

Research Article

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A study of nutritional status of adolescent girls residing in urban slums of Guwahati city, Assam, India

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ABSTRACT

Background: Adolescent girl's health covers morbidity, mortality, nutritional status and reproductive health and linked to these are environmental degradations, violence and occupational hazards. Adolescent girl's health also has an intergenerational effect. With the aim to assess their nutritional status, a cross sectional study was carried out among adolescent girls of 10-19 years residing in the urban slums of Guwahati city..

Methods: 400 adolescent girls were interviewed from 10 randomly selected slums over a period of one year. Predesigned pretested semi structured interview schedule was used to collect socio demographic and individual information of the respondents. Hemoglobin estimation was done using colour scale method.

Results: Out of 400 respondents, 34.75% were found to have a BMI lying between 15th -50th percentiles of reference value. 20.00% were found to be below 5th percentile. 33.50% of the total respondents belonged to class IV socioeconomic status, out of which 47.00% is found to have a BMI of less than 5th percentile. The study shows the prevalence of mild anaemia to be 28.46%, moderate anaemia to be 57.31% and severe anaemia 14.23% respectively. The mean haemoglobin of menstruating girls (8.87 gm%) was found to be less than in the non-menstruating girls (10.15 gm%). There was a positive association between prevalence of anaemia among the adolescent girls and worm infestation.

Conclusions: Socioeconomic status is seen to have an appreciable impact in the health and nutritional status of the slum dwelling adolescent girls.

Keywords: Adolescents, Nutrition, Slums, BMI, Anaemia, Worm infestation

INTRODUCTION

Adolescence is defined as period of personal development during which young people establishes a personal sense of individual identity and feeling of self-worth, which also includes an alteration of his or her body image, adaptation to more mature intellectual abilities, adjustment to society's demand for behavioural maturity, internalizing personal value system and preparing for adult role.¹ A transitional period between childhood and adulthood, adolescence provides an

opportunity to prepare for a healthy productive and reproductive life and also to prevent the onset of nutrition related chronic diseases in adult life while addressing adolescence specific nutrition issues and possibly also correcting some nutritional problems originating in the past.²

Poor nutrition starts before birth and generally continues into adolescence and adult life and can span generations. Chronically malnourished girls are more likely to remain malnourished during adolescence and adulthood and

when pregnant more likely to deliver low birth weight babies. In order to break the intergenerational cycle of malnutrition, a special focus needed for overcoming adolescent malnutrition especially among the girls.³ Over the past few years India's urban population has increased manifold which is presently around 28%.⁴ With rapid urbanization and having one of the highest growth rates in the world, majority of the urban population is forced to reside in the slums.

The rapidly changing socio psychology, monetary backwardness and burden of uncontrolled population explosion in slums make the adolescent girls vulnerable to malnutrition, infection and social abuse.⁵ Keeping these facts in mind and realizing the need for a community based data, the present study was undertaken. Limitation of the study was this paper deals with only a few vital aspects of the parent study.

METHODS

Study type, Study area and Study population: It is a community based cross sectional study done in the urban slums of Guwahati city for a period of one year from August 2011 to July 2012. The study population comprises of adolescent girls in the age group of 10 to 19 years residing in the urban slums of Guwahati city. All resident adolescent girls in the age group of 10-19 years in the selected slums (residing for > 6 months) were included in the study. Pregnant and lactating adolescent mothers and non-resident adolescents (e.g. visitors) were excluded from the study.

Sample size and sampling design

The sample size has been calculated based on the assumption that prevalence of any morbidity among the adolescent group at a given point of time is 50% because it shall yield the largest value of "n", when the level of precision "L" is fixed.³ Applying the formula $n=4pq/L^2$, the sample size for this study came out to be 400 (n=400).

Slums were taken as the primary sampling unit in the study. Out of a total of 90 slums as per Guwahati Development Department, Government of Assam, 2009, 10 slums were selected randomly to get the desired sample size. 40 adolescents from each slum were interviewed. Within each slum random sampling was used to select the first household and then subsequent houses were visited. In each selected household, all the adolescent girls meeting the inclusion criteria were included in the study. Consent for hemoglobin estimation was given by only 274 respondents.

