Socio-demographic Factors Affecting the Nutritional Status of the Under Three Children in Chandigarh, UT

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Abstract :

Introduction : The prevention of malnutrition is crucial for improving our human resources. Child under-nutrition is the major public health issue in many developing countries such as India. Out of 167 million underweight under-five-year old children in the world, 90 million live in South Asia. Despite global efforts for improving nutritional status of children, desired outcomes could not be achieved. Malnutrition is regarded as a silent emergency in India, seriously affecting human development and economy of the country. **Method :** It is a community based cross-sectional study, undertaken in Rural, Urban and Slum population of UT Chandigarh. Nutritional status of children was assessed using WHO classifications. **Results:** Out of the total 424 children surveyed, 262 (61.8%) were found to be underweight. Underweight prevalence was maximum among 25-36 months (75%) of age. There were 24.6% females of normal weight as compared to 40.6% in males. Normal weight was highest for birth order one (37.7%).

Key Words : WHO, Birth order, Malnutrition, Under Three children

Introduction :

Malnutrition is regarded as a silent emergency in India, seriously affecting human development and economy of the country. Proper nutrition of children leading to adequate growth and good health is the essential foundation of human development. Child malnutrition tremendously affects development outcomes. The prevention of malnutrition is crucial for improving our human resources. [1] Child under-nutrition is the major public health issue in many developing countries such as India. Out of 167 million underweight under-five-year old children in the world, 90 million live in South Asia. [1] Despite global efforts for improving nutritional status of children, desired outcomes could not be achieved. India has the highest proportion of undernourished children in the world. [2] World Health Organization (WHO) has estimated that 60.0 % of the 10.9 million deaths that occur annually among children aged less than five years in the developing countries are associated with under-nutrition [3], about 25% of the deaths in under-five occur in India alone, often associated with inappropriate feeding practices.

Nutritional status of children is conventionally determined by comparing standard indices: stunting, wasting, and underweight derived from anthropometric measurements, with National Centre For Health Statistics (NCHS) standards. On this basis of indices derived from anthropometric data, World Health Organization (WHO) classifies children in terms of underweight, stunted, and wasted. The prevalence of stunting, underweight and wasting are reported to be 45%, 47% and 16% respectively in India by UNICEF (2003). [4] NFHS-3 survey reports these proportions to be 48%, 43%, and 20% respectively.[5]

Present study attempts to find the prevalence of malnutrition in under three children and their relations with socio-demographic factors.

Method :

It is a community based cross-sectional study undertaken in Rural, Urban and Slum population of Union Territory (UT) Chandigarh.

Mothers of infants willing to participate in the study and satisfying the inclusion criteria and also children below three years of age within selected clusters served as study units.

Sample Design :

A stratified two-stage random sample design was adopted. At the first stage, from the sampling frame available, a sample of primary stage units (PSU), was selected randomly with probability proportional to size (PPS) in rural and urban and slum strata. A sample of ten clusters as PSU including six urban sectors, two slums and two villages was covered. At the second stage, a sample of households as second stage units was selected within each selected PSU of an optimum size with proportional allocation. All study units within selected households were interviewed to obtain the desired information.

Optimum Sample Size :

Power analysis was done to calculateoptimum sample size for the baseline survey of the study. Following formula with approximation for large population was used:

$$N_{opt.} = \frac{Z^2_{1-\epsilon/2} \, (1-P)}{\epsilon^2 \, P}$$

Where,

P = Anticipated population proportion

1 - α = Confidence Coefficient

∈ = Relative precision, and

Z is the value of standard normal variate.

Optimum sample size of mothers was calculated on the basis of various key parameters of breastfeeding behaviour of mothers. In the pilot survey, key parameters of breastfeeding behaviour of mothers were observed as 58% initiating breastfeeding within 6 hours, 57% giving colostrum, 60% not giving prelacteal feed and only about 55% exclusive breast feeding rate for six months. Maximum sample size for mothers calculated on the basis of these key parameters, assuming 5% relative precision and 95% confidence coefficient was obtained to be 726. Accordingly, a sample of an optimum size of 726 mothers was selected in the baseline survey. Sample for children below three years of age comprised of children (below three years of age) of mothers included in the survey.

