NUTRITIONAL STATUS OF YOUNG GIRLS OF GADAG DISTRICT

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Abstract

The growth and prosperity of a nation depend heavily on the nutritional status and development of adolescent girls as they not only constitute one tenth of its population but also influence the growth of the remaining population. Health and nutrition of the girls of today will affect the health and survival of the future generation. Adolescent girls are the mothers of tomorrow and no edifice can be built on a foundation which is so weak. It is now realized that nutritional insult at earlier ages leaves their mark during adolescence. Besides this, adolescence is a period of great turbulence. Because of puberty spurt, rapid physical growths do take place during this period and therefore nutritional requirements are quite different. In adolescent girls, psycho-social and emotional problems are of considerable magnitude and they may exert significant influence on their nutritional status. In the present study, an attempt has been made to assess the nutritional status of young girls of Gadag district. A total of 679 young girls of 10 to 24 years of age, living in the rural, urban and slum areas of Gadag district of Karnataka state were selected at randomly as sample. Out of them, 227 girls were from rural, 231 girls were from urban and 221 girls were from slum areas. Young girls were classified into two groups namely 10-18 years (adolescents) and 18-24 years (youth). The findings of the study indicates that the stunting and wasting was found to be more in young girls of rural and slum areas compared to urban area. The prevalence of thinness was found to be more than fifty percent among young girls belonged to 10-24 years age group. The hip ratio was more in urban young girls of 10-24 years age compared to rural and slum girls. The present study concludes that adolescence is a critical time for young girls. Young girls must enter adulthood with good nutritional stores to remain strong and healthy throughout their child-bearing years and into old age. There is a need for counseling, health and nutrition education at school and community level for improvement of nutritional status of adolescent girls.

***Key Words**: Nutritional Status, Adolescents, Stunting, Gadag District.*

Introduction

The growth and prosperity of a nation depend heavily on the nutritional status and development of adolescent girls as they not only constitute one tenth of its population but also influence the growth of the remaining population (Choudhary Seema, et.al. 2003). According to 2001 census of India, adolescents constitute about 22 per cent of the total populations and this trend is still growing in India. Within the adolescent population, the males outnumber the female. The female adolescents constitute 47 per cent while male adolescent constitute 53 percent.

Adolescence is a period of rapid growth and maturation in human development. The nutritional status of adolescent girls, contributes significantly to the nutritional status of the community. Reports of the World Health Organization (WHO) suggest that in South East Asian Region a large number of adolescents, who constitute 20% of the population in these countries, suffer from malnutrition, which adversely impacts their health and development (Haboubi and Shaikh, 2009). Health and nutrition of the girls of today will affect the health and survival of the future generation. Adolescent girls are the mothers of tomorrow and no edifice can be built on a foundation which is so weak. It is now realized that nutritional insult at earlier ages leaves their mark during adolescence. Besides this, adolescence is a period of great turbulence. Because of puberty spurt, rapid physical growths do take place during

this period and therefore nutritional requirements are quite different. In adolescent girls, psycho-social and emotional problems are of considerable magnitude and they may exert significant influence on their nutritional status. Although genetic codes set the upper limit of optimum growth, the environment in which they thrive can help or hinder realization of that goal (Choudhary Seema, et.al. 2003).

Nutritional status during adolescence plays an important role in human lifecycle. The global economic development and urbanization has resulted in great changes in the weight status of adolescents worldwide. A decreasing trend in the prevalence of under-nutrition has been identified in developing countries. On the other hand, an increasing shift towards higher rates of overweight and obesity among adolescents has been reported in developed and developing countries. The National Food Consumption Survey conducted in 2001-2003 showed that the prevalence of thinness, pre-obesity and obesity among boys aged 15 to 19 years old was 27.6%, 5.1% and 3.6%, respectively. The related figures for girls were 10.5%, 9.7% and 3.9%, respectively (Doustmohammadian, et.al. 2013). Malnutrition (under nutrition or over nutrition) which refers to an impairment of health either from a deficiency or excess or imbalance of nutrients is of public health significance among adolescents all over the world. It creates lasting effect on the growth, development and physical fitness of a person. Owing to sudden and special growth taking place in this phase, the nutritional requirements also increase tremendously compared to preceding years of growth. During this phase, diet should provide not only sufficient calories but also essential elements and nutrients such as protein, vitamins and minerals required for growth (Doustmohammadian, et.al. 2013). Nutritional and physical growth during adolescence creates increased demands of energy and nutrients. Special attention should be given to adolescent girls, who need to be well-nourished for their own immediate development and for the future nutritional demands of childbearing. There are hardly any studies on nutritional status of young girls especially in Gadag city. Therefore, the present study has been carried out to see the prevalence of stunting, underweight, and overweight among young girls of Gadag district. The study has also made an attempt to see the association of area of living with stunting, underweight, and overweight among young girls.