Data collection

Predesigned pretested semi structured interview schedule was used to interview the respondents. Colour scale for hemoglobin was used to estimate hemoglobin level, Stature meter to measure the height, electronic weighing

scale (bathroom type) to measure the weight. General clinical examination was done for assessing any deficiency signs. The BMI was calculated for the corresponding weight (in kg) and height (in meters) using the following formula: $BMI = \text{Weight in Kg} / \text{Height in meter}^2$

Ethical clearance

Before commencing the field work, necessary approval for conducting the study from the Institutional Ethics Committee of Gauhati Medical College and Hospitals, Guwahati has been obtained. Data collected was entered in Microsoft Office Excel and analyzed using SPSS version 17.0. Chi square test was used for analysis of categorical variables.

RESULTS

Study subjects

Out of the 400 adolescent girls surveyed, 309 (77.20%) had attained menarche at the time of survey. 134 (33.5%) girls belonged to families having class-IV socioeconomic status, followed by 32.80% in class- III, 24.50% and 9.20% in class-II and class I respectively.

Nutritional and socioeconomic status of the adolescents

The adolescent girls were assessed for their nutritional status. 34.75% were found to have a BMI lying between 15th -50th percentiles of reference value. 20.00% were found to be below 5th percentile.

33.50% of the total respondents belonged to class IV socioeconomic status, out of which 47.00% is found to have a BMI of less than 5th percentile. The association of BMI and socioeconomic status is found to be statistically significant at 1% level of significance (Table 1).

Stunting and thinness among the adolescent girls

The prevalence of stunting and thinness among the adolescents of 15-19 years is found to be 22.88% and 25.13% respectively. Among adolescents in the age category of 10-14 years, stunting is prevalent in 29.10% and thinness in 15.50% of the girls (Table 2).

Stunting and thinness and socioeconomic status

Majority of the stunted girls were seen to belong to class IV socioeconomic status (55.17%), followed by class III (31.03%) and class II (10.34%). Similarly majority of the adolescent girls with thinness were found to be clubbed in the class IV status (78.75%) (Table 3).

Haemoglobin status of the adolescent girls

Estimation of haemoglobin was done in only 274 (68.50%) of the study subjects. From the above table it

can be seen that 92.35% of the respondents were having haemoglobin less than 12 gm% and only 7.65% of the subjects were having a haemoglobin level more than 12 gm%.

The present study shows the prevalence of mild anaemia to be 28.46%, moderate anaemia to be 57.31% and severe anaemia 14.23% respectively (Table 4).

Table 1: Distribution of BMI of adolescent girls across their socioeconomic status.

Socioeconomic status	BMI (kg/m ²)					Total
	5	15	50	85	95	
Class-I	No.	1	6	13	15	37 (9.25)
	%	2.70	16.20	35.10	40.50	5.40
Class-II	No.	2	21	55	20	98 (24.50)
	%	2.00	21.40	56.10	20.40	0.00
Class-III	No.	14	61	40	16	0
	%	10.70	46.60	30.50	12.20	0.00
Class-IV	No.	63	28	31	12	0
	%	47.00	20.90	23.10	9.00	0.00
Total	No.	80	116	139	63	2
	%	20.00	29.00	34.75	15.75	.50

$\chi^2=1.560$, df =12, P=0.000N.B. Figures in parenthesis indicates column wise percentage.

Table 2: Prevalence of stunting and thinness among the adolescent girls.

Nutritional status	Age (in years)				Total (n=400)	
	10-14 (n=213)		15-19 (n=187)			
	No.	%	No.	%		
Stunting	62	29.10	54	28.88	116 (29.00%)	
Thinness	33	15.50	47	25.13	80 (20.00%)	
Total	95	44.60	101	54.01	196 (49.00%)	

Table 3: Prevalence of stunting and thinness among the respondents according to their socioeconomic status.

