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Original Article

Nutrition Section

Nutritional Status of School Age Children in Urban Slum Area in Vijayawada and Guntur

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ABSTRACT

Introduction: Nutritional deficiency may result in adverse health consequences. Socio-cultural practices, financial condition, awareness of parents and local factors influence the nutritional status. Malnutrition is one of the leading health issues in India.

Aim: To assess the nutritional status of school age children and the influence of socioeconomic status on nutrition.

Materials and Methods: A community based cross-sectional study was conducted among 208 numbers of school children (4-14 years) in Guntur and Vijayawada slum areas during July and August 2018. Semi-structured questionnaire was used to collect anthropometric and general data. Anthropometric measurements such as weight in Kg and height in cm were recorded. Chi-square test, unpaired t-test and Multivariate analysis were used to assess nutritional status at 5% level of significance.

Results: The prevalence of stunted children (low height for age), Wasted children (low BMI for age) were 46.63% and 48.08%, respectively. The percentage of children with underweight (low weight for age), overweight (high BMI for age) were 68.27% and 4.80%, respectively. 53.85% underweight children belonged to lower socioeconomic status. No difference in prevalence was observed among boys and girls for stunting and underweight ($p>0.05$). The mean heights of normal and stunted children were significantly different ($p<0.01$). The mean weights of normal and underweight were significantly different ($p<0.01$). The mean BMIs of normal and wasted children were significantly different ($p<0.01$).

Conclusion: Both boys and girls had equal prevalence of malnutrition. Prevalence of stunting, underweight and wasting were more than that of national prevalence. Underweight are significantly high in low socio-economic status and nuclear family.

Keywords: Anthropometry, Family type, Low socioeconomic status, Malnutrition, Multivariate analysis, Stunting, Wasting

INTRODUCTION

Foundation for adequate growth and development is laid during childhood and adolescence. School age is a dynamic period for physical growth and mental development of the child. Nutritional deficiency may result in adverse health consequences [1]. Malnutrition has been an important health problem in developing countries but the impact is more in country like India with large population and variety of socio-cultural practices [2,3].

Despite satisfactory achievement in economic progress, India has failed to secure a better nutritional status of majority of children in the country. The prevalence of underweight children is on rise among the poor households with wide regional differentiation [4]. There is a strong evidence that poor growth is associated with impaired physical development, slower cognitive development and may lead to serious health impairments in later part of life, reducing quality of life of individual [5,6]. Childhood obesity is a chronic nutritional disease condition adversely affecting health and well-being of children [7-9].

The poor sanitation in the slums and low socio-economic status of parents perpetuate a vicious cycle of malnutrition [10]. Children living under such conditions are at high risk for health and nutritional problems [5]. Inadequate food and infections are two preventable factors for growth deficits in developing countries. Anthropometry is most useful and accepted tool for assessing the nutritional status of children [11]. Heights for age, weight for age, BMI and mid arm circumference are the standard tools of anthropometric measurement for nutritional status.

Nutritional status plays an important role and determines the further growth and quality of life of the children [1]. The national family health survey (NFHS 3&4) has shown that the prevalence of underweight is about 53% of children from rural areas and varies across states [6]. Prevalence of stunting varies from 37.9 % to 70.7% where as prevalence of wasting varies from 3.8% to 8.1% in different states of India [11]. Literatures expressing data of nutritional status of school going children and adolescent are meagre. The authors aimed to study the nutritional status of school going children in urban slum areas. The objectives of the study are to assess anthropometry of the school children of urban slum areas. To estimate prevalence of stunted, wasted, underweight and obesity and the influence of socio-economic status and education of parents on nutrition.

MATERIALS AND METHODS

This was a community based cross-sectional study and conducted during July and August 2018, among school going children (age 4-14 years) in slum areas of Guntur and Vijayawada, on either sides of the river Krishna with an approximate population of 5000 each, were selected as these areas have been more prone for flood, rains, poor sanitation and frequent sewage contaminations. Ethical Committee had cleared this study no. NRIAS/IEC/394/2018. Teachers, parents and guardians were informed about the study objectives and consent was obtained prior to the study.

Inclusion criteria: All students in the age of 4-14 yeas were included in the study.

