

Original Research Article

Assessment of nutritional status of children (12-36 months of age) in urban area of district Rohtak, Haryana: a cross-sectional study

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ABSTRACT

Background: Children 1-3 years of age are most vulnerable to the vicious cycles of malnutrition, disease/infection and resultant disability all of which influence the present condition of a child at the microlevel and the future human resource development of the nation at the macrolevel.

Methods: Urban field practice area attached to the department of community medicine, Pt. B. D Sharma PGIMS, Rohtak being served by 14 anganwadi centres out of which 8 anganwadi centres were selected randomly. From each selected anganwadi centre, 22 children of 1-3 years of age group were selected by simple random sampling, thus, a sample of 176 children were included in the study.

Results: Overall prevalence of undernutrition in our study was found as follows: wasted 14.1%; underweight 20.0%; stunted 24.1%. Inverse relation between prevalence of undernutrition and educational status of mother was observed. Children who were ≥ 3 in birth order had high prevalence of wasting, stunting and underweight. Children with low birth weight were having higher percentages of wasting, stunting, and underweight. Children who took supplementary nutrition regularly from AWC were less likely to be undernourished.

Conclusions: Every endeavor should be made to combat the outcomes of undernutrition through multipronged approach such as growth monitoring, nutritional supplementation etc., Also, present study findings reinforce the importance of proper infant and child feeding practices and appropriate maternal care in prevention of childhood undernutrition.

Keywords: Undernutrition, Low birth weight, Supplementary nutrition, Growth monitoring

INTRODUCTION

Children under five years of age are most vulnerable to the vicious cycles of malnutrition, disease/infection and resultant disability all of which influence the present condition of a child at the microlevel and the future human resource development of the nation at the macrolevel.¹The necessity to improve the nutrition state of childhood is essential as current children will be future citizens. From a lifecycle perspective, the most crucial time to meet a child's nutritional requirements is

in the 1000 days, as during this time, the child has increased nutritional needs for supporting rapidly occurring growth and development, having more susceptibility toward diseases of infectious nature, increased susceptibility towards biologically controlled programs and having total dependency for caring, nourishment, and socialization on others. Also, early childhood constitutes the most crucial period of life, when the foundations are laid for cognitive, social and emotional, language, physical/motor development, and cumulative lifelong learning.²

Nutritional status is influenced by three broad factors, that is, food, health and care. The food rich in desired nutrients having diversity, easy availability, and affordability; appropriate and adequate maternal and child health care services; a clean and green environment which includes safe water, sanitation, and good hygiene practices can ease to achieve the optimal nutrition state among children. The combination and relative importance of these factors differ from country to country.³ Poor maternal nutrition impairs foetal development and contributes to low birth weight, subsequent undernutrition. Also, after birth, a number of practices can directly lead to poor growth are inadequate breastfeeding practices such as nonexclusive breast feeding; inappropriate complementary feeding, and others.⁴ The long term undernutrition in childhood results in several consequences such as delayed motor and skill milestones; intelligent quotient on lower side, prone to behaviour specific illnesses, lack of socialization characteristics, and more prone to communicable disease. Undernutrition is associated with poor school achievement and poor school performance. Reduced school attendance and educational outcome results in diminished income earning capacity in adulthood which in turn affects economic productivity at national level.

In India, as per National family health survey (NFHS-4) 2015-2016, about 38.4% under 5 children were stunted, 21% were wasted and 35.8% were found to be underweight. In Haryana, as per National family health survey (NFHS-4) 2015-2016, about 34% under 5 children were stunted, 21.2% were wasted and 29.4% were found to be underweight. While the prevalence of stunted, wasted and underweight was found to be 38.4%, 14.9% and 24.1% respectively in urban area of district Rohtak.⁵

