निम्न सामाजिक-आर्थिक स्तर जैसे सामाजिक घटकों स्तर जै सामाजिक घटकों को शुष्काक्षिपाक रोग के संदर्भ में विश्लेषित करने का प्रयास किया गया है। इसके स्तर का भी विश्लेषण करने का प्रयास किया गया है तथा जहां इसके अल्प स्तर को शुष्काक्षिपाक की गंभीरता तथा कुपोषण की डिग्री से सहसम्बद्ध होना बताया है।

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**STUDY OF CAUSES OF MATERNAL MORTALITY AT
SUB-DISTRICT LEVEL**

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ABSTRACT

The study analyses the causes of maternal deaths and suggests certain concrete measures to reduce the incidence of preventable maternal mortality. Apart from analyzing the causes of maternal deaths, the study includes a case control study to compare the characteristics of death cases with the cases in which women gave birth and survived. The study was conducted in both directions, i.e., retrospectively and prospectively.

Maternal mortality is a sensitive index of the prevailing health conditions and socio-economic development of the community. About five lakhs women die every year as a result of pregnancy all over the world. The maternal deaths for India, according to different estimates are reported to be about four per thousand live births with considerable variations. It has further been estimated that maternal deaths account for a little more than one per cent of the total deaths in India.

Maternal death is not a chance event and the reasons why women die in pregnancy or child birth are many layered. The causes include failure in proper health care, inadequacy of logistics, lack of transportation, socio-cultural, economical and political factors which greatly influence the status of women, their health, fertility and health seeking behavior. Keeping these issues in view, the study was conducted in Ajmer district (Rajasthan) by the Indian Institute of Health Management Research, Jaipur, under Training Interventions Project of AIHPPP.

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OBJECTIVES OF THE STUDY

- i. To analyse and compare the causes of maternal mortality in the institutional setting at sub-district and district level post-partum centres;
- ii. To analyse the causes of maternal deaths in community (in Women who haven't sought institutional care); and
- iii. To suggest certain concrete measures to reduce the incidence of Preventable maternal mortality.

METHODOLOGY

For retrospective study all maternal deaths which took place during 1.4.1992-31.9.1994 at JLN Hospital, Ajmer, PPC Kekri and PPC Kishangarh, were studied thoroughly. The information was collected from the death registers and admission tickets of the deceased. The research team visited the houses of the deceased for detailed information. The same procedure was adopted for the study of controlled cases also.

A sub-centre (Sample) was selected for prospective study in which a house to house survey was conducted to identify and register the women who were in their third trimester of pregnancy and were again followed for their deliveries and full post-natal period of 42 days. The study period was 1.10.1993 to 31.3.1994.

RESULTS AND OBSERVATIONS

Retrospective Study

A retrospective study was conducted to analyze the causes of maternal deaths for which all maternal deaths occurred (from 1.4.1992 to 30.9.1993) at Post-Partum Centre, Kekri, and Post-Partum Centre, Kishangarh, were studied. About 22 maternal deaths were identified. Fifty-two maternal deaths occurred at JLN Hospital, Ajmer, which were also studied to compare the characteristics in institutional setting of district and sub-district level hospitals.

FINDINGS

Regarding the age of the deceased, it was found that around 63.6 per cent of women belonged to the age between 25 and 34 years. The lowest age found was 18 years.

It was found that 27.3 per cent deceased women were prime (pregnant for the first time) and 31.8 per cent were fourth or more gravida. One woman was eleventh gravid. It shows high degree of multiparity.

From the hospital tickets it was found that all the deceased were anemic. In eight cases Hb was only 3 gm per cent. Thus, anemia was certainly a primary factor in at least 36.0 per cent of cases. Seventy-seven per cent of the deceased had Hb less than 8 gm per cent. Out of 22 maternal deaths, seven occurred during pregnancy, ten in the labor and five during puerperium. Out of the total deliveries, 40 per cent were normal. In 20 per cent cases breech was delivered, in 20 per cent LSCS and in 20 per cent an intervention through forceps was conducted.