Socioeconomic status	Thinness		Stunting	
	No.	%	No.	%
Class-I	1	1.25	4	3.45
Class-II	2	2.50	12	10.34
Class-III	14	17.50	36	31.03
Class-IV	63	78.75	64	55.17
Total	80	100.00	116	100.00

Table 4: Grading of haemoglobin of the adolescent girls according to WHO criteria.

Haemoglobin status	Age group (in years)				Total
	10-14		15-19		
	No.	%	No.	%	No. (%)
Hb. <7 g%	9	(25.00)	27	(75.00)	36 (13.17)*
Hb. 7-9.9 g%	90	(62.07)	55	(39.93)	145 (52.90)*
Hb. 10-11.9 g%	18	(25.00)	54	(75.00)	72 (26.28)*
Hb. >12 g%	19	(90.48)	2	(9.52)	21 (7.65)*
Total	136	(49.63)	138	(50.37)	274 (100)

N.B: Figures in parenthesis () indicates row wise percentage. Figures in () indicates column percentage.

Menstrual status and mean haemoglobin levels

Out of the 274 respondents whose haemoglobin estimation was done, the mean haemoglobin of menstruating girls (8.87 gm%) was found to be less than in the non-menstruating girls (10.15 gm%). The mean difference between these two groups was found to be significant at 5% level of significance ($Z=12.79$) (Table 5).

Haemoglobin status and history of passing worms in stool

Out of 92.33% of the girls who were anaemic, 96.67% gave the history of passing worms in stool whereas out of 7.67% who were not anaemic, 3.33% have the history of passing worms in stool. This is found to be statistically significant at 1% level of significance (Table 6).

Table 5: Distribution of adolescent girls according to their menstrual status and mean haemoglobin level.

Menstrual status	No (%)	Mean Hb (g%)
Menstruating	309 (77.5)	8.87
Non menstruating	91 (22.5)	10.15

$Z=12.79$

Table 6: Distribution of the adolescent girls according to the history of passing worms in stool and their haemoglobin status.

Passing worms in stool		Haemoglobin level<12 gm%		Total
		12 gm% and above		
Present	No. (%)	58 (96.67)	2 (3.33)	60 (100)
Absent	No. (%)	195 (91.12)	19 (8.88)	214 (100)
Total	No. (%)	253 (92.33)	21 (7.67)	274 (100)

$\chi^2=5.166$, df =1, P=0.019

DISCUSSION

Malnutrition is a silent emergency, but the crisis is real and its persistence has profound and frightening implications for children, society and future of mankind.⁶

BMI of the respondent girls in the study are categorized according to the socioeconomic status of their families. It was seen that, 33.50% of the total respondents belonged to class IV socioeconomic status, out of which 47.00% is found to have a BMI of less than 5th percentile. The association of BMI and socioeconomic status is found to be statistically significant at 1% level of significance. In a study conducted by Marwah et al in school children from Delhi, there is a significant disparity in anthropometric parameters of children belonging to the upper and lower socioeconomic strata, with upper socio economic status children being significantly taller and heavier.⁷

When the prevalence of stunting and thinness across the age group of the interviewed adolescents was assessed, it was seen that out of all adolescents in age group 10-14

years, stunting is prevalent in 29.10% and thinness in 15.50%. The prevalence of stunting and thinness among the adolescents of 15-19 years is found to be 22.88% and 25.13% respectively. In a study conducted among rural adolescent by NNMB in 2000, it was found that under nutrition increases in girls up to the age of 12 years and as adolescence progresses without improvement in their food intake, it stagnates and results in 40% adolescent girls being stunted, indicating that the proportion of stunting increases with age.⁸

The present study finds a strong preponderance of thinness and stunting among girls of lower socioeconomic status. Deshmukh et al in their study on nutritional status of adolescents in rural Wardha observed significantly higher prevalence of thinness among adolescents from families with lower income group than their counterparts belonging to higher income group.⁹