The existence of undernutrition in India is very severe and by far it is the most common cause for mortality among children. In India U5MR is 37 per 1000 live birth as per SRS 2013. The prevalence of underweight children under age 5 was an indicator to measure progress toward MDG, which aims to halve the proportion of people who suffer from hunger between the years 1990 and 2015 and for India, it implies to reduce the prevalence from 54.8% to 27.4%. Sustainable development goals (SDG) had focused to overcome any kind of malnutrition by the year 2030 along with to achieve the desired aim set at international levels for reducing stunting and wasting among children under 5 years of age by the year 2025.⁶ As the assessment of the ground reality as reflected by the statistics on nutritional status of children becomes very significant in this context, the present study was conducted in the urban area of Haryana, with primary objectives to estimate the prevalence of undernutrition among children 1-3 years of age and to find the factors associated with undernutrition.

Aim

The present study was conducted to estimate the prevalence of undernutrition among children 12-36 months of age and to determine the associated factors.

METHODS

Study design duration and location

Current study is a cross-sectional study of descriptive type conducted over a period of one year commencing from March 2019 at the urban field practice area attached to the department of community medicine, Pt. B.D Sharma PGIMS, Rohtak.

Study population, tool and techniques

Children 1-3 years of age and their mothers (informants) were selected as study population. A pre-designed and pre-tested semi-structured schedule was used as a study tool. Interview based for administering pro-forma to the mothers of the study participants was the technique used for study.

Sample size determination

Sample size was calculated using the formula;

$$N = 4PQ/L^2$$

Where P=prevalence of stunting, Q=100-P and L=the allowable error. Taking prevalence of stunting as 38.4% (NFHS- 4, Rohtak urban) and L as 20% of P, the calculated sample size is 160. So the total samples of 176 subjects were included in the study taking 10% as non-responders.

Procedure

Urban field practice area attached to the department of community medicine, Pt. B. D. Sharma PGIMS, Rohtak being served by 14 anganwadi centres out of which 8 anganwadi centres were selected randomly. From each selected anganwadi centre, 22 children of 1-3 years of age group were selected by simple random sampling, thus, a sample of 176 children were included in the study.

Data were collected from children's mother on predesigned, pretested, and semistructured schedule by the interview technique by the investigator himself. The investigator conducted house to house visits, contacted them other and children; informed written consent was taken from all the mothers before initiating the interview and mothers were explained the purpose of the study. They were ensured of full confidentiality and privacy during study.

The schedule covered demographic information, breastfeeding practices, sociocultural and economic factors, and anthropometric data. After taking preliminary information at the child’s home, children were called at the anganwadi centers along with their mother and were subjected to anthropometric measurements. Those houses found locked or any child not found at three consecutive home visits at an interval of one week apart were labeled as non-responders and excluded from study; and for the replacement of non-responders, simple random sampling was done on the remaining children of the corresponding anganwadi centers.

Mothers were advised regarding food practices and their queries were answered. The subjects who were found to have the disease which cannot be controlled at the peripheral level were referred to PGIMS, Rohtak for further intervention to benefit the subject on ethical grounds, though it was not a part of the study.

RESULTS

The present study included 176 participants, more than half (55.9%) participants were girls and 44.1% were boys. Out of all the children, 60% belonged to general category while 27.1%, 11.2% and 1.8% belonged to OBC, SC and ST category respectively. More than half of the study subjects belonged to nuclear family (54.1%), 35.3% belonged to 3-generation family and only 10.6% belonged to joint family as described in (Table 1). Regarding socio-economic status, almost half (49.4%) of participants belonged to lower middle class and 27.6% to upper middle class followed by upper lower class 20.0%. Only 2.9% belonged to upper class.

In present study the prevalence of wasting was 14.1%. The prevalence of underweight was 20%. The prevalence of stunting was 24.1% (Table 2). Inverse relation between prevalence of undernutrition and educational status of mother is shown in (Table 3). Prevalence of undernutrition was statistically significantly higher in children whose mothers were less educated. Children with higher birth order (3 or more) and with low birth weight were having higher percentages of wasting, stunting, and underweight (Table 4). It was observed that

children who took supplementary nutrition regularly from AWC were less likely to be undernourished. This association was observed to be statistically significant as described in (Table 5).