Of the deaths which occurred during labour or beyond it following obstetric conditions were associated.

Out of the deaths occurred during pregnancy, 71.0 per cent had fever and around 29.0 per cent had ante partum hemorrhage. It was found that only 18.0 per cent of the deceased women were educated up to school level and remaining were illiterate, which can certainly be attributed as contributing factor. Deep interrogation with their kith and kin revealed that 77.0 per cent of the deceased were reluctant to go to hospital while they were sick. The study revealed that during pregnancy, 72.7 per cent of the women were seeking care from nontechnical hands, 50.0 per cent from close relatives and 22.7 per cent from dais of the villages. In 9.0 per cent of maternal deaths, labor and puerperium were also attended by dai.

In the study of 52 maternal deaths at JLN Hospital, Ajmer, it was found that around 59.0 per cent of deceased were fifth or more gravida, which reflects high level of multiparity. In 30.8 per cent subject's anemia was at its worst at less than 5 gm per cent Hb.

The commonest complication during pregnancy was anemia followed by antepartum haemorrhage. The commonest complication encountered during labor was cephalopelvic disproportion followed by sepsis and accidental hemorrhage (Table 1).

TABLE 1
ASSOCIATED OBSTETRIC CONDITIONS

Obstetric Condition	Deaths (%)
Malpresentation	13.33
Accidental hemorrhage	6.67
Post-partum hemorrhage	33.33
Retained placenta	6.67
Sepsis	13.33
CPO and Eclampsia	26.67

Case Control Study

In this study controlled cases equal to the number of maternal deaths were taken and their characteristics were compared to know how the women who die differ from the women who give birth and survive.

Following were the findings of the case control study:

Age

The analysis of age revealed that the proportion of women in younger (15-25) and higher (35-39) age group was higher among the women who died.

Type of Family

The proportion of women who live in joint family was found to be higher in controlled cases.

Literacy

The comparison revealed a significant difference in the literacy level of women. The percentage of literates was only 18.2 per cent in the women who died, whereas the percentage was 40.9 per cent in controlled cases.

Socio-economic Status

The analysis of socio-economic status of the families indicates that the proportion of death case was higher in case of women belong to poor socio economic status.

Number of Pregnancies

Regarding the number of pregnancies the study revealed that the proportion of women who died were higher in first pregnancy and above third pregnancy. The proportion of women having first pregnancy was just double in death cases as compared to controlled cases, which was 27.3 per cent and 13.7 per cent respectively. The percentage of women having more than third pregnancy was 36.4 per cent and 27.3 per cent in deaths and controlled cases respectively. The interval between last two pregnancies was also less in death cases as compared to controlled cases.

Usual Source of Treatment

Proportion of private sector as a usual source of treatment of illness in family was higher in both, deaths and controlled cases. Proportion of sub-centre was just double in death cases as compared to controlled cases, which was 27.3 per cent and 13.7 per cent respectively.

Hemoglobin Status

Hemoglobin status was higher in controlled cases. It was found that 50.0 per cent of women who died and 18.2 per cent of women who gave birth and survived, were having Hb less than 5 gm. per cent Percentage of women having Hb above 9 gm. per cent was 18.2 per cent and 45.5 per cent respectively in deaths and controlled cases.

Registration of ANC's

Most of the women who died were not registered at any health centre for anti-natal care. The percentage of registration of ANC's was 31.8 per cent and 63.6 per cent respectively in deaths and controlled cases.

Number of Anti-natal Check-ups

The number of anti-natal check-ups was less in death cases. The percentage of women visited four or more times during pregnancy for anti-natal check-ups was 9.1 per cent and 18.2 per cent respectively in deaths and

Controlled cases.

Complications during Pregnancy

Most of the women who died were having some complication during pregnancy. The complications during pregnancy are given in Table 2.

