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RESEARCH ARTICLE

A STUDY OF ANTHROPOMETRIC FAILURE AMONG UNDER – 5 CHILDREN REGISTERED AT ANGANWADI CENTRES OF ALIGANJ, DELHI

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ABSTRACT

Introduction: Poor quality of infant and young child feeding practices are the major cause of malnutrition among the under – 5 children of any society. The composite index of anthropometric failure (CIAF) is a recent, and relatively robust criterion because it envisages all the parameters for estimation of nutritional status of a child.

Objectives: To determine anthropometric failure and its socio-demographic determinants among under – 5 children registered at Anganwadi centres.

Methods: A cross-sectional study was done among all the children aged 6 months – 5 years registered in all the seven Anganwadi centres of Aliganj, Delhi. Anthropometric measurements were done for all study participants using standard tools.

Results: A total of 206 children aged 6 months – 5 years participated in the study. Anthropometric failure was seen (using the CIAF criteria) in 119 (57.8%) study participants. The most common form of anthropometric failure was stunting with underweight. On bivariate analysis, it was found that lower education status of mother, and lower socio-economic status were significantly associated with anthropometric failure in the study participants, though on multivariate logistic regression analysis only lower socio-economic status was associated with anthropometric failure.

Conclusion: Anthropometric failure is common among under – 5 children and requires promotion and adoption of correct infant and young child feeding practices.

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INTRODUCTION

Adequate nutrition during infancy and childhood is fundamental to a child's full developmental potential (Dewey, 2003) whereas poor quality of infant and young child feeding practices are the major cause of malnutrition among the under – 5 children of any society. (World Health Organization, 2001) As per UNICEF, under – 5 mortality rate (U5MR) is the best single indicator of social development and well-being rather than gross national product (GNP) per capita, as U5MR reflects income, nutrition, health education, and basic education. (http://www.unicef.org/sowc08/docs/sowc08_panels.pdf) In India, common morbidities among children are fever, acute respiratory infection (ARI), diarrhoea, and malnutrition. (http://www.rchiips.org/nfhs/report.shtml) The prevalence of underweight among children in India is among the highest in the world, affecting nearly 60 million children. (Gragnolati *et al*., 2005) Malnutrition can be assessed in a number of ways, among which composite index of anthropometric failure (CIAF) is the most recent, and relatively robust because it envisages all the parameters for estimation of nutritional status of a child. A lag in any parameter of nutritional status is classified as anthropometric failure. The conventional indices such as underweight, wasting, and stunting reflect distinct biological processes and individually cannot measure the overall prevalence of undernutrition, as they overlap; an underweight child may also be stunted and/ or wasted. This model initially proposed by Svedberg (Svedberg, 2000) and further modified by Nandy *et al*. (2005) counts all children with wasting and/ or stunting and/ or underweight. India's Integrated child development services (ICDS) program continues to be the world's most unique early childhood development program, which is being satisfactorily operated since more than 3 decades of its existence. (Three Decades of ICDS - An Appraisal, 2006) ICDS is the foremost symbol of India's commitment of breaking the vicious cycle of malnutrition, morbidity, reduced learning capacity and mortality, on the other. (http://www.wcd.nic.in/icds.html) The scheme benefits more than 8.4 crore under 6 children in the country through its extensive network of Anganwadis. (Press Information Bureau, Ministry of Women and Child Development, 2014) The Anganwadis offer a unique platform for nutritional supplementation and growth monitoring of

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children. With this background, we planned to conduct the current study to determine anthropometric failure and its socio-demographic determinants among under – 5 children registered at Anganwadi centres.

MATERIALS AND METHODS

It was a community based cross – sectional study which was carried out in Aliganj, which is one of the field practice areas of Department of Community Medicine, VMMC and Safdarjung Hospital. The area has a total of seven Anganwadi centres, all of which were included in the study. A total of 361 under – 5 children are registered in these seven Anganwadis. Among these, all children aged 6 months – 5 years who were available at the Anganwadi centre on the day of data collection were eligible for inclusion in the study. Data collection was done over a period of 7 days, one day at each Anganwadi centre. The study period was Nov – Dec 2016.A preformed, semi-structured interviewer administered questionnaire was used to collect data from guardians of study participants on the family's socio-demographic profile. Weight of the study participants was measured using digital weighing machine (SECA 874 U digital scale), and height for study participants between 2 – 5 years was measured using stadiometer (SECA 213 Stadiometer). Length was measured in case of study participants aged 6 months – 2 years using an infantometer. Mid Upper Arm Circumference (MUAC) was also measured with the help of a non-stretchable tape. An MUAC of < 12.5 cm was considered undernutrition. (United Nations Children Fund Technical Bulletin No. 13 revision 2)The permission to conduct the study was obtained from the Institution Ethics Committee, VMMC and Safdarjung Hospital, New Delhi. The Anganwadi workers were informed about the purpose of the study and permission was sought from them for the same. The Anganwadi workers informed the guardians of the eligible children about the purpose of the study, and asked them to accompany their ward to the Anganwadi centre on the pre-decided day of data collection. Written informed consent was taken from guardians of all the eligible children before including them in the study. The data was entered in Microsoft Office Excel sheet and analyzed using licensed SPSS version 21 (IBM, Illinois, USA). Descriptive analysis was done to calculate proportions, mean and standard deviation. Difference between proportions was assessed using chi square test/ Fisher's exact test. All the variables found to be associated with anthropometric failure with a p-value of < 0.2 on bivariate analysis were further analyzed for significant associations using multivariate logistic regression. A p-value of < 0.05 was considered significant.

