

SOCIODEMOGRAPHIC CORRELATES OF MALNUTRITION AMONG SCHOOL AGED CHILDREN IN AN URBAN SLUM IN INDIA: A CROSS SECTIONAL STUDYRanu Rawat¹, Santosh Kumar², Anil Bindhu S³**HOW TO CITE THIS ARTICLE:**

Ranu Rawat, Santosh Kumar, Anil Bindhu S. "Sociodemographic Correlates of Malnutrition among School Aged Children in an Urban Slum in India: A Cross Sectional Study". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 10, February 02; Page: 1598-1605, DOI: 10.14260/jemds/2015/225

ABSTRACT: Children in the age group of 5-14 years are regarded as of school age.¹ A recent estimate (1996-2005), in developing world, states that approximately 146 million children are underweight, 39% of whom live in India.² Malnutrition comprises of both under nutrition as well as over nutrition. While under nutrition in children has always been of high magnitude in developing countries ,over weight and obesity is also increasing in prevalence because of improvements in socioeconomic conditions and rapid urbanization the so called 'nutrition transition'.³

KEYWORDS: Nutritional status, malnutrition, children, obesity.

INTRODUCTION: Children in the age group of 5-14 years are regarded as of school age.¹ Nutritional status is the condition of health of an individual as influenced by nutrient intake and utilization in the body.² The science of nutrition developed partly from the study of diseases brought about by insufficient and incomplete diets. Malnutrition has been defined as "a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients". It comprises four forms i.e. under nutrition, over nutrition, imbalance and specific deficiency of nutrients.³ In developing countries like India malnutrition is rampant affecting a large segment of population. Also commonly seen are various micro and macronutrient deficiencies which are of grave concern. Children are the worst sufferers of any kind of malnutrition. At one end of the spectrum are the majority of children suffering from under nutrition.

At the other end are the urban children among whom overweight and obesity is markedly increasing due to excessive consumption of energy-dense junk foods which is completely devoid of nutrition otherwise and only provides the so called "empty calories".⁴ This is the so called 'nutrition transition' in developing countries whereby costlier and unhealthy fast food is replacing the traditional cheaper and nutritious food.⁵ Children are also adopting sedentary lifestyles due to the habit of watching T.V. and using computers thereby giving less time to outdoor playing which further inflates the prevalence of overweight among them.

It is imperative that tremendous importance be given to the nutrition of school age children as it lays the foundation of lifelong good health in them. A popular adage is that a healthy mind lies in a healthy body. Only children with sound health can give positive intellectual contribution to the society and become future valuable nation builders.

There is a genuine dearth of community based studies which throw light on the nutritional status of school aged children. Hence this study was undertaken at the community level with the following objectives:

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1. To study the prevalence of malnutrition in children aged 5-14 years and.
2. To study the various sociodemographic factors associated with malnutrition in these children.

MATERIAL AND METHODS:

Study Design: Cross-sectional study.

Study Setting: The present study was conducted in a slum area in families having children in the age group of 5-14 years which were registered at Urban Health Training Centre of LLRM Medical College, Meerut.

Study Subjects: Children of registered families aged 5-14 years.

Study Period: The data for this study was collected from February 2011 to June 2011.

Sample Size: It was calculated using the formula $n = \frac{(Z\alpha)^2 \times p \times q}{d^2}$. By taking prevalence of under nutrition in school aged children as 50% with a relative precision of 10% and α error 5%, an optimum sample size for study was calculated as 400.

Sampling Technique: There were 1867 registered families having children in the age group of 5-14 years. Children were selected by simple random sampling technique using random number table.

Data Collection: House to house visits.

Data Collection Tools: Structured questionnaire. Height and weight were measured by measuring tape and weighing scale respectively.

METHODOLOGY: On visiting each house, firstly an informed consent was verbally taken from parents of children who were willing to participate in the study. The data was collected by means of a structured questionnaire which also included information about socio-demographic factors. Height and weight of each child was recorded. The children stood barefoot and erect on the weighing scale looking in front when the weight was recorded to the nearest 0.5kg. Height was measured using a measuring tape. The children were barefoot at the time of measurement with their head, buttocks and heels aligned against the wall.

The tape was applied to the wall and the reading was taken to the nearest 0.1 cm. The nutritional status was assessed by the US Center for Disease Control and Prevention (CDC)-2000 BMI for age percentile charts available separately for boys and girls aged 2-20 years. In order to calculate BMI, weight and height of each child was measured. The BMI thus calculated was plotted on the CDC BMI-for-age chart to obtain a percentile ranking. Underweight was regarded as less than the 5th Percentile, Healthy Weight as between 5th percentile to less than the 85th percentile, overweight as between 85th to less than the 95th percentile and obese as equal to or greater than 95th percentile in accordance with CDC classification.⁶

Data Analysis: The data was analyzed using SPSS 20. Qualitative variables were described in percentages. Association between qualitative variables was analysed by chi- square test.