TABLE 2
COMPLICATIONS DURING PREGNANCY

Complications	Deaths (%)	Controlled Cases (%)
Non	4.5	68.2
High fever	22.7	9.1
Excessive bleeding	9.1	4.5
Eclamptic fits	13.7	-
S. Anemia	50.0	18.2

The above table shows that the proportion of women, having no complication during pregnancy was much higher among controlled cases. Percentage of women having severe anemia was 50.0 per cent and 18.2 per cent respectively in controlled and death cases.

Maternal Care during Pregnancy

Most of the women who died were seeking maternal care of non-technical hands during pregnancy. Percentage of women to whom maternal care was provided by non-technical hands was 27.3 per cent and 63.6 per cent respectively in deaths and controlled cases.

PROSPECTIVE STUDY

A house to house survey was conducted to identify all ANC's completed 28 weeks of pregnancy and were also followed for their deliveries and full post-natal period of 42 days in the study area. There were 42 deliveries. It was found that 16.7 per cent of women were below 20 years of age. 64.3 per cent of women were between 21 and 30 years of age. Regarding the age at marriage, it was found that 76.2 per cent of women were married when they were under 18 years of age. Highest age of marriage was 25 years.

Height wise breakup of the women revealed that maximum of the subjects was 5' to 5'4". 9.5 per cent of women were below 4'8".

It was found that out of 42.Deliveries only four were conducted in hospitals. Not even a single delivery was conducted at sub-centre. 90.5 per cent of deliveries were conducted at home. Around 73.8 per cent deliveries were conducted by non-technical hands and 14.3 per cent of deliveries were conducted by their relatives.

The study revealed that ANC could not be provided by technical hands in 14.3 per cent of women. TT was not given in case of 16.7 per cent of women and 23.8 per cent of women did not take IFA tablets during pregnancy, though 11.9 per cent of women were found to be anemic.

CONCLUSIONS

Maternal mortality is not a chance event there are many intervening factors which affect it, like social status, position of women, economic resources, facilities for family planning, maternity care, etc. Maternal mortality is the end point of the process which begins at birth and develops over a women's entire reproductive lifetime.

It is essential to have an integrated strategy to ensure significant impact on the problem.

The strategy should be directed towards the following dimensions:

- i. Adoption of family planning methods to avoid major risk factors of too many children too close, too early and too late. Effective contraception to avoid unwanted pregnancies is suggested.
- ii. Ensuring access to health facilities capable of providing operative Intervention, antibiotic therapy and blood transfusion.
- iii. The strengthening of services on pre-natal care and detection of high risk factors during pregnancy with efficient referral system to high levels of care are desirable. There must be adequate transport for w6men referred to next level.
- iv. Well designed health education, both in school and in community may be encouraged. In addition, the messages of reproductive health, nutrition, dangers of early marriage and early pregnancy, advantages of pre-natal care and family planning may be

designed and communicated.

- v. Integrated rural development and improving villages infrastructure Can also go a long way in preventing and reducing maternal deaths.
- vi. Most of the women died due to maternity causes were having some degree of anemia; therefore, it is important to lay the emphasis on nutrition and distribution of IFA tablets during pregnancy.
- vii. People including TBAs should be made aware of the importance of clean delivery to minimise the occurrences of sepsis.

Lkkjk'k

प्रस्तुत अध्ययन से मातृ-मृत्यु के कारणों का विश्लेषण किय गया है तथा रोकी जा सकने वाली मातृ-मृत्यु घटनाओं में कमी लाने के लिए ठोस उपाय सुझाए गए हैं। मातृ-मृत्यु कारणों का विश्लेषण करने के अतिरिक्त, इस अध्ययन के अन्तर्गत एक केस-नियंत्रण-अध्ययन भी शामिल है, जिससे मृत्यु-केसों के लक्षणों की ऐसे केसों से तुलना की जा सके, जिसमें महिलाओं ने बच्चे को जन्म दिया था तथा तत्पश्चात जीवित रही थी। यह अध्ययन दोनों पहलुओं अर्थात् पूर्वपिक्षी तथा भावी पहलुओं को ध्यान में रखते हुए संचालित किया गया था।

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