Exclusion criteria: Students who were not present for 2 consecutive visits, parents not co-operating to share information and students ill during or 2 weeks prior to the study.

A total of 208 children were assessed during this period. Power of the study was 97.5; calculated with Altmans nomogram, using prevalence of underweight 53% [6], Sample size=208, Level Of Significance (LOS)=5% and standardised difference=1.08.

A semi-structured questionnaire [1,5,6] was drafted in English and local (Telugu) language. Questionnaire was used to collect information on family characteristics like type of family, education and occupation of parents and information on individual characteristics like; sex and eating habits. Age of the child was obtained from school records. Anthropometric measurements like weight in Kg and

height in cm were recorded. Height was measured to the nearest 0.1 cm with non-stretchable tape, fixed to the vertical wall. Weight was measured with standard weighing balance. Pallor, oedema and frequency of illness were also ascertained.

STATISTICAL ANALYSIS

Master chart was prepared and data were analysed in Microsoft excel. For nutritional assessment, BMI for age, height for age, weight for age were used. Stunting, underweight and wasting were assessed by values 2SD (standard deviation) below the WHO reference values and were taken as markers of under nutrition [12-14]. Unpaired t-test was used for quantitative data like height, weight; BMI and Chi-square test was used to compare prevalence at 5% level of significance. Multivariate analysis was used for association of different factors with nutritional status.

RESULTS

In this study, majority of parents (68.75% of father and 75% mother) were illiterate. Majority of children (75%) belonged to lower socio-economic class; 45.67% (95) were males and 54.33% (113) were females. Among the children observed; 63.54%, 24.52%, 11.54% were Hindu, Christians and Muslims, respectively. Pallor, spooning of nails and oedema were observed in 26.9%, 2.4%, 0.48% children, respectively.

There were significant differences (p<0.01); between the height of normal and stunted children [Table/Fig-1], weight of normal and underweight children [Table/Fig-2], BMI of normal and children with wasting [Table/Fig-3].

DISCUSSION

In the present study, 208 children were observed and the sample size was similar to the sample size of study conducted in Cachar district of Assam [1]. Majority of stunted children were observed in 6 to 8 years of age [Table/Fig-1] whereas, majority of underweight children were in the age of 6 to 11 years. Majority of children with low BMI were found among 6 to 10 years of age. These observations are similar to the study of Srivastava A et al., [6]. The overall prevalence of stunted children is 46.63% and is more than prevalence reported

Age (year)	Total (%) N=208	Normal (%) N=111	Stunted (%) N=97	Mean in Normal±SE	Mean in stunted±SE	t-value	p-value
4	3 (1.44)	1 (0.9)	2 (2.06)	97	85.5±2.12	-	-
5	2 (0.96)	1 (0.9)	1 (1.03)	120	102	-	-
6	28 (13.46)	10 (9.01)	18 (18.56)	113±3.05	100.8±3.52	9.198	<0.01
7	35 (16.83)	13 (11.71)	22 (22.56)	118.5±4.70	106.7±4.64	7.240	<0.01
8	37 (17.79)	18 (16.22)	19 (19.59)	121.9±3.30	113.7±2.42	8.589	<0.01
9	28 (13.46)	19 (17.12)	9 (9.28)	127.7±4.19	115.8±3.19	7.524	<0.01
10	29 (13.95)	29 (26.13)	0	128.83±6.50	-	-	-
11	20 (9.62)	7 (6.31)	13 (13.4)	141.4±4.50	128±3.21	7.753	<0.01
12	7 (3.36)	4 (3.6)	3 (3.09)	148±8.08	136.7±2.88	2.275	>0.05
13	8 (3.84)	4 (3.6)	4 (4.12)	146.8±2.36	136±3.36	5.227	<0.01
14	11 (5.29)	5 (4.5)	6 (6.19)	153.2±4.08	138.7±6.37	4.381	<0.01

[Table/Fig-1]: Mean observed Height for age of normal and stunted children.