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RESULTS: Table 1 shows the nutritional status of children according to the CDC BMI for age Percentile criteria. The prevalence of underweight, healthy weight, overweight and obesity in children was found to be 48.0%, 38.5%, 9.8% and 3.7% respectively.

Table 2 shows the association of underweight with various sociodemographic factors. It was found that the prevalence of underweight in children belonging to General, OBC and S.C. castes was 29.2%, 56.8% and 74.6% respectively ($P < 0.001$), in children belonging to joint and nuclear families was 70.0% and 26.0% respectively ($P < 0.001$) and in children belonging to families having family size < 5 and ≥ 5 was 25.4% and 60.5% respectively ($P < 0.001$).

Table 2 also shows the association of overweight and obesity with various sociodemographic factors. The prevalence of overweight and obesity in children who belonged to 5-9 years and 10-14 years age group was found to be 19.6% and 8.3% respectively ($P < 0.001$), in children belonging to General, OBC and S.C. castes was 18.7%, 9.9% and 9.0% respectively ($P < 0.001$) and in children belonging to families having family size < 5 and ≥ 5 was 23.9% and 7.7% respectively ($P < 0.001$). No statistically significant difference was seen in the prevalence of either underweight or overweight and obesity with sex and social class of the child.

Nutritional Status	Number	Prevalence (%)
Underweight ($< 5^{\text{th}}$ Percentile)	192	48.0
Healthy Weight (5^{th} to $< 85^{\text{th}}$ Percentile)	154	38.5
Overweight (85^{th} to $< 95^{\text{th}}$ Percentile)	39	9.8
Obese ($\geq 95^{\text{th}}$ Percentile)	15	3.7
Total	400	100.0

Table 1: Nutritional Status of children according to BMI for age Percentile Criteria (CDC)

Age group	Population		Under weight		Healthy Weight		Over weight		Obese	
	No.	%	No.	%	No.	%	No.	%	No.	%
5-9 years	183	45.7	92	50.3	55	30.1	28	15.3	8	4.3
10-14 years	217	54.3	100	46.1	99	45.6	11	5.1	7	3.2
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=0.70$; $df=1$; $P>0.1$				$\chi^2=11.00$; $df=1$; $P<0.001$			
Sex	No.	%	No.	%	No.	%	No.	%	No.	%
Male	211	52.8	108	51.2	74	35.1	17	8.1	12	5.6
Female	189	47.2	84	47.2	80	42.3	22	11.6	3	1.6
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=1.81$; $df=1$; $P>0.1$				$\chi^2=0.02$; $df=1$; $P>0.5$			
Caste	No.	%	No.	%	No.	%	No.	%	No.	%
General	171	42.7	50	29.2	89	52.1	21	12.3	11	6.4

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OBC	162	40.5	92	56.8	54	33.3	13	8.0	3	1.9
S.C.	67	16.8	50	74.6	11	16.4	5	7.5	1	1.5
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=48.06;$ df=2; P<0.001				$\chi^2=30.92;$ df=2; P<0.001			
Social Class	No.	%	No.	%	No.	%	No.	%	No.	%
Upper¹	8	2.0	2	25.0	6	75.0	0	0	0	0.0
Upper Middle²	224	56.0	101	45.1	91	40.6	24	10.7	8	3.6
Lower Middle	74	18.5	43	58.1	25	33.8	6	8.1	0	0.0
Upper Lower	94	23.5	46	48.9	32	34.0	9	9.6	7	7.5
Lower	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=4.34;$ df=2; P>0.1				$\chi^2=2.84;$ df=2; P>0.1			
Type of Family	No.	%	No.	%	No.	%	No.	%	No.	%
Joint	200	50.0	140	70.0	36	18.0	17	8.5	7	3.5
Nuclear	200	50.0	52	26.0	118	59.0	22	11.0	8	4.0
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=77.56;$ df =1; P<0.001				* $\chi^2=0.77;$ df =1; P>0.1			
Family Size	No.	%	No.	%	No.	%	No.	%	No.	%
<5	142	35.5	36	25.4	72	50.7	22	15.5	12	8.4
≥5	258	64.5	156	60.5	82	31.8	17	6.6	3	1.1
Total	400	100.0	192	48.0	154	38.5	39	9.8	15	3.7
			$\chi^2=45.24;$ df=1; P<0.001				* $\chi^2=20.56;$ df=1; P<0.001			

Table 2: Nutritional Status of Children in relation to sociodemographic factors

For calculation of * χ^2 1 and 2 have been merged together and overweight and obesity have been clubbed together.

DISCUSSION: The prevalence of thinness or underweight in children (BMI for age <5th percentile) in the present study was observed as 48%. This is slightly lower than 58.2% reported by Hasan et al(2011),⁷ much higher than 11.1% reported by Anjum et al (2012)⁸ and exactly similar to Mandal et al (2014)⁹ who reported prevalence of thinness as 48%.