Inclusion criteria : Mothers having children below three years and willing to participate in the study. Their children below 3 years of age were study subjects of the present study.

Nutritional status of children was assessed using WHO classifications. Children who were not available for anthropometric measurements in spite of repeated efforts or whose parents were not willing to participate in the study were excluded from the study after making efforts for replacing non-respondents to minimize non-responses. Mothers of selected children who were willing to participate in the study were interviewed for collecting information on selected socio-demographic characteristics: age of children, caste, religion, socio-economic status (SES), educational status etc. Weight, one of important anthropometric parameters was recorded for children ensuring reliability as far as possible. Height could not be measured due to various field problems.

Non-respondents due to any reason in the baseline survey were replaced by new participants selected at random. Respondents were interviewed in privacy to collect the desired information using pre-designed, pre-tested interview schedules for different groups of respondents. House-to-house survey was conducted for this purpose. Field problems faced during data collection were solved time to time.

Modified Prasad's Classification [6]adjusted with current income levels was used for assessing socio-economic status (SES) and categories were pooled into Low, Middle and High status.

Assessment of Nutritional Status : The prevalence of under-nutrition was evaluated in terms of nutritional status assessed by WHO criterion. [7] According to WHO criterion, based on standard deviation (SD) units (termed as Z-scores), children who were more than two standard deviations below the reference median on the basis of weight-for-age, were considered to be underweight and children who were below three Z- score values of the reference median (<-3Z-score) were considered to be severely underweight.

The data was entered and analysed using SPSS and statistical tests like Chi square, Student's t test were applied.

Ethical Guidelines for biomedical research on human participants issued by ICMR (2006) were followed and confidentiality of responses was ensured. In case of children, consent was taken preferably from mothers or from any other elderly members. Approval by Institutional Research Committee and Institutional Ethics Committee (IEC) was also taken.

Results :

There were 262(61.8%) underweight children among total 424 children. Also 18(4.3%) were found overweight. Mean age of underweight children was

Observations :

Table 1 : Nutritional status of children by who classification

WHO grade	No	Percent	Age of Children	
			Mean	SD
Normal	144	33.9	9.35	8.587
Underweight	131	30.9	12.76	8.812
Severely Underweight	131	30.9	14.63	9.382
Overweight	12	2.8	13.00	6.592
Severely Overweight/Obese	6	1.4	5.67	6.282
Overall	**424**	**100.0**	**12.08**	**9.095**

comparatively higher as compared to that for other children with an overall mean age of 12.08±9.09 years. (Table 1)

Table 2 : Nutritional status of children by who classification according to socio-demographic characteristics

Age in months	WHO grade			
	Normal	**Underweight**	**Overweight**	**Total**
1	5(35.7)	7(50.0)	2(14.3)	**14(100.0)**
2-6	74(54.8)	57(42.2)	4(3.0)	**135(100.0)**
7-12	27(24.3)	79(71.2)	5(4.5)	**111(100.0)**
13-24	27(22.5)	86(71.1)	7(5.8)	**120(100.0)**
25-36	11(25.0)	33(75.0)	0(.0)	**44(100.0)**
Total	144(34.0)	262(61.8)	18(4.2)	**424(100.0)**
Mean± SD	9.35±8.56	13.69±9.13	10.56±7.24	**12.08±9.09**
Gender				
Male	101(40.6)	135(54.2)	13(5.2)	**249(100.0)**
Female	43(24.6)	127(72.6)	5(2.9)	**175(100.0)**
Total	144(34.0)	262 (61.8)	18 (4.2)	**424(100.0)**
Birth Order				
1	93 (37.7)	141(57.1)	13(5.3)	247(100.0)
2	41(31.3)	86(65.6)	4(3.1)	131(100.0)
3& above	10(21.7)	35(76.1)	1(2.2)	46(100.0)
Total	144(34.0)	262(61.8)	18(4.2)	424
Birth Spacing				
Not applicable/ No Response	94(36.9)	149(58.4)	12(4.7)	255(100.0)
12-24	11(25.0)	31(70.5)	2(4.5)	44(100.0)
25-36	27(27.6)	69(70.4)	2(2.0)	98(100.0)
37-48	11(47.8)	10(43.5)	2(8.7)	23(100.0)
48 and above	1(25.0)	3(75.0)	0(.0)	4(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
Duration since Marriage				
No Response	40(32.5)	75(61.0)	8(6.5)	123(100.0)
Upto 1	62(34.1)	115(63.2)	5(2.7)	182(100.0)
2-5	34(33.3)	63(61.8)	5(4.9)	102(100.0)