Of all the adolescents screened for their haemoglobin level, it was seen that 92.35% of the respondents were having haemoglobin less than 12 gm% and only 7.65% of the subjects were having a haemoglobin level more than 12 gm% in the current study. The prevalence of mild anaemia was found to be 28.46%, moderate anaemia 57.31% and severe anaemia 14.23% respectively. Studies conducted by various other authors also shows a greater prevalence of mild and moderate anaemia compared to severe anaemia among the adolescents.^{10,11}

The mean hemoglobin of menstruating girls (8.87 gm %) was found to be less than that of non-menstruating girls (10.15 gm %). Study conducted by Chaudhury et al 2003 also depicts similar findings.¹²

In the present study, it is seen that out of 92.33% of girls who were anaemic, 96.67% gave the history of passing worms in stool whereas out of 7.67% who were not anaemic, 3.33% have the history of passing worms in stool. This is found to be statistically significant at 1% level of significance. Some other studies also highlight synonymous findings.¹³

CONCLUSION

Adolescence represents a transition phase through which a child becomes an adult. For many of these young people, adolescence is a healthy transition period during which they learn values and skills that will benefit them in future. Although they are considered the healthiest group in the population, the health and lives of a large number of teenagers, now and for the coming years, are endangered. They are marred by poverty, inadequate education and work opportunities, exploitation, civil unrest, ethnic and gender discrimination. Rapid urbanization, telecommunication, travel and migration

bring both new possibilities and new risk to young people. These conditions may directly jeopardize health. In addition there are adolescent specific issues that also call for specific attention and interventions. Socio economic factors are seen to play a decisive role in the health status of the adolescents, community based approach to meet the nutritional needs of the adolescents, facilities for proper housing and other government facilities for urban poor should be made available in the slums to combat the high level of anaemia among the adolescents, supplementation of iron folic acid tablets and periodic deworming should be initiated. Last but not the least, educating the girl child can break the barrier to her ability to exercise her right, develop her capacities and to have access to services and opportunities.

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REFERENCES

1. Adolescents by Gary M. Ingersoll, 1989.
2. WHO Nutrition in adolescents: Issues and challenges for the health sector: Issues in adolescent health and development, 2005.
3. WHO. Adolescent Nutrition: A review of the situation in selected South East Asian Countries, 2006.
4. Acharya A, Reddaiah VP, Baridalyne N. Nutritional status and menarche in adolescent girls in an urban resettlement colony of South Delhi. *Indian J Comm Med.* 2006;31(4):302-3.
5. Singh J, Singh V, Srivastava AK, Suryakant. Health status of adolescent girls in slums of Lucknow *Indian J Community Med.* 2006;31(2):11-5.
6. UNICEF. State of the World's Children Report. Focus on Malnutrition.1998.
7. Marwah RK, Tandon N, Singh Y, Aggrawal R, Grewal K, Manik K. A study of growth parameters and prevalence of overweight and obesity in school children from Delhi. *Indian J Pediatr.* 2006;43(11):943-52.
8. NNMB Technical Report No.20. Report on Diet and Nutritional Status of Adolescents, NIN ICMR Hyderabad. 2000;20:1-25.
9. Deshmukh PR, Guptha SS, Bharambe MS, Dhongre AR, Maliye C, Kaur S, et al. Nutritional status of adolescents in rural Wardha, *Indian J Pediatr.* 2006;73:139-41.
10. Verma A, Rawal VS, Kedia G, Kumar D, Chauhan J. Factors influencing anaemia among girls of school going age (6-18 years) from the slums of Ahmadabad city. *Indian J Community Med.* 2004;29(1):25-6.
11. Chaudhary SM, Dhage VR. A study of anaemia among adolescent females in urban area of Nagpur. 2008;33(4):243-5.
12. Choudhary S, Mishra CP, Shukla KP. Nutritional status of adolescent girls in rural Varanasi. *Indian Journal of Social and Preventive Medicine.* 2003;34(1):54-61.
13. Goel S, Gupta BP. Anaemia prevalence among adolescents of an urban hilly community. *Indian J Community Med.* 2007;32(1).

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