Methodology

A cross sectional study was carried out to assess the nutritional status of girls of young girls of Gadag district. A total of 679 young girls of 10 to 24 years of age, living in the rural, urban and slum areas of Gadag district of Karnataka state were selected at randomly as sample. Out of them, 227 girls were from rural, 231 girls were from urban and 221 girls were from slum areas. Young girls were classified into two groups namely 10-18 years (adolescents) and 18-24 years (youth). The investigator visited school and colleges of urban, slum and rural areas. The investigator also visited households to collect information from young girls who were school dropout. The socio-demographic data were elicited by administering the pretested questionnaire and anthropometric measurements such as height, weight, waist and hip circumference were recorded by following standard methods. Data, thus generated, were analyzed with the help of personal computer using SPSS package version 16.0. Nutritional status of young girls were assessed by using various parameters viz. height-for-age (level of stunting), weight-for-age (level of underweight), Body Mass Index (BMI) for body weight (thinness or overweight), Waist-Hip Ratio (abdominal obesity). Relevance of these parameters was examined against available reference values viz. of WHO for height-for-age, weight-for-age and BMI-for-age. BMI of each young girl was computed by using the formula weight (kg)/ height (m2). Young girls were graded in different grades of nutritional status according to WHO 2004. The cut off value for thinness/underweight/stunting was -2SD and for overweight/obesity it was >2SD of WHO Growth standards 2004. Frequency and Percentage was calculated and $\chi 2$ test was administered to see the significant association between variable groups.

Results

Table 1 reveals the distribution of young girls based on age and area of living. Among the total sample, 53.6% of the young girls were in the age group of 10 to 18 years while 46.4% of the young girls were in the age group of 18 to 24 years. Nearly equal percentages of sample were from urban (34%), slum (32.6%) and rural (33.4%) areas. More percentages of urban young girls (61.5%) were in the age group of 10 to 18 years than their counterpart. Nearly equal percentages of rural as well as slum young girls were observed under 10 to 18 years and 18 to 24 years of age group.

Table 1: Distribution of young girls based on age and area of living

Area of Living		Age groups		Total
		10 to 18 years	18 to 24 years	
Rural	No	112	115	227
	%	49.3	50.7	33.4
Slum	No	110	111	221
	%	49.8	50.2	32.6
Urban	No	142	89	231
	%	61.5	38.5	34.0
Total	No	364	315	679
	%	53.6	46.4	100.0

Table 2 reveals the area-wise distribution of young girls aged 10 to 18 years based on the level of stunting (height-for-age). 47.3% of the young girls were under mild (40.9%), moderate (4.4%) and severe (1.9%) level of stunting while 52.7% of the young girls were normal. considerably more percentage of urban young girls (3.5%) were observed under severe level of stunting while noticeable percentage of slum young girls were observed under mild (57.3%) and moderate (6.4%) level of stunting. The highly significant association between level of stunting and area of living (χ^2=51.054 at P<0.000) of young girls was observed.

Table 2: Area-wise distribution of young girls based on level of Stunting (Height for age)

Age Group	Area of Living		Normal	Mild	Moderate	Severe	χ^2 Value
10 to 18 years	Rural (n_1=112)	No	50	58	4	0	51.054** (d.f.=6) P<0.000
		%	44.6	51.8	3.6	0.0	
	Slum (n_2=110)	No	38	63	7	2	
		%	34.5	57.3	6.4	1.8	
	Urban (n_3=142)	No	104	28	5	5	
		%	73.2	19.7	3.5	3.5	
	Total (N=364)	No	192	149	16	7	
		%	52.7	40.9	4.4	1.9	

The table 3 reveals the area wise distribution of young girls aged 10 to 18 years based on level of underweight (weight-for-age). Among the total sample, 33.2% of the young girls were normal, 52.7% of them were under mild level of underweight, 12.6% of them were under moderate level of underweight and 0.3% of them were observed under severe level of underweight. 1.1% of the young girls were overweight. With respect to area wise distribution, only 2.8% and 0.7% of the young girls of urban area were overweight and severely underweight respectively. Considerably more percentages of young girls of rural (57.1% and 16.1%) and slum (56.4% and 15.5%) areas were observed under mild and moderate level of underweight respectively. A significant association between level of underweight and area of living (χ^2=19.702 at P<0.012) of young girls was observed.

