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Maternal and Environmental Factors Affecting the Nutritional Status of Children in Mumbai Urban Slum

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Abstract- India has made huge strides in the past decades in warding off the spectre of famine. The Green Revolution should have gone a long way to tackling child malnutrition, Norman Borlaug's creation of dwarf spring wheat strains in the 1960s meant that India could feed itself at last. Better farming techniques and food security policies have made mass starvation a thing of the past. Yet the problem of child malnutrition remains critical, and the reasons it deserves concerted attention are many. Besides the obvious moral obligation to protect the weakest in society, the economic cost to India is and will be staggering. The present study was carried out to find out Maternal and Environmental Factors affecting the nutritional status of Anganwadi children in Rafiq nagar urban slum of Mumbai. This is a Descriptive Epidemiological study conducted at Rafiq Nagar urban slum which is a field practice area of Department of Preventive and Social Medicine, TN Medical College, Mumbai, India. All children below 6 years of age attending 6 Anganwadi were included. The information was gathered by personal interview of mothers using semi-structured proformas. Out of 194 children 93 (47.9%) were males. According to WHO malnutrition grading, 59.8% children were malnourished and only 90 (46.4%) were completely immunized. Parents' higher education, exclusive breast feeding for 6 months, proper weaning, immunization and higher socioeconomic status had beneficial effect on nutritional status of children. Also environmental conditions, birth order and total number of children in family had effect on nutritional status of children. Malnutrition was prevalent in the age group of 1-2 years. Thus mother should be properly educated regarding the nutritional needs of the growing children and importance of complete immunization. Importance of exclusive breastfeeding, timely weaning, providing proper protein rich, energy dense complementary food should be stressed. Proper sanitation of the drinking water should be promoted in the community to prevent the water born diseases in the children. Mothers can be taught regarding the treatment of the common ailments in the house such as diarrhoea using homemade ORS. Regular de-worming of the child in the Anganwadi should be done.

Index Terms- Environmental factors, Immunization, Malnutrition, Maternal Factors, Urban slum

I. INTRODUCTION

Children are in a constant phase of development. Their body is in a phase of constant wear-tear and repair, their brain is developing, bones are growing. These growing children require constant supplementation of calories, proteins and micronutrients to keep the pace of increased demands of the body. Since childhood is the most vulnerable phase in the life of human being, nutritional inadequacies will result in the hampering of the development of the body. If this nutritional inadequacy is continued for a long period of time it results in the growth faltering manifested in the form of low weight, small height, low IQ. Future of the country is determined by the growing generation of the country. It is the health status of children of any country that represents the health status of people of that country. Since this growing generation is going to be the future productive citizens, they should be healthy enough to make use of the full potential of their productive age. Scientific evidence has shown that beyond the age of 2-3 years, the effects of chronic malnutrition are irreversible. Child malnutrition is the single biggest contributor to under-five mortality due to greater susceptibility to infections and slow recovery from illness. Misconception prevalent in the present time is the unavailability of the enough food. Between 6-18 months, young child requires only 200-300 kcal food to maintain normal growth and development; but because of insufficient knowledge of parents about feeding practices they don't provide enough food to their children leading to faltering of growth and consequently illness and death of child.[(1)]

India is by no means the poorest country on earth; it doesn't have the lowest life expectancy or literacy, or the highest rate HIV/AIDS. India isn't at war, there is considerable foreign direct investment, and there is a large buffer stock of food grains. But it is far from the whole story. Mumbai, India's commercial capital is in many ways a microcosm of the country. Next to the breathtaking opulence of the down town area and the booming financial services industry, lies Asia's largest slum, the bustling Dharavi and Govandi, home to two million people – many of whom lack clean drinking water and basic sanitation.

According to the state government's data, 3.5% of Greater Mumbai's slum children under six die every year because of poor nutrition and increased risk of infections - a figure largely accepted by academics and social workers. The city has about 7.3 lakh slum children below the age of four (according to the government National Family Health Survey), so at least 25,550 (3.5% of 7.3 lakh) children die of malnutrition and related

illnesses every year. 'Malnutrition kills 56,000 children annually in urban slums' sources according to Times of India opinion dated 10/1/11. About 25,000 slum children in Mumbai die of malnutrition every year, a sad fact brought to focus by the recent deaths in Mumbai's Rafiq Nagar locality where the study was conducted.[(2)]

These deaths occurred in a community of rag pickers that lives off Mumbai's biggest garbage dump. If they don't spend their day sorting out and selling garbage, they can't eat. The women are anaemic; their children are born underweight, and often don't survive beyond two months. Amongst those that do, their nutritional status keeps going down because they live only on breast milk.

