

Original Research Article

Nutritional status of children under five year of age: a cross sectional study in rural area of Jhalawar, Rajasthan

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Received: 03 June 2019

Accepted: 16 July 2019

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ABSTRACT

Background: Adequate nutrition is essential in early childhood to ensure healthy growth and development, proper organ functions and a strong immunity. Accurate assessment of nutritional status of children is a requisite in appropriate planning and effective implementation of nutrition interventions. The objective of this study is to assess nutritional status of children under five year of age in rural area and to identify the socio-demographic factors associated with under nutrition.

Methods: A cross sectional study was conducted among children aged six months to five years in rural area of Jhalawar, Rajasthan. Nutritional status of the children was assessed by measurement of mid upper arm circumference and information like birth order of children, birth weight and number of siblings was collected using a pre-coded and semi structured questionnaire.

Results: Moderate under-nutrition was present in 16.8% children. Under-nutrition was present among 9.9% male and 24.2% female children. 38.1% children with birth weight less than 2.5 kg were under-nourished. Proportion of under-nutrition was 27.7% among children with number of siblings more than 2 while it was only 11.1% among those with 2 or less number of siblings.

Conclusions: Gender, number of siblings and birth weight of children were significantly associated with nutrition status of children.

Keywords: Nutrition, Under five, Children, Siblings, Birth weight

INTRODUCTION

Malnutrition is a serious medical condition marked by deficiency of energy, essential proteins, fats, vitamins and minerals in diet. Worldwide, Malnutrition contributes to more than one-third of all deaths of under-five aged children.¹ Currently, 195 million children aged under-five are affected by malnutrition. Of these 90% live in sub-Saharan Africa and South Asia. At least 20 million children suffer from severe acute malnutrition (SAM) and another 175 million children are undernourished.²

Malnutrition in India has been regarded as 'The Silent Emergency'. This is revealed by the fact that in India the prevalence of under-weight children is the highest in the world, and is approximately double that of Sub-Saharan Africa. In developing countries, each year approximately 2.3 million deaths among children aged 6-60 months are associated with malnutrition, which is about 41% of the total deaths in this age group.³

The 4th National Family Health Survey report showed that the under-five mortality rate in India is 32%. The percentage of children under 5 years who are stunted

(height-for age) and who are underweight (weight-for-age) are 32.5% and 31.5% respectively. The percentage of children under 5 years who are wasted (weight-for-height) and severely wasted are 20.3% and 6.5% respectively in NFHS survey report.⁴

The interaction between under-nutrition and infection can create a potentially lethal vicious cycle of worsening illness and deteriorating nutritional status. Poor nutrition in the first 1,000 days of a child's life can also lead to stunted growth, which is irreversible and associated with impaired cognitive ability and reduced school and work performance.⁵

Adequate nutrition is essential in early childhood to ensure healthy growth and development, proper organ functions, a strong immunity, and cognitive and neurological development. Economic growth and development require well-nourished populations who can acquire new skills, think critically and contribute positively to their communities.⁶

In any research on health and nutritional condition in childhood, anthropometric examination is an almost mandatory tool. The mid upper arm circumference (MUAC) is an important measurement which is often used for the assessment of nutritional status in among preschool children. In community based studies, MUAC appears to be a superior predictor of childhood based anthropometric indicators. Compared with weight for height, MUAC has a sensitivity of 24.6% and a specificity of 94.8% appears to be a better predictor of childhood mortality than is weight for height.⁷

Nutritional status plays a vital role in determining the health status particularly in children. Accurate assessment of nutritional status is a requisite in proper planning, effective implementation and evaluation of nutrition interventions. So the present study was carried out to assess nutritional status of children aged six months to five years based on measurement of mid upper arm circumference in rural area of Rajasthan and to identify the socio-demographic factors associated with under nutrition.

METHODS

A cross sectional study was carried out in children aged six months to five years enrolled at anganawadi centres in Mandawar village, the rural field practice area, of Department of Community Medicine, Jhalawar Medical College, Jhalawar. Study was conducted from December 2018 to May 2019. There are total four anganwadi centers in Mandawar Village. Total 274 children aged six months to five years were enrolled at the time of commencing the study in all four anganwadi centres. In present study, 50% of enrolled children at all four anganwadi centers were assessed for nutritional status. Hence, a sample size of 137 was selected using simple random sampling method. A pre-coded, pretested and

semi structured questionnaire was used for data collection. Information like birth order of children, birth weight and number of siblings was taken from the records available at anganwadi centers and from attenders (guardians) of children after taking written consent. Mid upper arm circumference of children was measured in centimetres using MUAC (mid upper arm circumference) Tap. MUAC was measured with the child's left arm at right angle (90°) to the body. The distance between the inferior border of the acromion and the tip of the olecranon process was measured and the mid-point on the child's arm was marked. The tape was then placed horizontally at the level of the mid-point without compressing the tissues and a circumference measurement was taken to the nearest 0.1 cm. Nutritional status of the children was assessed using WHO (2007) recommended age and sex specific cut off points for MUAC (cm).^{4,8} For assessment of nutritional status of the children, MUAC $\leq 2SD$ was considered as moderate under-nutrition and $\leq 3SD$ as severe under-nutrition.^{4,9} Approval was taken from Institutional Ethics Committee before commencing the study.

Data was entered in MS excel 10 and analyzed using appropriate statistical tests. P value <0.05 was considered statistical significant.

RESULTS

Total 137 children were assessed in present study. Out of them 71 (51.8%) were males and 66 (48.2%) were females. Majority were of birth order 2nd (38.7%) followed by birth order 1st (32.8%). 21 (15.3%) children were born with low birth weight. Proportion of children with 2 or less number of siblings was 65.7% (Table 1).

