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Prevalence of stunting and thinness among adolescents of Allahabad City

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ABSTRACT

Undernutrition is a major public health issue and a principal cause of ill health condition. It results in short stature and lean body mass and is associated with deficiencies in muscular strength and working capacity in adolescents. To know the prevalence of stunting and thinness among adolescents a cross sectional study was carried out in four different colleges of Allahabad on 1290 adolescents aged between 11 to 16 years. Out of them, 543 boys and 747 girls were studied. Weight and height of students were measured and body mass index was calculated. WHO 2007 reference was used to defined thinness as BMI for age less than -2SD and stunting as height-for-age less than -2SD.The prevalence of stunting and thinness was found to be 30.6% and 9.8% respectively. Stunting was found significantly ($p=0.000$) higher among girls (36.4%) while thinness was found significantly ($p=0.023$) higher among boys (11.9%). The prevalence of stunting was observed significantly ($p=0.000$) higher among girls belonged to age group 14-16 years whereas in boys no significant ($p>0.05$) difference was observed. On the other hand the prevalence of thinness was found to be significantly ($p<0.05$) higher among both boys and girls in the age group 11-13 years. Overall 40.4% adolescents were found undernourished. Hence, there is a need for nutritional intervention programmes in adolescents in order to control the problem of undernutrition among them.

Key Words : Adolescents, Stunting, Thinness

INTRODUCTION

Adolescence is defined as the period of transition between childhood and adulthood and is characterized by an exceptionally rapid rate of growth (Tanner, 1978). It is the time when there is an increased demand for nutrients; if fail to meet body's requirements it could pose a greater risk of undernutrition. Undernutrition continues to be a major public health issue and a principal cause of ill health condition (Nandy *et al.,* 2005 and Deshmukh *et al.*, 2006). In adolescents undernutrition results in short stature and lean body mass and is associated with deficiencies in muscular strength and working capacities (Rosen, 2004). This results in

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problem of low birth weight, which is more common in the offspring of adolescent mothers and is associated with fewer chances for survival and higher infant death rates (Rosen, 2004).

Adolescents contribute to 1.20 billion of the global population and comprises one of the largest cohorts (243 million) of the Indian population (Parasuraman *et al.,* 2009). Anthropometric indicators stunting (low height-for-age) and thinness (low BMI-for-age) are used to evaluate the undernourishment level in adolescents. The main difference between these two indicators is that the former shows chronic undernutrition whereas the later shows acute undernutrition. It is important to determine the status of undernutrition in adolescents as they are one of the most nutritionally vulnerable segments of the population. Limited data is available on stunting and thinness among adolescents in Allahabad. Therefore, the present study was conducted to know the prevalence of stunting and thinness in adolescents.

METHODOLOGY

A cross sectional study was carried out on students studying between 6th to 11th standard in Allahabad city. A total number of 1290 adolescents age between 11-16 years were studied. Four different colleges *i.e.* Government Inter College, Mary Wanamaker Girls' Inter College, Jamuna Christian Inter College and Allahabad Inter College were randomly selected. Probability proportional to the size of population was used to select the sample size. It was assumed that at least 50 children would be studied from each class. Children were randomly selected from each class. Consent was taken from the principal of colleges before the initiation of the study.

Weight and height of students were measured and body mass index was calculated. To assess the prevalence of thinness and stunting in adolescents WHO 2007 reference for 5-19 years was used (www.who.int/growthref/who2007_bmi_for_age/en/ ; www.who.int/growthref/who2007_height_for_age/en/). Thinness was defined as BMI for age less than -2SD and stunting was defined as height-for-age less than -2SD. Prevalence of stunting and thinness is presented as percentages. Chi square test was used to analyze the results statistically. $p<0.05$ was considered as statistically significant.

RESULTS AND DISCUSSION

A total of 1290 adolescents in the age group of 11-16 years were participated in the study. Out of them (42.1%) were boys and (57.9%) were girls. Among the total boys (22.7%) were stunted and (11.9%) were thin while in girls (36.4%) were stunted and (8.2%) were thin. On total (30.6%) students were stunted while (9.8%) were thin. Overall (40.4%) students were undernourished *i.e.* either stunted or thin.