Hence there is an urgent need to address the serious issue of why are malnutrition levels in India so high?

II. MATERIALS AND METHODS

The area selected for study was Rafiq Nagar, Govandi which has been declared as urban slums of Mumbai, situated in the areas besides the eastern Express Highway to Vashi. This is situated about 3 km from Govandi railway station and 1.5 km towards the north of Shivaji nagar Urban health Center. It comes under the jurisdiction of M (east) Ward of Municipal Corporation of Greater Mumbai.

Rafiq Nagar is the area where all the garbage from Mumbai is dumped and called as dumping ground of Mumbai. This area has the population which has migrated from different areas of the country like West Bengal, Uttar Pradesh, Bihar, Tamil Nadu and various parts of Maharashtra. This area has predominantly Muslim population. Most of the people are rag pickers and depended on this occupation for their daily living. This area has a total population of 9500 of which total child population under 6 years of age is 1600 (Data available from ICDS Mumbai office)

Study population comprises of children below 6 years of age registered under Anganwadi situated In Rafiq Nagar. All children from age 0-6 years are included in the study and subject selection is based on the inclusion and exclusion criteria.

Study was carried in the community of Rafiq Nagar which has a total of 12 Anganwadi in the area. Out of those twelve Anganwadi six Anganwadi were selected by using the simple random technique using lottery method. All the children attending the Anganwadi were included into the study provided they fulfil the inclusion and exclusion criteria.

Total population of 0-6 years children in six Anganwadi was 230 out of which 194 were selected for the study as they fulfilled the study criteria. There was a loss of 36 children as the mothers were not available during the study as mothers were involved in rag picking activity during the morning hours. Still efforts were made to motivate the mothers to attend the Anganwadi center and get enrolled into the study. When not responded by those mothers, their children were excluded from the study. Mothers were interviewed using a preformed semi structured questionnaire and the children were examined and weight and height taken to determine the nutritional status of the child.

The collected data was numerically coded and entered in Microsoft Excel 2007 and then transferred to SPSS version 15.0 Added data was analyzed with appropriate test like Chi-square test to see the association among various parameters, with p value 0.05 considered as significant.

III. RESULTS

Total 194 children were selected for the study. There were in all 230 children enrolled in total six Anganwadi. There was a dropout of 36 children due to various reasons and thus were excluded from the study. Table 1 shows, 101 (52.1%) females and 93 (47.9%) males participated in the study. According to the WHO growth card, 78 (40.20%) were found to be of normal nutritional status whereas 116 (59.80%) children were suffering from malnutrition. Of these 116 children 73 (37.60%) children were suffering from moderate acute malnutrition (MAM) and 43 (22.20%) children were suffering from severe acute malnutrition (SAM). Moderate malnutrition was more prevalent in females and severe malnutrition was more prevalent amongst the males. Out of 194 children, 111 children (57.20%) were suffering from chronic malnutrition as they were below 5th percentile for their height for age. Amongst these 55 (49.5%) were females and 56 (50.5%) were males. 84 (43.30%) were wasted as they were below 5th percentile for weight for their height. Females had seen more to suffering from wasting disease.

Table 2 shows, though the nutritional status of the child had no significant association with the age of the child, as the age of the child increased the nutritional status of the child goes on deteriorating, with less than 1 year age group was the least sufferer from malnutrition 22.2%. As child crosses 1 year age, malnutrition rate rises sharply to 61.6% (114 out of 185).

Similar was the picture shown by the association between height for age of the child where 11.1% of the children were suffering from chronic malnutrition (i.e. stunting in age group of 1 year) whereas the rate of stunting rises steeply to 59.4% by 2 years of age (i.e.110 out of 185).

A significant association was noted between the age of the child and history of the child suffering from worm infestation as none of the child gave the history of suffering from worm infestation in below 1 year age and the percentage rises to 23.3% in 1-2 years of age and 55.6% above two years of age. Similarly pallor was noted in 11.1% of the children below 1 year of age and the prevalence rises to 61.1% above 1 year of age (i.e. 113 of 185). There was no significant association between the age of the child and history of chronic diarrhoea, LRTI (lower respiratory tract infection) and admission in hospital for any reason in the past.