6-9	6(42.9)	8(57.1)	0(.0)	14(100.0)
10 and above	2(66.7)	1(33.3)	0(.0)	3(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
Type of family				
Joint	105(34.4)	185(60.7)	15(4.9)	305(100.0)
Nuclear	39(32.8)	77(64.7)	3(2.5)	119(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
SES				
Low	44(24.2)	132(72.5)	06(3.3)	182(100.0)
Middle	34(31.8)	71(66.4)	02(1.9)	107(100.0)
High	66(48.9)	59(43.7)	10(7.4)	135(100.0)
Total	144(48.9)	262(61.8)	18(4.2)	424(100.0)

(Table 2) Prevalence of Normal weight was found maximum in age group of 2-6 months children. Maximum underweight prevalence was among 25-36 months age group recorded as 75.0%. There were 24.6% females of normal weight as compared to 40.6% such males. Among male children, prevalence of underweight was found less (54.2%) as compared to that among girls (72.6%). Normal weight was highest among for birth order one (37.7%). Underweight percentage was highest in case of birth order 3 and above (76.1%) and minimum for birth order one (57.1%). Classification of Children according to Age of Mothers, prevalence of underweight children was 65.8% for mother's age between 18- 21 yrs. Normal weight children was maximum 35.6% among 22-25 years of mothers. It was found that highest prevalence of underweight among children is 70.4% for Birth spacing of 25-36 months. According to "duration of since marriage", prevalence of underweight among children, was highest (63.2%) for duration since marriage up to one year for mothers.

Normal weight children were more in case of joint family (34.4%) as compared to that in nuclear families (32.8%) and underweight children were more in nuclear families 64.7%. Prevalence of underweight was found to be maximum (72.5%) in case of low SES as compared to those for middle (66.4%) and high (43.7%) SES categories.

Table 3 : Bivariate analysis of correlates of undernutrition

Gender of Child	WHO grade		Total	
	Normal	**underweight**		
Male	101(42.8)	135(57.2)	236(100.0)	X^2 = 13.4
Female	43(25.3)	127(74.7)	170 (100.0)	P<0.001
Total	144(35.5)	262(64.5)	406(100.0)	
Prelacteal feed				
Not Given	61(34.9)	114(65.1)	175(100.0)	X^2 =0.05
Given	83(35.9)	148(64.1)	231(100.0)	P=0.83
Total	144(35.5)	262(64.5)	406(100.0)	
Colostrum Feeding				
Yes	127(36.1)	225(63.9)	352(100.0)	X^2 =0.43
No	17(31.5)	37(68.5)	54(100.0)	P=0.54
Total	144(35.5)	262(64.5)	406(100.0)	

Age at complementary feeding in months				
Proper	54(27.1)	145(72.9)	199(100.0)	X^2 =11.83
Improper	90(43.5)	117(56.5)	207(100.0)	P<0.001
Total	144(35.5)	262(64.5)	406(100.0)	
EBF with no water				
No	75(39.1)	117(60.9)	192(100.0)	X^2 =2.05
Yes	69(32.2)	145(67.8)	214(100.0)	P= 0.18
Total	144(35.5)	262(64.5)	406(100.0)	

As per Table 3 On the bases of bivariate analysis, correlates of being under weight were investigated. The percentage of underweight children among all surveyed children was found to be 64.5%. Based on this analysis, females were more likely to be underweight (74.7%) as compare to males (57.2%) Gender of baby was found to be significantly associated (P<0.001) with WHO grade. Age at start of complementary feeding was also found to be significantly associated with being underweight. Children of low socio economic status were more likely to be underweight as compare to their counterparts (P<0.001) Similarly birth order was also found to be significantly associated with being underweight (P=0.03) and children of birth order were less likely (60.3%) to be underweight as compare to children of higher birth order (70.3%). Age at previous delivery also came out to be a significant correlate of being underweight (P=0.04). Children were more likely to be under weight (68.7%) in case of being delivered up to 21 years of age of their mothers as compare to rest of the children (59.2%) rest of the variables were not found to be significant correlates of on the basis of bivariate analysis.