Table 3: Area-wise distribution of young girls aged 10 to 18 years based on level of Underweight

Age groups	Area of Living		Overweight	Normal	Mild	Moderate	Severe	χ^2 Value
10 to 18 years	Rural (n_1=112)	No	0	30	64	18	0	19.702* (d.f.=8) P<0.012
		%	0.0	26.8	57.1	16.1	0.0	
	Slum (n_2=110)	No	0	31	62	17	0	
		%	0.0	28.2	56.4	15.5	0.0	
	Urban (n_3=142)	No	4	60	66	11	1	
		%	2.8	42.3	46.5	7.7	0.7	
	Total (N=364)	No	4	121	192	46	1	
		%	1.1	33.2	52.7	12.6	0.3	

Table 4 depicts the age-wise and area wise distribution of young girls based on level of body mass Index i.e. thinness and overweight. Among young girls of 10-18 years age group, more than 40% of the adolescent girls have severe (21.2%) and moderate (19.2%) level of thinness while 28.0% of them have mild level of thinness. A very less percentage of adolescent girls were overweight (0.5%) and obese (0.3%). The severe level of underweight observed more in slum (24.5%) and urban (22.5%) compared to rural (16.1%) category. But no significant association was found between young girls living in different areas with respect to level of underweight (χ^2 =13.572, P<0.193).

Table 4: Age and Area-wise distribution of young girls based on level of body mass index

Age groups	Area of Living		Severe	Moderate	Mild	Normal	Over weight	Obese	χ^2 Value
10 to 18 years	Rural (n_1=112)	No	18	23	40	30	1	0	13.572 (d.f.=10) P<0.193
		%	16.1	20.5	35.7	26.8	0.9	0.0	
	Slum (n_2=110)	No	27	22	32	29	0	0	
		%	24.5	20.0	29.1	26.4	0.0	0.0	
	Urban (n_3=142)	No	32	24	30	54	1	1	
		%	22.5	16.9	21.1	38.0	0.7	0.7	
	Total (n_A=364)	No	77	69	102	113	2	1	
		%	21.2	19.0	28.0	31.0	0.5	0.3	
18 to 24 years	Rural (n_1=115)	No	6	23	28	55	3	0	35.06** (d.f.=10) P<0.000
		%	5.2	20.0	24.3	47.8	2.6	0.0	
	Slum (n_2=111)	No	7	15	15	59	14	1	
		%	6.3	13.5	13.5	53.2	12.6	0.9	
	Urban (n_3=89)	No	10	6	27	46	0	0	
		%	11.2	6.7	30.3	51.7	0.0	0.0	
	Total (n_B=315)	No	23	44	70	160	17	1	
		%	7.3	14.0	22.2	50.8	5.4	0.3	
10 to 24 years	Rural (N_1=227)	No	24	46	68	85	4	0	28.998** (d.f.=10) P<0.001
		%	10.6	20.3	30.0	37.4	1.8	0.0	
	Slum (N_2=221)	No	34	37	47	88	14	1	
		%	15.4	16.7	21.3	39.8	6.3	0.5	
	Urban (N_3=231)	No	42	30	57	100	1	1	
		%	18.2	13.0	24.7	43.3	0.4	0.4	
	Total (N=679)	No	100	113	172	273	19	2	
		%	14.7	16.6	25.3	40.2	2.8	0.3	

Among young girls of 18 to 24 years age group, the severity of underweight or thinness was high (mild=22.2%, moderate=14% and severe=7.3) while overweight (5.4%) and obesity (0.3%) was considerably less. The severity of thinness observed significantly more among adolescent girls of urban (48.2%) and rural (49.5%) area while the severity of overweight/obesity was observed significantly more among adolescent girls of slum area (13.5%) than their respective counterparts. A significant association was found between young girls of 18 to 24 years living in different areas with respect level of thinness (χ^2=35.06, P<0.000). Of the total population i.e. among 10-24 years age

group young girls, more than 30% of them were under severe (14.7%) and moderate (16.6%) level of thinness while 1/4th of them were under mild level of thinness. 2.8% of young girls were overweight and 0.3% of them were obese. The severe level of underweight was significantly more in urban area (18.2%), while moderate level of underweight was significantly more in rural (20.3%) and mild level of underweight was significantly more in slum (21.3%) area compared to their respective counterparts. A highly significant association was found between young girls (10-24 years) of different areas of living (χ^2=28998, P<0.001) with respect to level of thinness.