Table 1 shows that the prevalence of stunting significantly higher (p=0.000) among

Table 1 : Prevalence of stunting and thinness by gender

Nutritional status	Boys (n=543) (%)	Girls (n=747) (%)	Total (n=1290) (%)	X^2	P value
Stunting	123 (22.7)	272 (36.4)	395 (30.6)	28	0.000*
Thinness	65 (11.9)	61 (8.2)	126 (9.8)	5.16	0.023*

girls (36.4%) as compared to boys (22.7%) whereas the prevalence of thinness was significantly higher (p=0.023) in boys (11.9%) than girls (8.2%). Similar findings were reported by Mondal *et al.* (2010) in the study done on rural adolescents of Darjeeling district, West Bengal that the prevalence of thinness was significantly higher among boys than girls; the prevalence of stunting was higher among girls than their male counterparts however the difference was statistically not significant (p>0.05).

There are studies that have recorded high prevalence of stunting from Assam (51.90%) (Mondal and Sen, 2010), West Bengal (52.46%) (Das *et al.,* 2007) and Karbi Anglong, Assam (51.20%) (Mondal and Terangpi, 2014); higher prevalence of thinness from Assam (41.32%) (Medhi *et al.,* 2007) Chhattisgarh (58.30%) (Patanwar and Sharma, 2013) and West Bengal (32.00%) (Mondal and Sen, 2010). Wide variations were observed in the prevalence of stunting and thinness in adolescents may be due to difference in study area and selection of study subjects. In this study adolescents were selected from urban area as well as WHO 2007 reference was used to define stunting and thinness so the prevalence of stunting and thinness was found lower compared to previous studies.

Out of total 543 boys, 281(51.7%) belonged to 11-13 years while 262 (48.3%) belonged to 14-16 years. Among boys age wise prevalence of stunting ranged from 14.9% (12 years) to 29.2% (16 years) *i.e.* higher prevalence of stunting with increase in age whereas thinness ranged from 20.7% (12 years) to 1.5% (16 years) *i.e.* decreased tendency with increase in age. Proportion of thinness was more prevalent in boys belonged to early age groups (11-13 years) (73.8%) compared to (14-16 years) (26.2%) and the difference was found highly significant (p=0.000) (Table 2). There are several studies that also reported prevalence of thinness decreased with age (Nandy *et al.,* 2005; Mondal and Sen, 2010; Mondal and Terangpi, 2014; Shahabuddin, 2000 and Shahabuddin, 2000)

Table 2 : Prevalence of stunting and thinness according to age in boys

Age (years)	Total	Stunting	Thinness
11	66	20 (30.3)	9 (13.6)
12	87	13 (14.9)	18 (20.7)
13	128	22 (17.2)	21 (16.4)
14	113	27 (23.9)	12 (10.6)
15	84	22 (26.2)	4 (4.8)
16	65	19 (29.2)	1 (1.5)
Total	543	123 (22.7)	65 (11.9)

Out of total 747 girls, (48.2%) belong to 11-13 years age group while (51.8%) belong to 14-16 years. The proportion of stunting was found significantly (p=0.000) higher (65.4%) among girls belonged to 14-16 years than 11-13 years (34.6%) whereas the proportion of thinness was found significantly (p=0.005) higher (65.6%) among those in the age group 11-13 years as compared to 14-16 years (34.4%). In girls, thinness was found highest at the age of 11 years (12.6%) that gradually decreased with increase in age *i.e.*16 years (3.8%) (Table 3). Prevalence of thinness is frequently associated with nutritional deficiencies, menstrual irregularity and adverse reproductive outcomes among adolescent girls and young women (World Health Organization, 1995; Mondal, 2014 and Sen *et al.,* 2010).

Table 3 : Prevalence of stunting and thinness according to age in girls			
Age (years)	Total	Stunting	Thinness
11	79	20(25.3)	10(12.6)
12	125	41(32.8)	15(12.0)
13	156	33(21.2)	15(9.6)
14	130	52(40.0)	08(6.2)
15	124	61(49.2)	08(6.5)
16	133	65(48.9)	05(3.8)
Total	747	272(36.4)	61(8.2)

Conclusion :

A high prevalence of stunting (30.6%) and thinness (9.8%) was found among adolescents in Allahabad. Overall 40.4% students were undernourished. Hence, there is a need for nutritional intervention programmes in adolescents in order to control the problem of undernutrition.

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