Significant association was noted between the age of the child and history of rashes with or without fever in the child. None of the child had history of rashes below 1 year of age and the approximately 30% of the mothers in the age group of 1-2 years gave the history of rashes with fever and 52.7% of the mothers of the children above 3 years gave the history of rashes over the body in the past. It cannot be conclusively proved that the rashes that the child suffered were from measles.

TABLE 3, 4 show, parents' higher education, higher socioeconomic status, less birth order, small family size, minimum three ANC visits, high birth weight more than 2500 grams, early initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for 6 months, weaning at 6 month, breastfeeding along with supplementary food upto 2 years,

complete immunization status had favourable effect on nutritional status. Significant association was seen between these factors and nutritional status. Also environmental factors have the direct impact on growth of the child. Tap water supply in houses, children staying in pucca house, houses using sanitary type of latrines had significant relationship with healthy nutritional status.

TABLE 5 shows, 58.8% of the children were suffering from pallor (anaemia), 46.90% of the children had the history of worms in stools, 41.20% of the children had the history of suffering from rashes all over the body with or without the history of fever (not conclusively suffered from measles), 41.20% of the children had the history of admission in the past for various reasons, 28.40% of the children had ear discharge at the time of initial general examination, 26.80% of the children had the history of admission due to LRTI in the past and 25.80% of the children had history of passed loose stools more than 3 times a day in the past. Significant association was found between these variables and the nutritional status of the child

TABLE 1: Distribution of patients according to age of the child and nutritional grades

Variables		Female (n-101)	Male (n-93)	Total
Age	Up to 1 year	3 (3%)	6 (6.5%)	9 (4.6%)
	1-2 years	13 (12.9%)	17(18.3%)	30 (15.5%)
	2-3 years	24 (23.8%)	21(22.6%)	45 (23.2%)
	More than 3 years	61 (60.4%)	49(52.7%)	110 (56.7%)
ICDS grade (Integrated child Development Service Scheme grading)	Grade I	44(43.6%)	31(33.3%)	75 (38.7%)
	Grade II	24(23.8%)	25 (26.9%)	49 (25.3%)
	Grade III	8 (7.9%)	3 (3.2%)	11(5.7%)
	Grade IV	0 (0%)	1 (1.1%)	1 (0.5%)
	Normal	25 (24.8%)	33 (35.5%)	58 (29.9%)
WHO grades	2-3 SD (MAM)	42 (41.6%)	31 (33.3%)	73 (37.6%)
	> 3 SD (SAM)	19 (18.8%)	24 (25.8%)	43 (22.2%)
	Normal	40 (39.6%)	38 (40.9%)	78 (40.2%)
Height for age	$< 5^{th}$ percentile	55 (54.5%)	56 (60.2%)	111 (57.2%)
	$\geq 5^{th}$ percentile	46 (45.5%)	37 (39.8%)	83 (42.8%)
Weight for height	$< 5^{th}$ percentile	45 (44.6%)	39 (40.9%)	84 (43.3%)
	$\geq 5^{th}$ percentile	56 (55.4%)	54 (58.1%)	110 (56.7%)

TABLE 2: Association of age with malnutrition

		Age				Chi-square test
		< 1 year (n-9)	1-2 yr(n-30)	2-3 yr(n-45)	> 3 yr (n-110)	
WHO grading	Malnutrition	2 (22.2%)	17 (56.7%)	29 (64.4%)	68 (61.8%)	P value-0.11; Non-significant
	Normal	7 (77.8%)	13 (43.3%)	16 (35.6%)	42 (38.2%)	
Weight for height	< 5th percentile	6 (66.7%)	20 (66.7%)	24 (53.3%)	60 (54.5%)	P value- 0.57; Non-significant
	≥ 5th percentile	3 (33.3%)	10 (33.3%)	21 (46.7%)	50 (45.5%)	
Height for age	< 5th percentile	1 (11.1%)	19 (63.3%)	25 (55.6%)	66 (60%)	P value-0.03; Significant
	≥ 5th percentile	8 (88.9%)	11 (36.7%)	20 (44.4%)	44 (40%)	
Worm infestation in past	Yes	0 (0%)	7 (23.3%)	25 (55.6%)	64 (58.2%)	P value < 0.01; Significant
	No	9 (100%)	23 (76.7%)	20 (44.4%)	46 (41.8%)	
Pallor	Yes	1 (11.1%)	8 (26.7%)	30 (66.7%)	75 (68.2%)	P value < 0.01; Significant
	No	8 (88.9%)	22 (73.3%)	15 (33.3%)	35 (31.8%)	
Rash with or without fever in past	Yes	0 (0%)	9 (30%)	13 (28.9%)	58 (52.7%)	P value< 0.01; Significant
	No	9 (100%)	21 (70%)	32 (71.1%)	52 (47.3%)	