Table 5 reveals the age and area wise distribution of young girls based on waist hip ratio. Waist-Hip ratio indicates level of risk based on accumulation of abdominal fat. Among 10-18 years age group, more than one third of adolescents (34.1%) were at moderate risk while 0.5% were at high risk of abdominal obesity. More percentage of urban adolescent girls (39.4%) were at moderate risk than their counter parts, but no significant association was found between young girls (of 10-18 years of age) living in different areas with respect to level of risk of abdominal obesity (χ2=4.175l, P<0.383). Among young girls of 18 to 24 years age group, 29.5% of young girls were at moderate risk while 2.5% were at high risk of abdominal obesity based on waist hip ratio. Significantly more of urban young girls were at moderate (43.8%) and high (4.5%) level of risk than their counterparts. A significant association was found between young girls of different areas of living with regard to level of risk as per waist hip ratio (χ^2=17.869, P<0.001). Of the total sample i.e. among young girls of 10 to 24 years, significantly more percentage of urban girls were at moderate risk (41.1%) and high risk (2.2%) compared to rural and slum young girls. A highly significant association was found between areas of living with respect to level of risks as per waist hip ratio among young girls of 10 to 24 years age group (χ^2=17.651, P<0.001)

Table 5: Age and Area-wise distribution of young girls based on waist-hip ratio

Age groups	Area of Living		High risk	Moderate risk	Low risk	χ^2 Value Sig.
10 to 18 years	Rural (n_1=112)	No	0	33	79	4.175 (d.f.=4) P<0.383
		%	0.0	29.5	70.5	
	Slum (n_2=110)	No	1	35	74	
		%	0.9	31.8	67.3	
	Urban (n_3=142)	No	1	56	85	
		%	0.7	39.4	59.9	
	Total (n_A=364)	No	2	124	238	
		%	0.5	34.1	65.4	
18 to 24 years	Rural (n_1=115)	No	2	22	91	17.869* (d.f.=4) P<0.001
		%	1.7	19.1	79.1	
	Slum (n_2=111)	No	2	32	77	
		%	1.8	28.8	69.4	
	Urban (n_3=89)	No	4	39	46	
		%	4.5	43.8	51.7	
	Total (n_B=315)	No	8	93	214	
		%	2.5	29.5	67.9	
10 to 24 years	Rural (N_1=227)	No	2	55	170	17.651* (d.f.=4) P<0.001
		%	0.9	24.2	74.9	
	Slum (N_2=221)	No	3	67	151	
		%	1.4	30.3	68.3	
	Urban (N_3=231)	No	5	95	131	
		%	2.2	41.1	56.7	
	Total (N=679)	No	10	217	452	
		%	1.5	32.0	66.6	

Discussion

Nearly one fourth of India's population comprises of adolescents representing a vibrant human resource. Nutritional status during adolescence is an important determinant of health outcomes. Hence, it is of utmost importance to improve nutritional status during adolescence. A recent UNICEF's "State of the World's Children 2011" report says that more than half (56%) of adolescent girls in India are suffering from anemia. The terrible nutritional figures for adolescents put India in the company of least developed nations such as Congo, Burkina Faso, and Guinea. India, in fact, beats even Sub-Saharan Africa with the highest underweight adolescent girl population of 47% in age group of 15 to 19 years.

In the present study, about 47.2% adolescents were observed under mild, moderate and severe level of stunting and 65.6% of adolescents were observed as underweight with mild, moderate and severe level. The significant association was found between area of living and the level of underweight and stunting. The level of stunting and wasting was more in rural and slum area compared to urban area. The reasons may be the urban families were more aware of nutrition, high socio economic conditions and they can afford nutritious food to their children.

A community based, cross-sectional study was conducted on 143 adolescent girls (10-19 years) in West Bengal (Das and Biswas, 2005) revealed that, Overall prevalence of 'thinness' and 'stunting' was found to be 14.7% and 37.8%, respectively. A study by Goyle Anuradha (2009) found that wasting and stunting, was 72% and 37% respectively. About 72% of the young girls were malnourished as per weight for age and 37% were short in stature as per height for age which is similar to our study. Further in the present study, the overweight as per weight for age is 2.8% in urban and it was nil in rural and slum area. Almost similar findings were observed in a study conducted by Sachan, et.al. (2012) which revealed that overweight among urban girls were 5.4% and that of rural girls was 3.9%. The report on region WHO consultation on nutritional status of adolescent girls reported 45% prevalence of stunting among girls and 20% among boys with an average of 32% in both the sexes.