RESULTS

A total of 206 children aged 6 months – 5 years participated in the study. Table 1 shows the socio-demographic profile of the study participants. Majority of the study participants were male (112; 54.4%). The age of study participants was normally distributed, with the mean age being 2.7 years (SD 1.1). The families of most of the study participants was nuclear (162; 78.6%), and had up to 2 children (149; 72.3%). Most study participants belonged to upper lower (109; 52.9%) and lower middle (80; 38.8%) socio-economic status as per modified Kuppuswamy socio-economic status scale (income update 2016). Almost two-third (133; 64.6%) study participants were delivered at a health facility. The birth order of most study participants was 2 (100; 48.6%) followed by 1 (81; 39.3%). All study participants were completely immunized for age (206; 100%). The anthropometric parameters of the study participants are mentioned in Table 2. The MUAC was less than 12.5 cm in 15 (7.3%) study participants. Anthropometric failure was seen (using the CIAF criteria) in 119 (57.8%) study participants. The most common form of anthropometric failure was stunting with underweight, i.e., Group E (36; 17.5%), followed by stunting alone, i.e., Group F (30; 14.6%). Among the 119 study participants with anthropometric failure, most were male (67; 56.3%), and aged 2 – 3 years (35; 29.4%). Bivariate analysis revealed that socio-economic status and education status of mother were associated with anthropometric failure in the study participants (Table 3). A greater proportion of study participants who belonged to families of lower socio-economic status, and whose mothers were educated up to middle school had anthropometric failure (p-value < 0.05).For multivariate logistic regression, three variables were included – place of birth, education status of mother, and socio-economic status of family of study participant. It was found that only socio-economic status was significantly associated with anthropometric failure in the study participant (p = 0.030), and not place of birth (p = 0.088) or education status of mother (p = 0.086).

Table 1. Socio-demographic profile of study participants (N = 206)

Sl. No.	Socio-demographic characteristic of study participant	Number (%)
1.	Sex	
	Male	112 (54.4)
	Female	94 (45.6)
2.	Age	
	6 months – 1 year	15 (07.3)
	1 – 2 years	51 (24.7)
	2 – 3 years	57 (27.7)
	3 – 4 years	53 (25.7)
	4 – 5 years	30 (14.6)
3.	Type of family	
	Nuclear	162 (78.6)
	Joint	44 (21.4)
4.	Education status of mother	
	Up to middle school	128 (62.1)
	Beyond middle school	78 (37.9)
5.	Education status of father	
	Up to middle school	86 (41.7)
	Beyond middle school	120 (58.3)
6.	Occupation of mother	
	Housewife	198 (96.1)
	Employed	08 (03.9)
7.	Occupation of father	
	Unemployed	06 (02.9)
	Employed	200 (97.1)
8.	Socio-economic status of family	
	Upper	01 (00.5)
	Upper middle	15 (07.3)
	Lower middle	80 (38.8)
	Upper lower	109 (52.9)
	Lower	01 (00.5)
9.	Number of children in family	
	1	49 (23.8)
	2	100 (48.5)
	3	47 (22.8)
	More than 3	10 (04.9)
10.	Birth order	
	1	81 (39.3)
	2	100 (48.5)
	3	20 (09.7)
	More than 3	5 (02.5)
11.	Place of birth	
	Health facility	133 (64.6)
	Home	73 (35.4)
12.	Immunization status	
	Completely immunized for age	206 (100.0)

Table 2. Anthropometric parameters of study participants (N = 206)

S. No.	Anthropometric parameters of study participant	Number (%)
1.	Mid upper arm circumference	
	< 11.5 cm	02 (01.0)
	11.5 to 12.4 cm	13 (06.3)
	12.5 to 13.4 cm	24 (11.7)
	≥ 13.5 cm	167 (81.1)
2.	CIAF criteria	
i.	Normal nutrition (Group A)	87 (42.5)
ii.	Anthropometric failure	119 (57.8)
	Wasting alone (Group B)	09 (04.4)
	Wasting + Undernutrition (Group C)	23 (11.2)
	Wasting + Undernutrition + Stunting (Group D)	18 (08.7)
	Stunting + Undernutrition (Group E)	36 (17.5)
	Stunting alone (Group F)	30 (14.6)
	Underweight alone (Group Y)	03 (01.5)

Table 3. Association between socio-demographic characteristics and anthropometric failure among study participants (N = 206)