Table 3: Association of Malnutrition with various Epidemiological factors

Variables		Malnutrition		Chi-square value	Association
		Present (116)	Absent (78)		
Sex of the child	Male	55 (47.4%)	38(48.7%)	0.032	P value- 0.86; Non-significant
	Female	61 (52.6%)	40 (51.3%)		
Mother's Education	Illiterate & primary school	87 (75%)	42 (53.8%)	9.37	P value < 0.01; Significant
	Middle school & above	29 (25%)	36 (46.2%)		
Father's Education	Illiterate & primary school	75 (64.7%)	37 (47.4%)	5.67	P value- 0.02; Significant
	Middle school & above	41 (35.3%)	41 (52.6%)		
Birth Order	2 and less	60 (51.7%)	58 (74.4%)	10.02	P value < 0.01; Significant
	3 and more	56 (48.3%)	20 (25.6%)		
Total children in family	2 and less	38 (32.8%)	44 (56.4%)	10.69	P value < 0.01; Significant
	3 and more	78 (67.2%)	34 (43.6%)		
Total family income	Below 4893	68 (58.6%)	41 (52.6%)	0.7	P value – 0.4; Non-significant
	4894 and above	48 (41.4%)	37 (47.4%)		
Total family members	4 or less	31 (26.7%)	35 (44.9%)	6.84	P value < 0.01; Significant
	5 or above	85 (73.3%)	43 (55.1%)		
Socio-economic status	Class I, II, III	23 (19.8%)	27 (34.6%)	7.08	P value-0.02; Significant
	Class IV, V	93 (80.2%)	51 (65.4%)		
ANC Registration	Yes	83 (71.6%)	64 (82.1%)	2.8	P value –0.09; Non-significant
	No	33 (28.4%)	14 (17.9%)		
Minimum 3 ANC Visits	Yes	56 (48.3%)	53 (67.9%)	7.3	P value < 0.01; Significant
	No	60 (51.7%)	25 (32.1%)		
Place of Birth	Home Delivery	37 (31.9%)	21 (26.9%)	0.55	P value-0.46;

	Hospital Delivery	79 (68.1%)	57 (73.1%)		Non-significant
Source of Water supply	Tap water	64 (55.2%)	60 (76.9%)	9.57	P value < 0.01; Significant
	Tanker water	52 (44.8%)	18 (23.1%)		
Type of house	Pucca	13 (11.2%)	19 (24.4%)	5.86	P value-0.01; Significant
	Kuccha	103 (88.8%)	59 (75.6%)		
Defecation practices in house	Closed sanitary type	68 (58.6%)	56 (71.8%)	3.51	P value - 0.04; Significant
	Open space defecation	48 (41.4%)	22 (28.2%)		

TABLE 4: Association of Malnutrition with Breastfeeding, Immunization status and birth weight

Variables		Malnutrition		Chi-square value	Association
		Present (116)	Absent (78)		
Initiation of Breast-Feeding	Within 1 hr of delivery	41 (35.3%)	45 (57.7%)	18.57	P value < 0.01; Significant
	Within 24 hr of delivery	21 (18.1%)	20 (25.6%)		
	After 24 hr of delivery	54 (46.6%)	13 (16.7%)		
Duration of Exclusive Breastfeeding	6 month	36 (31%)	53 (67.9%)	25.65	P value < 0.01; Significant
	Less that 6 month	62 (53.4%)	20 (25.6%)		
	More than 6 month	18 (15.5%)	5 (6.4%)		
Duration of Breastfeeding	2 years and more	40 (34.5%)	36 (46.2%)	14.9	P value < 0.01; Significant
	Less than 2 years	62 (53.4%)	21 (26.9%)		
	Continued breast feeding	14 (12.1%)	21 (26.9%)		
Immunization Status	Completely Immunized	43 (37.1%)	47 (60.3%)	10.09	P value < 0.01; Significant
	Partially Immunized	63 (54.3%)	27 (34.6%)		
	Non-immunized	10 (8.6%)	4 (5.1%)		
Birth Weight in grams	< 2500	30 (25.9%)	6 (7.7%)	14.09	P value <0.01; Significant
	≥ 2500	38 (32.8%)	43 (55.1%)		
	Others**	48 (41.4%)	29 (37.2%)		
Water sanitation Practices	Boiling	1 (0.9%)	2 (2.6%)	6.46	P value- 0.04; Significant
	Filtering	74 (63.8%)	61 (78.2%)		
	None	41 (35.3%)	15 (19.2%)		