In the present study among 10-18 years age group it was observed that, overall thinness among urban girls was less (60.5%) compared to rural girls (72.3%) and slum girls (73.6%). Overall 68.2% of adolescent girls were thin in 10-18 years age group. Among young girls the thinness was 56.6%. A study conducted by Shabuddin et.al. (2000) on a rural community in Bangladesh revealed that 59.0% of adolescents girls were thin. A study by Maiti, et.al. (2011) on Prevalence of stunting and thinness among early adolescent school girls of Paschim Medinipur district, West Bengal reported that the overall extent of thinness was 37.70% and thinness was more (46.32%) prevalent in 10 years of age. The prevalence of thinness decreased with age.

In the present study thinness (BMI) was present in 56.6% of young girls belongs to 10-24 years age group. A less percentage of thinness (43.8% of boys and 30.1% girls) was observed in a study by Anand, et. al. (1999).

Further in the present study, the prevalence of thinness was more in 10-18 years age group (68.2%) than 18-24 years age group (43.5%). A study by Prashanth and Shaw Chandra (2009) on nutritional status of adolescent girls from an urban slum area in South India showed that the prevalence of thinness between the ages of 10-15 years ranges from 19-25% further dipping down to 12% at around 16-17 years which is very less compared to present study but the trend is similar in both the studies i.e. as age advances the thinness also reduces. There is high prevalence of under-nutrition among slum adolescent girls in the slum community.

In the present study the overall prevalence of thinness among 10-24 years age group is 56.6%. A study conducted by Patil, et.al. (2009) on health problems among adolescent girls revealed that 67.8% and 69.3% of girls were underweight (BMI<18.5). According to the proposed Asian criteria, subjects with normal nutritional status 27.6%, the corresponding value by the WHO criteria was

28.3%. Adolescent girls who were categorized as overweight by the proposed Asian criteria (23 to 24.9 Kg/m2) were 2% and those categorized by the previous WHO (25-29.9 Kg/m2) 2.4% respectively. None of the study subjects were labeled as pre-obese and obese as per the WHO criteria.

However 2.6% of subjects were found to belong to the category of overweight/obesity according to the proposed Asian criteria. Similarly, Mehta, et.al (2007) study on obesity amongst affluent adolescent girls of 16 to 17 years age group in Delhi showed that the prevalence of obesity was 5.8% and prevalence of overweight was 15.2%. Thus 20.5% of school girls had BMI≥25 i.e. they are either obese or overweight. This prevalence is higher than that of the present study. This is because the adolescents were belonged to high income groups. A significant relation ($\chi 2$ =28.998, P<0.001) was observed between area wise and age wise (10-24 years) and level of body mass index among young girls. .

In the present study among 10-18 years age group with respect to Waist hip ratio, urban girls were at high risk (39.4%) compared to rural (29.5) and slum (31.8%) category. Overall among 10-24 years age group, the Waist hip ratio was more in urban girls and they were at high (0.2%) and moderate risk (41.1%) compared to rural (2.2%, 24.2%) and slum(1.4%,30.3%). This may be because of lack of physical activities, over eating, sedentary life, eating of sweets and drinking of sugar beverages, etc. There are very few studies available on central type of obesity among adolescents.

According to Després, et.al. (2001) waist circumference provides crude index of absolute amount of abdominal adipose tissue whereas waist hip ratio provides index of relative accumulation of abdominal fat. Since a simultaneous increase in waist and hip measurements in the same individual would mean the WHR remaining stable over time despite considerable accumulation of abdominal fat which can be thus assessed by the increased waist circumference. Similarly, study by Mehta, et.al (2007) on obesity amongst affluent adolescent girls of 16 to 17 years age group in Delhi showed that out of the 22 obese girls central obesity was present in 21 girls (95.4%) [WC ≥ 80 cm] and 12 girls (54.5%) [WHR >0.85]. There is significant prevalence of obesity in affluent school girls in Delhi and more than half of them have central obesity.

CONCLUSION

The study concludes that the stunting and wasting was found to be more in young girls of rural and slum areas compared to urban area. The prevalence of thinness was found to be more than fifty percent among young girls belonged to 10-24 years age group. The hip ratio was more in urban young girls of 10-24 years age compared to rural and slum girls. Adolescence is a critical time for young girls. Young girls must enter adulthood with good nutritional stores to remain strong and healthy throughout their child-bearing years and into old age. Good nutrition is especially important for adolescent girls to meet future needs of pregnancy and breastfeeding. There is a need for counseling, health and nutrition education at school and community level for improvement of nutritional status of adolescent girls.

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