Table 1: Socio-demographic profile of the study subjects (n=176).

Socio-demographic variables	N (%)
Gender	
Male	78 (44.1)
Female	98 (55.9)
Category	
General	104 (60)
OBC	48 (27.1)
SC	20 (11.2)
ST	04 (1.8)
Type of family	
Nuclear	95 (54.1)
Joint	19 (10.6)
Three-generation	62 (35.3)
Socio-economic status*	
Upper	05 (2.9)
Upper-middle	49 (27.6)
Lower-middle	87 (49.4)
Upper-lower	35 (20)

*Modified Kuppaswamy socio-demographic scale.

Table 2: Distribution of study participants according to nutritional status using WHO child growth standards (n=176).

Characteristics	N	%
Underweight		
Yes	36	20
No	140	80
Stunting		
Yes	43	24.1
No	133	75.9
Wasting		
Yes	25	14.1
No	151	85.9

Table 3: Association between nutritional status of children and mother’s education.

Characteristics	Wasting		Stunting		Underweight		Total N (%)
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Mother’s education	Yes	No	Yes	No	Yes	No	
Illiterate (n=12)	5 (42.0)	7 (58.0)	7 (58.0)	5 (42.0)	6 (50.0)	6 (50.0)	12 (100)
Primary and middle school (n=44)	7 (16.0)	37 (84.0)	12 (27.3)	32 (72.7)	11 (25.0)	33 (75.0)	44 (100)
High and senior secondary school (n=80)	11 (12.5)	69 (87.5)	19 (21.6)	61 (78.4)	16 (20.0)	64 (80.0)	80 (100)
Graduate, diploma and above (n=40)	2 (5.0)	38 (95.0)	5 (12.5)	35 (87.5)	3 (7.5)	37 (92.5)	40 (100)

Continued.

Characteristics	Wasting N (%)		Stunting N (%)		Underweight N (%)		Total N (%)
Total	25	151	43	133	36	140	176
Test of significance	X ² =13.926, df=3, p=0.001		X ² =18.525, df=3, p<0.001		X ² =24.049, df=3, p<0.001		

Table 4: Association between nutritional status of children and birth characteristics.

Characteristics	Wasting N (%)		Stunting N (%)		Underweight N (%)		Total N (%)
	Yes	No	Yes	No	Yes	No	
Birth order							
1-2	16 (11.1)	128 (88.9)	32 (22.2)	112 (77.8)	25 (17.4)	119 (82.6)	144 (100)
3 or more	9 (28.0)	23 (72.0)	11 (34.4)	21 (65.6)	11 (34.4)	21 (65.6)	32 (100)
Total	25	151	43	133	36	140	176
Test of significance	X ² =6.135, df=1, p=0.011		X ² =1.326, df=1, p=0.176		X ² =7.593, df=1, p=0.006		
Birth weight (kg)							
<2.5	6 (33.3)	12 (66.7)	8 (44.4)	10 (55.6)	9 (50.0)	9 (50.0)	18(100)
>2.5	19 (12.1)	139 (87.9)	35 (22.1)	123 (77.9)	27 (17.1)	131 (82.9)	158(100)
Total	25	151	43	133	36	140	176
Test of significance	X ² =21.554, df=1, p=0.000		X ² =19.236, df=1, p=0.000		X ² =20.122, df=1, p=0.000		

Table 5: Association between consumption of supplementary nutrition from AWC and nutritional status of children.