In the present study, 9.8% children were found to be overweight (BMI for age 85th to <95th percentile) and 3.7% were found to be obese (BMI for age ≥ 95th percentile), together constituting 13.5% for overweight/obesity which is lesser than the findings of overweight (17.73%) and obesity

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(4.99%) by Unnithan et al (2008)¹⁰ and higher than the findings of Bharati et al (2008)¹¹ who found overweight(3.1%) and obesity (1.2%) in school going children; together constituting 4.3 per cent for overweight/ obesity and Jafar et al (2008)¹² who reported the prevalence of overweight and obesity as 3% in urban Indo Asian school-aged children.

In the present study, no statistically significant difference was seen in the prevalence of underweight in children in relation to age which was 50.3% and 46.1% in 5-9 years and 10-14 years respectively ($P>0.1$) which is similar to the findings of Medhi et al (2006)¹³ whereas Suvarna and Itagi (2009)¹ found the prevalence of underweight in children, higher in younger age group in contrast to Mian et al (2002)¹⁴ reporting the prevalence of malnutrition higher among older children than younger ones. In the present study the prevalence of overweight and obesity in 5-9 years and 10-14 years age group was found to be 19.7% and 8.3% respectively ($P<0.001$) which is in contrast to the findings of Kumari (2005)¹⁵ who reported that the mean weight of the children increased with age in both the sexes.

In the present study, the prevalence of underweight was 51.2% and 44.4% in male and female children respectively ($P>0.1$) compared to 43.8% and 30.1% respectively as reported by Anand et al (1999)¹⁶. Mian et al (2002)¹⁴ and Suvarna and Itagi (2009)¹ also reported no sex difference in prevalence of underweight while Shariff et al (2000)¹⁷ reported higher underweight in boys and Shakya et al (2004)¹⁸ reported higher underweight in girls. The prevalence of overweight and obesity in males and females was found to be 13.7% and 13.2% respectively ($P>0.5$) as compared to 6.0% and 5.6% respectively as reported by Shariff et al (2000).¹⁷

In the present study statistically significant difference was found in the prevalence of underweight in Scheduled Caste, OBC and General Caste which was 74.6%, 56.8% and 29.2% respectively ($P< 0.001$). Venkaih et al (2002)¹⁹ also reported higher underweight among adolescents belonging to the Scheduled Caste Community than others. Also a statistically significant difference was found in the prevalence of overweight and obesity in Scheduled Caste, OBC and General Caste which was 9.0% 9.9% and 18.7% respectively($P< 0.001$).However, no supportive literature could be traced to reach a conclusion.

In the present study no statistically significant difference was found in the prevalence of underweight in children belonging to Upper class, Upper middle class, lower middle class and upper lower class families which was 25%, 45.1%, 58.1% and 48.9% respectively ($P>0.1$). This is consistent with the findings of Choudhary et al (2009)²⁰ who found least underweight in children of high SES category (54.05%) and maximum (82.54%) in subjects belonging to lower SES. Also, no statistically significant difference was found in the prevalence of overweight and obesity in children belonging to Upper class, Upper middle class, lower middle class and upper lower class families which was nil, 14.3 %, 8.1% and 17.1% respectively ($P>0.1$) which is dissimilar to the findings of Chhatwal et al (2004)²¹ who reported that obesity in developing countries increases with socioeconomic class and Nair et al (2007)²² who reported that the risk of overweight was 4 times higher among the adolescents of high SES as compared to those of low SES.

In the present study, statistically significant difference was found in the prevalence of underweight in joint family and nuclear family which was 70% and 26% respectively ($P< 0.001$) as compared to 48.6% and 46.9% respectively reported by Venkaih et al (2002)¹⁹ in children aged 10-17 years. However no statistically significant difference was found in the prevalence of overweight

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and obesity in joint family and nuclear family which was 12% and 15% respectively ($P>0.1$). As no supportive literature could be traced therefore further exploration is needed.

In the present study, a statistically significant difference was seen in the prevalence of both underweight as well as overweight and obesity in relation to family size < 5 and ≥ 5 which was 25.4% and 60.5% and 23.9% and 7.7% respectively ($P<0.001$ for both). This is in accordance with the findings of Rao et al (2006)²³ who reported that the adolescents from households with family size of more than 5 had higher risk of having underweight compared to those with family size less than 5. However it is in contrast to the findings of Venkaih et al (2002)¹⁹ who reported the prevalence of overweight in case of family size 1-4 and 5-10 was 39.8% and 46.6% respectively.

CONCLUSION: In our study various sociodemographic factors like age, caste, type of family and family size were found to have an influence on occurrence of malnutrition in 5-14 year old children. Raising the living standards of people is the only means by which malnutrition in children can be taken care of. Government of the country should pledge to provide better education and employment opportunities to its citizens so as to raise their quality of life. Also raising the level of female education has to be given top priority so as to enable them to secure jobs and contribute to family income. Adoption of Small families should also be rigorously implemented.

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Date of Submission: 02/01/2015.
Date of Peer Review: 03/01/2015.
Date of Acceptance: 21/01/2015.
Date of Publishing: 30/01/2015.