Age (Year)	Total (%) N=208	Normal (%) N=66	Under weight (%) N=142	Mean in normal±SE	Mean in Under weight±SE	t-value	p-value
4	3 (1.44)	0	3 (2.11)	0	10.67±1.20	-	-
5	2 (0.96)	1 (1.52)	1 (0.71)	17	13	-	-
6	28 (13.46)	7 (10.61)	21 (14.79)	19.6±1.78	14±0.32	4.911	<0.01
7	35 (16.83)	6 (9.09)	28 (20.42)	22.4±1.13	15.5±0.33	8.346	<0.01
8	37 (17.79)	10 (15.15)	27 (19.01)	23.6±0.98	17.2±0.69	4.979	<0.01
9	28 (13.46)	9 (13.64)	19 (13.38)	25.7±0.86		8.089	<0.01
10	29 (13.95)	9 (13.64)	20 (14.08)	29.0±1.18	19.2±0.37	7.304	<0.01
11	20 (9.62)	7 (10.61)	13 (9.15)	37.1±1.13	20.8±0.54	13.384	<0.01
12	7 (3.36)	3 (4.55)	4 (2.84)	40.7±3.48		4.201	<0.01
13	8 (3.84)	7 (10.61)	1 (0.71)	39.9±1.94	22.1±0. 61	-	-
14	11 (5.29)	7 (10.61)	4 (2.82)	41.7±1.41	27.3±1.11	3.596	<0.01

[Table/Fig-2]: Mean observed weight for age of normal and under weight children.

Age (year)	Total (%) N=208	Normal (%) N=98	Wasted (%) N=100	Mean BMI in Normal±SE	Mean BMI in Wasted±SE	t-value	p-value
4	3 (1.44)	2 (2.04)	1 (1)	13.99±0.18	11.9	-	-
5	2 (0.96)	0	2 (2)	-	12.17±0.35	-	-
6	28 (13.46)	14 (14.29)	13 (13)	14.49±0.20	12.17±0.24	7.411	<0.01
7	35 (16.83)	15 (15.31)	18 (18)	14.310.29	12.43±0.14	6.38	<0.01
8	37 (17.79)	14 (14.29)	21 (21)	15.2±0.32	12.01±0.54	4.47	<0.01
9	28 (13.46)	13 (13.27)	15 (15)	15.14±0.35	12.68±0.19	6.318	<0.01
10	29 (13.95)	11 (11.22)	17 (17)	15.62±0.38	12.56±0.22	7.525	<0.01
11	20 (9.62)	10 (10.2)	8 (8)	16.09±0.62	12.65±0.27	7.525	<0.01
12	7 (3.36)	3 (3.06)	4 (4)	18.34±1.5	14.15±0.34	3.184	<0.01
13	8 (3.84)	5 (5.1)	1 (1)	19.24±0.94	14.22	-	-
14	11 (5.29)	11 (11.22)	0	18.42±0.87	-	-	-

[Table/Fig-3]: Mean observed BMI for age of children with normal and wasting.

by Srivastava A et al., and Fazili A et al., (a study from Kashmir, India) [6,15]. Observations of height and weight in the present study are similar to the studies conducted by Fazili A et al., [15]. The percentage of wasted children is more compared to the study of Dhingra R and Bhat A, [16]. In the present study the prevalence of underweight is more when compared to study of Olivares S et al., [17]. Pallor observed in the present study is less than reported by Osei A et al., (a study from Garhwal, India) and Sundaresan S et al., (a study from Tamil Nadu) [18,19].

In the present study, the low socio-economic class had highest prevalence of underweight, stunted and wasted children [Table/Fig-4,5]. Similar results had been reported by Gopaldas T et al., [20]. Prevalence of underweight was significantly high (p<0.01) in low socio-economic children. The highest prevalence of underweight, stunted and wasted children belonged to nuclear family [Table/Fig-4,6]. However prevalence of under weight was significantly higher (p=0.028). Parents' education played important role on nutritional status of children [Table/Fig-4,7,8]. Malnutrition of children was common among illiterate parents but Fathers education was significantly associated (p<0.05). This observation contradicts the observation of Srivastava A et al., [6]. In this scenario, the probable explanation may be family income and father's education. Various studies reported that parent's education has been a key element in improving children's nutritional status [6,20].