Discussion :

Studies on nutritional assessment among children in India remain a very challenging task. Under-nutrition, a type of malnutrition, occurs due to inadequate intake of nutrients required for proper growth, maintenance and development of the body. Chronic under-nutrition in childhood is linked to slower cognitive development and serious health impairments later in life that reduce the quality of life and also the economic productivity of people. [9]

Under-nutrition is hence not only a consequence of poverty but also a cause. Child under-nutrition continues to be one of the principal causes of ill-health and premature mortality and morbidity among children in developing countries. [10-12]

According to WHO criterion 61.8 % underweight were found in this survey, which is quite high as compared to findings of NFHS-3 survey [5] (43%). National Family Health Survey (NFHS -2) found that 47 percent of all children under age three were underweight. Data from NFHS-3 shows only a very small decline, with under-nutrition level remaining around 45 percent for children below three. The prevalence of underweight was reported to be 47% in India by UNICEF (2003). [4]

In a recent study by Kumar Mittal and Sharma (2010), Proportion of underweight was found to be 49.1%. [13] Children belonging to low standard of living index were at significantly higher risk of being underweight in the study by Kumar Mittal and Sharma. In our study also the prevalence of under-weight was more in children from lower socio-economic strata.

In a study by Sen, Dey and Mondal (2011) [14], the prevalence of under-nutrition (under-weight) was found to be 47.0%. Maximum prevalence of underweight was among 25-36 months recorded as 75.0%. According to the recently developed child growth standards of World Health Organization (WHO) Standards, 39% of the children below six

months of age are underweight (Dongra et al , 2010).[15]

In the present study, female children were more likely to be underweight (72.6%) as compared to males (54.2%) showing gender discrimination still prevalent in the community.

Proportions of underweight children, was found maximum among children aged 25-36 months, unlike in 13-24 months found earlier by Kumar et al (2006). [14] This study shows that as the birth order increases, the prevalence of malnourishment also increases. Percentage of underweight is highest with the birth order 3 and above i.e 75%. Lesser the age of the mother, more are the chances of child being under-weight. This finding supports the fact that the body of the female of young age is not ready to bear the baby.

Results of studies [6, 17-20] on IYCF have indicated that inappropriate feeding practices can have profound consequences for the growth, development, and survival of infants and children, particularly in developing countries. Delayed initiation of breastfeeding, deprivation from colostrums, and improper complementary feeding came out to be significant risk factors of underweight in the present survey. Several studies [21, 22] have recognized the link between malnutrition and child feeding practices. The study by Kumar et al (2006) [22] also discussed influence of Infant-feeding Practices on Nutritional Status of Under-five Children. The initiation of breast-feeding after six hours of birth, deprivation of colostrum and improper complementary feeding were found significant (P<0.05) risk factors for underweight in that study. In the present survey also, delayed initiation of breastfeeding, deprivation from colostrum, and improper complementary feeding came out to be significant risk factors of underweight. Risk of being underweight was more in case of late initiation of breastfeeding and deprivation from colostrum. There were 54.3% children found to be of normal grade in case of no pre lacteal feed as compared to (57.9%) in case of receiving prelacteal feeds.

Conclusion :

The study was undertaken to know the prevalence of malnutrition in children and to identify important factors leading to malnutrition. According to WHO criterion the overall prevalence of underweight was found to be 61.8%. Prevalence of underweight was more among girls (72.6%) as compared to boys (54.2%). Underweight prevalence was maximum (75.0%) among children aged 25-36 months. Prevalence of underweight was found to be maximum (72.5%) in case of low SES. EBF, Prelecteal feed, colostrums feeding etc all are significantly related to underweight. It is suggested to promote optimal Infant and Young Child Feeding Practices (IYCF) to reduce malnutrition in terms of being underweight among children under three years of age.

Acknowledgment :

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