Characteristics	Wasting N (%)		Stunting N (%)		Underweight N (%)		Total N (%)
	Yes	No	Yes	No	Yes	No	
Supplementary nutrition from AWC							
Regular (n=91)	12 (13.2)	79 (86.8)	20 (22.0)	71 (78.0)	15 (16.5)	76 (83.5)	91 (100)
Irregular (n=76)	9 (12.0)	67 (88.0)	17 (22.4)	59 (77.6)	16 (21.0)	60 (79.0)	76 (100)
Never (n=9)	4 (44.4)	5 (55.6)	6 (66.6)	3 (33.4)	5 (56.0)	4 (44.0)	9 (100)
Total	25	151	43	133	36	140	176
Test of significance	X ² =13.926, df=2, p=0.0011		X ² =22.525, df=2, p=0.000		X ² =16.049, df=2, p=0.000		

DISCUSSION

The present study was carried out to assess nutritional status of children aged 1-3 years in the urban area of Haryana. In the present study majority (55.9%) participants were female while male contributed around 44.1% of study population. The prevalence of underweight, stunting and wasting was found to be 20%, 24.1% and 14.1% respectively. According to NFHS-4 (2015-2016, India) the prevalence of underweight, stunting and wasting was 36%, 38.4% and 21% respectively.⁷ Studies conducted by Inkane et al in Maharashtra (69.3%, 60%, 45.7%), Gopinath et al in Kancheepuram (57%, 85%, 26%) and Gladius et al in Tamil Nadu (53%, 62%, 54%) showed the prevalence of underweight, stunting and wasting respectively, which is higher as compared to our study. In our study underweight, stunting and wasting rates declined in children as there was advance in the educational status of mothers.⁸⁻¹⁰ Educated mother understands the growth needs of child and actively seeks nutritional advice and counseling.

The findings in our study reflect that mother's educational qualification is strongly associated with nutritional status of their children; (p<0.01). Mother's literacy played a protective role against malnutrition in children. This might be due to better health care practices in terms of proper exclusive breast feeding, in-time complementary feeding and quality and quantity of complementary feeding among literate mothers as compared to illiterate mothers. Similar studies by Hasan et al in Bangladesh, Dabar et al in South Delhi, David et al in Vellore and Inkane et al in Nagpur have shown that children of mothers with secondary or higher education were at lower risk of childhood malnutrition when compared with children of mothers with no education.¹¹⁻¹³ While taking children birth weight into consideration, it was observed in present study that wasting, stunting and underweight were higher among children who had history of LBW as compared to children with normal birth weight, which is found to be statistically significant (p<0.01). This is due to the fact that, as birth order of child increases, the care given to them decreases, because mothers will have to take care of more number of children, which will have a negative impact on their nutritional status.¹⁴ Hungama survey showed the

prevalence of underweight among children with low birth weight as 49.9% while that among children with a normal weight was 33.5%. Similar findings were observed in the studies conducted by David et al in Vellore, Basit et al in Udupi and Priyanka et al in Maharashtra.¹³⁻¹⁶ In present study children with higher birth order (three or more) or children belonging to a family size of three or more, had higher prevalence of wasting, stunting and underweight. Similar findings were observed in studies of Dabar et al in South Delhi and Gladius et al in Tamil Nadu, where higher birth order was significantly associated with malnutrition.^{10,12} As the family size increases there is division of resources (dietary resources), overcrowding and poor care of children which increases the chances of children to suffer from undernutrition. The present study observed that, 56% of study participants who never took supplementary nutrition from AWC were found to be underweight, 66.7% were found stunted and 44% were found wasted, while the prevalence of underweight, stunting and wasting was observed 16.5%, 22% and 13.2% respectively among children who were taking supplementary nutrition regularly from AWC. The association between consumption of supplementary nutrition from AWC and nutritional status of children were found to be statistically significant ($p < 0.01$).

Limitations

Limitation of current study was the study was conducted in urban field practice attached to only one medical college and hence it lacks generalization of results.

CONCLUSION

Every endeavor should be made to combat the outcomes of undernutrition through multipronged approach such as growth monitoring, nutritional supplementation, and nutritional rehabilitation, early diagnosis and treatment of morbidity, also present study findings reinforce the importance of proper infant and child feeding practices, appropriate maternal care, and female literacy in prevention of childhood undernutrition; and all these in the long run will improve the nutrition status of children.

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