Sl. No.	Socio-demographic characteristic of study participant	Anthropometric failure		p-value
		Present n (%)	Absent n (%)	
1.	Sex			0.572
	Male	67 (59.8)	45 (40.2)	
	Female	52 (55.3)	42 (44.7)	
2.	Age			0.698
	6 months – 1 year	09 (60.0)	06 (40.0)	
	1 – 2 years	31 (60.8)	20 (39.2)	
	2 – 3 years	35 (61.4)	22 (38.6)	
	3 – 4 years	26 (49.1)	27 (50.9)	
	4 – 5 years	18 (60.0)	12 (40.0)	
3.	Type of family			0.731
	Nuclear	95 (58.6)	67 (41.4)	
	Joint	24 (54.5)	24 (45.5)	
4.	Education status of mother			0.004
	Up to middle school	84 (65.6)	44 (34.4)	
	Beyond middle school	35 (44.9)	43 (55.1)	
5.	Education status of father			1.000
	Up to middle school	50 (58.1)	36 (41.9)	
	Beyond middle school	69 (57.5)	51 (42.5)	
6.	Occupation of mother			0.724^
	Unemployed	115 (58.1)	83 (41.9)	
	Employed	04 (50.0)	04 (50.0)	
7.	Occupation of father			0.699^
	Unemployed	03 (50.0)	03 (50.0)	
	Employed	116 (58.0)	84 (42.0)	
8.	Socio-economic status of family			0.000*^
	Upper	00 (00.0)	01 (100.0)	
	Upper middle	03 (20.0)	12 (80.0)	
	Lower middle	40 (50.0)	40 (50.0)	
	Upper lower	75 (68.8)	34 (31.2)	
	Lower	01 (100.0)	0 (00.0)	
9.	Number of children in family			1.000
	Up to 2	86 (57.7)	63 (42.3)	
	More than 2	33 (57.9)	24 (42.1)	
10.	Birth order			0.527
	Up to 2	103 (56.9)	78 (43.1)	
	More than 2	16 (64.0)	09 (36.0)	
11.	Place of birth			0.105
	Health facility	71 (53.4)	62 (46.6)	
	Home	48 (65.8)	25 (34.2)	

* p-value < 0.05; ^ Fisher's Exact test

DISCUSSION

The prevalence of anthropometric failure in the present study was found to be high (almost 60%), similar to the studies done in other parts of the country (Dewan *et al*., 2016; Dhok and Thakre, 2016; Boregowda *et al*., 2015; Dasgupta *et al*., 2014; Solanki *et al*., 2014; Shit *et al*., 2012; Mandal and Bose, 2009), though the most common category of anthropometric failure was variable. Nevertheless, the results highlight that anthropometric failure is affecting a large proportion of our under – 5 children. On bivariate analysis, our study found that lower education status of mother, and lower socio-economic status were significantly associated with anthropometric failure in the study participants, though on multivariate logistic regression analysis only lower socio-economic status was associated with anthropometric failure. Dhok *et al*. (Boregowda *et al*., 2015) had also found that lower socio-economic status and illiteracy of mother were significantly associated with anthropometric failure, while Dasgupta *et al*. (2014) and Shit *et al*. (2012) reported that low maternal education was associated with anthropometric failure. The studies by Dewan *et al*. (2016) and Shit *et al*[17] also found a significant association of higher number of siblings and high birth order with anthropometric failure, which was not seen in our study. This may be attributed to the fact that in both these studies, almost one-third of the study participants had more than 3 siblings, while in our study less than 5% of the study participants had more than 3 siblings.

Our study helped to unravel the burden of anthropometric failure in under – 5 children of our study area. The guardians of all the study participants who were found to have anthropometric failure were provided nutritional counselling at our UHTC in the area. The Anganwadi workers were also counselled to provide supplementary nutrition as per the ICDS norms for undernourished children, and measure their anthropometric parameters regularly. The study had a few limitations too. It was done only among under – 5 children registered at Anganwadi centres, and hence the results are not generalizable to all the under – 5 children of the area. CIAF uses all the three criteria, weight for age (WA), height for age (HA) and weight for height (WH) criteria and hence using this, greater percentage of children are labelled with undernutrition. Determination of overall burden has implications for resource allocation for dealing with child undernutrition. Though the Integrated child development services (ICDS) program provides nutritional services to more than 8 crore pre-school children, the problem of undernutrition is still grave in our country. Results from the fourth round of National Family Health Survey (NFHS) 2012-14 is available for 20 states, and the percentage of pre-school children who are underweight is still about one-third. (http://rchiips.org/nfhs/factsheet_NFHS-4.shtml) The coverage of supplementary nutrition through ICDS scheme has been relatively high (National Institute of Public Cooperation and Development, 2006), though the quality and number of days for which supplementary nutrition is provided remain matters of concern. (Programme Evaluation Organisation, Planning Commission, Government of India, 2011) There is need to improve service delivery under ICDS, as well as infant and young child feeding (IYCF) practices among the caregivers. There is need to promote exclusive breastfeeding, begin complementary feeding at 6 months of age, and feed adequate as well as nutritious food to children to curb the menace of child undernutrition in the country.

Conflict of interest

None

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