Logistic regression for height		
Chi-squared		**6.814**
df		5
Significance level		p=0.2349
Odds ratios and 95% Confidence intervals		
Variable	**Odds ratio**	**95% CI**
Family type	0.3137	0.0876 to 1.1231
Fathers' education	0.8865	0.4834 to 1.6257
Mothers' education	1.8166	0.8061 to 4.0937
Socioeconomic status (SES)	0.8904	0.3903 to 2.0314
Gender	1.2914	0.7367 to 2.2639
Logistic regression for weight		
Chi-squared		14.200
df		5
Significance level		p=0.0144
Odds Ratios and 95% Confidence intervals		
Variable	**Odds ratio**	**95% CI**
Family type	0.1297	0.0144 to 1.1689
Fathers' education	1.3336	0.7096 to 2.5064
Mothers' education	1.8013	0.7735 to 4.1948
Socio-economic status (SES)	0.8080	0.3365 to 1.9400
Gender	0.7680	0.4164 to 1.4165
Contingency table for Hosmer and Lemeshow test		
Logistic regression for BMI		
Chi-squared	**3.630**	
df	5	
Significance level	p=0.6038	
Odds ratios and 95% Confidence intervals		
Variable	**Odds ratio**	**95%CI**
Family type	1.7419	0.5911 to 5.1332
Fathers' education	1.4424	0.7820 to 2.6604
Mothers' education	0.5394	0.2460 to 1.1826
Socio-economic status (SES)	1.4386	0.6290 to 3.2902
Gender	1.1689	0.6699 to 2.0397

[Table/Fig-4]: Multivariate analysis of factors affecting nutrition.

Socioeconomic status	Underweight (%) N=142	Stunted (%) N=97	Wasted (%) N=100
Lower class	112 (78.87)	75 (77.32)	78 (78)
Lower middle	26 (18.34)	19 (19.59)	18 (18)
Middle class	3(2.11)	3 (3.09)	3 (3)
Upper class	1 (0.71)	0	1 (1)
Chi square	13.27	0.5	0.94
df	2	2	2
p	**<0.01**	0.78	0.624

[Table/Fig-5]: Socioeconomic status and malnutrition.

Family type	Underweight (%) N=142	Stunted (%) N=97	Wasted (%) N=100
Nuclear	132 (92.96)	89 (91.75)	96 (96)
Joint	8 (5.63)	7 (7.22)	3 (3)
Extended	2 (1.41)	1 (1.03)	1 (1)
Chi square	4.78	5.19	1.43
df	1	1	1
p	**0.028**	0.075	0.488

[Table/Fig-6]: Family type and malnutrition.

Mother's education	Under weight (%) N=142	Stunted (%) N=97	Wasted (%) N=100
Illiterate	112 (78.87)	76 (78.35)	74 (74)
Primary education	24 (16.9)	17 (17.53)	20 (20)
Secondary education	5 (3.52)	3 (3.09)	4 (4)
Graduation	1 (0.7)	1 (1.03)	2 (2)
Chi square	2.65	2.16	1.63
df	2	2	2
p	0.266	0.339	0.443

[Table/Fig-7]: Mothers' education and malnutrition.

Father's education	Under weight (%) N=142	Stunted (%) N=97	Wasted (%) N=100
Illiterate	102 (71.83)	69 (71.13)	69 (69)
Primary education	30 (21.27)	20 (20.62)	22 (22)
Secondary Education	9 (6.34)	6 (6.19)	9 (9)
Graduation	1 (0.7)	2 (2.06)	0
Chi square	9.73	10.04	0.24
df	2	2	2
p	**0.008**	**0.007**	0.888

[Table/Fig-8]: Fathers' education and malnutrition.

Limitation(s)

This study is limited by sample selection. Structured questionnaire with scoring might have generated more useful result and information. Inter-group comparison might have focused on local factors affecting nutritional status of school going children.

As these slum areas are more prone to rain, flood, epidemics and poor sanitation, effects of these parameters on nutritional status may be a scope for further study.

CONCLUSION(S)

From the present study, it may be concluded that the children in the slum areas had more malnutrition. There was almost equal prevalence of malnutrition among boys and girls. The prevalence of underweight and wasting were more relevant than that of stunting.

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