Table 1: Distribution of study participants (n=137).

Characteristics	Variables	Number	%
Gender	Male	71	51.8
	Female	66	48.2
Birth order	1	45	32.8
	2	53	38.7
	3	26	19.0
	≥ 4	13	9.5
Birth weight (in kg)	<2.5	21	15.3
	≥ 2.5	116	84.7
Number of siblings	≤ 2	90	65.7
	>2	47	34.3

Table 2: Nutritional status of children (n=137).

Nutritional status	Number	%
Normal	114	83.2
Moderate under-nutrition	23	16.8
Severe under-nutrition	0	0.0

Out of 137 children, 114 (83.2%) were found with normal nutritional status while moderate under-nutrition

was present in 23 (16.8%) children. None of the children was found with severe under-nutrition (Table 2).

Under-nutrition was present among 9.9% male and 24.2% female children and this gender difference was statistically significant ($p < 0.05$) as depicted in Table 3.

Association of nutritional status with birth weight of children is shown in Table 4. Proportion of under-nutrition was higher among children with birth weight less than 2.5 kg (38.1%) as compared to those with birth weight ≥ 2.5 kg (12.9%) and this association was statistically significant ($p < 0.05$).

Table 5 depicts association of nutritional status with birth order of children. Proportion of under-nutrition was increased with increase in birth order of children. However, the difference was not statistically significant ($p > 0.05$).

Proportion of under-nutrition was 27.7% among children with number of siblings more than 2 while it was only 11.1% among those with 2 or less number of siblings as depicted in Table 6 and the association was also statistically significant ($p < 0.05$).

Table 3: Association of nutritional status with gender of study participants (n=137).

Gender	Nutritional status		Total N (%)	P value
	Normal (n=114) N (%)	Under-nutrition (n=23) N (%)		
Male	64 (90.1)	7 (9.9)	71 (100)	0.02
Female	50 (75.8)	16 (24.2)	66 (100)	

Table 4: Association of nutritional status with birth weight of children (n=137).

Birth weight (kg)	Nutritional status		Total N (%)	P value
	Normal (n=114) N (%)	Under-nutrition (n=23) N (%)		
<2.5	13 (61.9)	8 (38.1)	21 (100)	0.004
≥ 2.5	101 (87.1)	15 (12.9)	116 (100)	

Table 5: Association of nutritional status with birth order of children (n=137).

Birth order	Nutritional status		Total N (%)	P value
	Normal (n=114) N (%)	Under-nutrition (n=23) N (%)		
1	40 (88.9)	5 (11.1)	45 (100)	0.29
2	45 (84.9)	8 (15.1)	53 (100)	
3	20 (76.9)	6 (23.1)	26 (100)	
≥ 4	9 (69.2)	4 (30.8)	13 (100)	

Table 6: Association of nutritional status with no of siblings (n=137).

No. of siblings	Nutritional status		Total N (%)	P value
	Normal (n=114) N (%)	Under-nutrition (n=23) N (%)		
≤ 2	80 (88.9)	10 (11.1)	90 (100)	0.01
>2	34 (72.3)	13 (27.7)	47 (100)	

DISCUSSION

Present study was carried out to assess nutritional status of children aged six months to five years based on measurement of mid upper arm circumference. Mid upper arm circumference is one of the measure of protein energy malnutrition. Nutritional status of under five children is of utmost importance, since the foundation of lifetime growth and development, strength and rational vitality is laid during this period.

In present study, 83.2% children were found with normal nutritional status while moderate malnutrition was present in 16.8% children. The prevalence of moderate malnutrition in under-five in our study is in contrast to study among preschool children by Bisai et al in North 24 Parganas, West Bengal, India where 43.9% children were moderately undernourished.⁹ Nyaruhucha et al reported that 35% of the children were moderately undernourished in MUAC measurements in their study.¹⁰

Based on mid upper arm circumference measurement, none of the children was found with severe malnutrition in our study. Similar to our study, there was no severe malnutrition among children in respect to MUAC measurement in study by Sarkar et al in Darjeeling District of West Bengal, India.⁴ In contrast to our study, 3.5% and 25.9% of the children were severely undernourished in study by Bisai et al and Nyaruhucha et al.^{9,10} 53.9% of the children were undernourished based on mid upper arm circumference measurement, of which 11.2% had severe acute malnutrition in study by Gupta et al in Delhi.¹¹

In present study, under-nutrition was present among 9.9% male and 24.2% female children and this gender difference was statistically significant. In contrast to our study, There was no significant difference ($p > 0.05$) between nutritional status and sex of the child in study by Nyaruhucha et al and Anurag et al.^{11,12}

Under-nutrition was significantly higher among children with birth weight less than 2.5 kg in present study. This finding is in accordance to study by Purohit et al, Mamulwar et al and Ghane et al.^{3,13,14}

In present study, proportion of under-nutrition was increased with increase in birth order of children. However, the difference was significantly not associated. In contrast to our study, nutrition status of children was significantly associated with birth order in study by Purohit et al.³

Proportion of under-nutrition was significantly higher among children with number of siblings more than 2 in our study. Similar finding was reported by Meena et al in their study in Kolar area of Madhya Pradesh.¹⁵

CONCLUSION

Findings of the study indicate that gender, number of siblings and birth weight of children were significantly associated with nutrition status of children.

Recommendations

Adequate ante natal care, restricting the family size and providing proper care to female child can be considered as important measures to improve the nutritional status of children.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Jain M, Bhati JS, Jain M, Kumar V, Garg K, Gupta PK. Nutritional status of children under five year of age: a cross sectional study in rural area of Jhalawar, Rajasthan. *Int J Community Med Public Health* 2019;6:3321-5.