**Others - where birth weight could not be determined due to home delivery of child

Table 5: Association of malnutrition with various diseases

Variables		Total	Malnutrition		Chi-square value	Association
			Present (116)	Absent (78)		
History of (H/O) Ear discharge	Yes	55 (28.4%)	40 (34.5%)	15 (19.2%)	5.31	p value-0.02; Significant
	No	139 (71.6%)	76 (65.5%)	63 (80.8%)		
H/O Worm infestation	Yes	91 (46.9%)	66 (56.9%)	25 (32.1%)	11.56	P value < 0.01; Significant
	No	103 (53.1%)	50 (43.1%)	53 (67.9%)		
Pallor	Yes	114 (58.8%)	84 (72.4%)	20 (25.6%)	39.2	P value < 0.01; Significant
	No	80 (41.2%)	32 (27.6%)	58 (74.4%)		
H/o Lower Respiratory Tract Infection	Yes	52 (26.8%)	40 (34.5%)	12 (15.4%)	8.67	P value < 0.01; Significant
	No	142 (73.2%)	76 (65.5%)	66 (84.6%)		
H/O Chronic Diarrhoea	Yes	50 (25.8)	38 (32.8%)	12 (15.4%)	7.36	P value < 0.01; Significant
	No	144 (74.2%)	78 (67.2%)	66 (84.6%)		
H/O hospital	Yes	80 (41.2%)	58 (50%)	22 (28.2%)	9.41	P value < 0.01;

admission in Past	No	114 (48.8%)	58 (50%)	56 (71.8%)		Significant
H/O rash with or without fever	Yes	80 (41.2%)	60 (51.7%)	20 (25.6%)	12.04	P value <0.01; Significant
	No	114 (48.8%)	56 (48.3%)	58 (74.4%)		

IV. DISCUSSION

The present study is the community based descriptive epidemiological study carried out in Rafiq Nagar which is an urban slum dumping ground of Mumbai, which come under the field practice area of department of preventive and social medicine of the parent institution. It was conducted during the period of August 2011 to October 2011 and the sampling method adopted was the simple random sampling method.

Out of 194 children 58 (29.90%) were having normal nutrition status while the rest 136 (70.10%) children were found to be suffering from malnutrition according to ICDS grade card. According to the WHO growth card 78 (40.20%) were found to be of normal nutritional status whereas 116 (59.80%) children were suffering from malnutrition. 111 children (57.20%) were suffering from chronic malnutrition as they were below 5th percentile (less than 2 SD) for their height for age. 84 (43.30%) were wasted as they were below 5th percentile (less than 2 SD) for weight for their height and shows that these children had been suffering from wasting.

M.K. Goel et al. conducted a study in Rohtak, a city in Haryana on 540 children aged 1-6 years. The study found that 57.4% children were malnourished. Out of which Grade I 107(19.8%), Grade II 137(25.4%), Grade III 45 (8.3%) & Grade IV 21 (3.9%)[(3)].

Steinohff MC et al (1983) conducted a cross sectional survey of the nutritional status of 1223 preschool age children in a development area in the southern Indian state of Tamil Nadu. They found that 45% of the children were underweight (low weight for age), 51% were stunted (low height for age) and 21% were wasted (low weight for height).[(4)]

Present study has shown that only 22.20% of the children below 1 year of the age suffered from malnutrition which rose drastically to 56.70% in the age group of 1-2 years of age, 64.40% in 2-3 years of the age, and 61.80% in the age group of above 3 years. It is very clear that as the age of the child increased the nutritional status of the child went on deteriorating. Insufficient duration of exclusive breastfeeding, improper weaning and complementary feeding practices, exposure to various infectious diseases like diarrhoeal and respiratory diseases may be the responsible factors for such finding.

Shubhada S. Avachat et al. conducted a study in six villages of rural Maharashtra in the year 2009. The study reveals that malnutrition is a problem that affects 56.93% children in the age group 1-2 yrs and 52.8% children in the age group 2-3 yrs. The prevalence of malnutrition was significantly more in 1-3 year age group[(5)]**.** Rao S et al carried out a longitudinal study to investigate changes in nutritional status and morbidity over time among pre-school slum children. They studied 845 children in the age group of 0-5 years from three slums in Pune, Maharashtra for a period of 2 years. Peak prevalence of malnutrition was observed around 18 months and shorter period (3.5 months) of exclusive breastfeeding was probably responsible.[(6)]

Sex of the child and the nutritional status showed non-significant association. Though the present cultural practices had always favoured males, here in this study almost equal percentage of males and females was suffering from malnutrition. As earlier noted stunting was more prevalent in males and wasting was more prevalent amongst the females.

A Mittal et al. had done study to determine the effect of various maternal factors on the prevalence of underweight and stunting among 1-5-year-old children in urban slum population Tripuri Town, Patiala. Lower grades (I and II) were more common among males than females (35.29% vs 32.85%), whereas severe grades (III and IV) were common in females (5.71% vs 2.94%). However, the results were statistically insignificant[(7)]. M.K. Goel, R. Mishra, D. Gaur& A.Das conducted a cross sectional study in the urban slums of Rohtak, a city in Haryana on 540 children aged 1-6 years. There was no significant association between nutritional status and sex of the child (p=0.928).[(3)]

In our study, it is clearly seen that the immunization has definite protective role against malnutrition. It protects the child from 6 vaccine preventable diseases namely polio, tuberculosis, diphtheria, pertusis, tetanus, and measles.

'Malnutrition and infectious disease morbidity among children missed by the childhood immunization program in Indonesia' a study done by Semba RD et al. showed 73.9% of children received complete immunizations (3 doses of diphtheria-Pertusis-tetanus, 3 doses of oral poliovirus, and measles), 16.8% had partial coverage (1-6 of 7 vaccine doses), and 9.3% received no vaccines. Of children with complete, partial, and no immunization coverage, respectively, the prevalence of severe underweight (weight-for-age Z score < -3) was 5.4, 9.9, and 12.6%, severe stunting (height-for-age Z score < -3) was 10.2, 16.2, and 21.5%, and current diarrhoea was 3.8, 7.3, and 8.6% (all $p < 0.0001$), respectively. In families where the child had complete, partial, and no immunizations, the history of infant mortality was 6.4, 11.4, and 16.5%, and under-five child mortality was 7.3, 13.4, and 19.2% (both $p < 0.0001$).[(8)] 'Effectiveness of measles immunization on diarrhoea and malnutrition related mortality in 1–4 year olds' by S. K. Kappor and V. P. Reddaiah shows that at the end of 2 years and 2 rounds of immunization with measles, significant reductions were observed in 1–4 year old mortality due to diarrhoea and malnutrition in the study area in contrast to control area.[(9)]

A significant association noted between the parent's educational status and the nutritional status, stunting and wasting of children as the education of parent's increases the nutritional status of the child tend to be in a normal range of the WHO grade card.

Parents' education are associated with the awareness about the proper child rearing practises, better health seeking

attitude, better knowledge about breastfeeding and complementary feeding, updated knowledge about immunization. Higher education and the occupation status are associated with better living conditions of the family and improved environmental conditions. Higher education is associated with the better awareness about the child rearing practices.

A study was conducted by Chakraborty S et al in children (0-6 year) in rural population of Jhansi district in the state of Uttar Pradesh found significant difference (2=12.53, p<0.05) between the per cent of PEM in children of mother who are illiterate or having primary education in comparison to those of having education up to middle school and / or above.[10]

A Mittal, J Singh, SK Ahluwalia had done study to determine the effect of various maternal factors on the prevalence of underweight and stunting among 1-5-year-old children in urban slum population Tripuri Town, Patiala. Mother‘s education seemed to play a protective role against child‘s malnutrition. Overall 70.75% of the mothers were literate though up to different levels. Prevalence was the highest where mothers were illiterate (60.9%) vs. value of 21.2% where mother had education more than high school. Differences were statistically significant.[7] Dwivedi SN, Banerjee N, Yadav OP conducted a cross-sectional study in Bhopal slum children. The prevalence of malnutrition was significantly higher among those children whose fathers were illiterate (p<0.05).[11]Ray S.K., Roy P., Deysarkari et al. conducted a study to determine the extent of malnutrition among young children in an urban slum community in India in 1986. 64.71% of the undernourished and 51.35% of the nourished had illiterate parents.[12]

In our study children having high birth order had poor nutritional status. Similar results were found in Dwivedi SN, Banerjee N, Yadav OP study conducted a cross-sectional study in Bhopal slum children. The birth order of the children was positively associated with their grades of malnutrition (p <0.05).[11] R. Verma, P. Khanna et al. conducted a study on Assessment of Nutritional Status And Dietary Intake Of Pre-School Children In An Urban Pocket of Rohtak city in the year 2006. 5 anganwadis of Rohatak city were selected randomly. A significant association (p < 0.001) was observed between birth order and the nutritional status of the child. Highest prevalence of malnutrition (76.2%) was observed in children with birth order 4 and above.[13]

Ray S.K., Roy P., Deysarkari S. et al. conducted a study to determine the extent of malnutrition among young children in an urban slum community in India in 1986. The sample included 103 families and 88 children 0-5 years old. 70% of children with 3 or more siblings and 58.85% of children with less than 3 siblings were undernourished.[12]

The present study clearly depicts the association between birth weight of child, times of initiation of breastfeeding after delivery; duration of exclusive breast feeding, duration of breast feeding had significant association with the nutritional status of the child. Continued breast feeding definitely has protective role in prevention of malnutrition. However the type of food to be given at the start of weaning was not significantly associated with nutritional status of the child. The children given those given liquid food or the children those given semisolid food during weaning both showed the similar prevalence of malnutrition. There are many socio cultural taboos and the misbelieves in the community about the time of starting the breast feeding hence the people tend to withhold giving the colostrums to the child which is the most nutritious and appropriate diet to the newly born child. They tend to give the child the various other feeds like the plain water, janam ghutti and the honey, sugar water etc which are delirious to the health of the child. These feeds introduce the child to the various external infectious agents and child falls prey to the diseases in the early stages of the life. It has been previously mentioned that the various gastro intestinal and other morbidities are responsible for making the child to land in the malnutrition grade. These children are devoid of the nutritious proteins present in colostrum which are the building block of the body. Child does not get antibodies, various anti infective agents and the immunoglobulin A present in the colostrums which protect the child from various infection.

Dinesh Kumar, N.K. Goel et al. conducted a study to study the nutritional status of under-five children and to assess whether infant feeding practices are associated with the undernutrition in Anganwadi (AW) areas of urban Allahabad. Initiation of breast feeding after six hours of birth, deprivation from colostrum and improper complementary feeding were found significant (P < 0.05) risk factors for underweight.[14]

Suman Chakrabarty, Rohini Ghosh et al. conducted a cross sectional study among Shabar tribal community in Khurda and Cuttack districts of Orissa found the prevalence of underweight was found to be higher among children (58.0%), who were initiated breast milk after 24 hours of birth than those who received within 24 hours of birth (43.1%) but the difference was not significant. They also found the proportions of underweight among children who had exclusive breastfeed for less than 6 months were significantly higher (p<0.01) than those who were breastfed more than 6 months. When exclusive of breast feeding 6 months and above 35.4 % children are underweight with odds ratio is 1. While those children with exclusive of breast feeding was less than 6 months 64.2% children were underweight with odds ratio 2.97.[15]

Prevalence of malnutrition and its relation with feeding practices was studied in 605 tribal under five children in Ahmednagar District, Maharashtra by Chirmulay D et al (1993). There was a significant relation of nutritional status of preschool children with feeding practices. Exclusive breastfeeding was beneficial upto 6 months of age. After this age, it lost its advantage. Children greater than 1 year who are exclusively breast fed had a higher prevalence of malnutrition.[16]

In the present study it was found that as the socio economic status of the family improved, the malnutrition rates in the family decreased. Dwivedi SN et al. conducted a cross-sectional study in Bhopal slum children. An inverse correlation was observed between socioeconomic status and the prevalence of malnutrition (p <0.05).[11] Shubhada S. Avachat et al. conducted a study in six villages of rural Maharashtra in the year 2009. Majority of Children from the socioeconomic status IV (58.03%) and V (64.84%) were malnourished. ($\chi 2$=39.2 d.f.=4 p<0.01 highly significant).[5]

In the present study it is found that the total income of the family had no significant association with the nutritional status of the child. It can be concluded from the finding that only money is

not needed to lead a healthy life, but even more things are required like better educational status of the parents, better occupation, better living conditions and awareness about the proper child rearing practices.

No significant association was established between the nutritional status of the child and the history of registration of their pregnancy. It was found that appropriate number of the ANC visits is associated with the better health status of the child. It shows the health seeking attitude of the mother for the betterment of herself, and her child. More ANC visits had proved tract record of better monitoring of the pregnant mothers, better chances of taking iron and folic acid supplementation for longer period, better monitoring of the growth of the fetus and better pregnancy outcome.

A Case Study from Goundam Cercle, Timbuktu Region showed that Children whose mother went for prenatal consultation shows 24.8% prevalence of malnutrition, while those not shows 35.3% prevalence of malnutrition.[17]

Children having poor environmental conditions like kuccha house, open defecation practices, no tap water, had poor nutritional status. The study conducted by Sayed NE et al. found that good environmental condition was associated with a lower stunting rate (OR=0.83, CI=0.72-0.96). Increased age of child and living in a non-squatter area were associated with wasting (OR=1.02, CI=1.001-1.03 and OR=0.38, CI=0.15-0.97 respectively).[18]

A Case Study from Goundam Cercle, Timbuktu Region found that children whose family had latrine facility at their home shows prevalence of 27.8% of undernutrition, while those families with open air defecation had 40.7% of prevalence of undernutrition.[17]

Children having ear discharge, pallor, history lower respiratory tract infection, worm in stool or history of admission in hospital had poor nutritional status. These infections make the child susceptible to land up in malnutrition. It can be viewed the other way round too that the malnourished children are also weaker in the immune status and are thus exposed to the repeated infections. Thus malnutrition is a vicious cycle where a malnourished child has a weak disease fighting ability and this lower immunity in the child makes the child more susceptible to malnutrition.

Dwivedi SN, Banerjee N, Yadav OP conducted a cross-sectional study in Bhopal slum children. The prevalence of malnutrition was significantly ($p < 0.05$) higher among the children with a history of infection (81.8%) and worm infestation (77.0%) in comparison to those without history of infection (13.1%) and worm infestation (61.9%), respectively.[11]

Bhatia V, Puri S et al. conducted a community-based cross-sectional study found that there is a statistically significant relationship between acute ailments (diarrhoea, ARI) with malnutrition was observed where 73.08% children were suffering from malnutrition in comparison with 42.08% children when no acute ailment had occurred ($p < 0.001$). It was observed that among these children, 20.45% children were passing worms in stools in the last 6 months and 25.24% gave history of pica with or without abdominal pain. Some children were having both the problems (worms in stools and pica).[19]

Ray S.K., Roy P. et al. conducted a study to determine the extent of malnutrition among young children in an urban slum community in India in 1986. 41.18% of the undernourished had upper respiratory tract infections, 52.82% had diarrhoea, and 97.37% had parasitic infections. The respective proportions for nourished children were 59.46%, 40.54%, and 78.57%. Statistically significant differences occurred only for parasitic infections.[12]

V. CONCLUSION

Mother should be properly educated regarding the nutritional needs of the growing children and importance of complete immunization. Importance of exclusive breastfeeding, timely weaning, providing proper protein rich, energy dense complementary food should be stressed. Uses of non expensive, culturally acceptable nutritious recipes have to be promoted and demonstrated. Appropriate dietary modifications should be done to ensure the increased calorie & protein intake as per the recommendations. That means nutritional education should be considered as major intervention to reduce problem of PEM. As the education status of the mothers cannot be improved further still there is lot of scope to improve the knowledge level of these mothers regarding proper child rearing practices. Anganwadi workers, local mahila mandals, community based organizations and volunteer groups can help organize regular meetings of these mothers in order to address the issues regarding proper child rearing practices. Mothers should be encouraged to 8nrol at the earliest to the nearest ANC clinic so that the mothers can be taken care of during ANC period. Propaganda on a wide scale in regard to importance of early ANC registration, regular follow up and importance of administration of iron, B complex etc. will go a long way to decrease the incidence of Low Birth Weight which will help in reducing PEM. Anganwadi worker, Community Health Volunteers and other health functionaries, and community based organization can be motivated to take up the task of early registration of further follow up.

Proper sanitation of the drinking water should be promoted in the community to prevent the water born diseases in the children. Filtering the drinking water, boiling the water should be promoted. Mothers can be taught regarding the treatment of the common ailments in the house such as diarrhoea using homemade ORS. Regular de-worming of the child in the Anganwadi should be done.

Mother should be taught to monitor the growth of their children by regular weighting their children and noting on the WHO growth charts, so that the growth faltering can be diagnosed at an earlier stage and the necessary timely interventions can be taken.

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