Original Research Article

Mental health and nutritional issues: a dual burden among adolescent school going girls of urban and rural Jodhpur

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ABSTRACT

Background: Adolescents constitute 21% of the total population in India. Untreated mental disorders affect a person's potential to live a fulfilling life and raises the possibility of conduct disorders. Moreover, malnutrition leads to growth retardation and sexual maturation in later life. Thus, this study was undertaken to understand the role of family size, socio-economic status, marital status on mental and nutritional health of adolescent girls in urban and rural Jodhpur.

Methods: A descriptive cross-sectional study in three schools each from rural and urban Jodhpur was conducted to include adolescent girls aged 10-19 years. Semi-structured questionnaire was administered to collect demographic and socio-economic data along with DASS-21 and SMFQ for mental health assessment and BMI, waist-hip ratio collected for nutritional health.

Results: Depression score ≥10 was observed in 34.3% girls (significantly associated with monthly attendance), anxiety score ≥10 observed in 64.8% (associated with socio-economic class and monthly attendance) and stress score ≥10 observed in 26.2% (associated with monthly attendance). Th e17.4% were thin while 4.7% overweight, significantly associated with location, age group and socio-economic class. The 5% were at increased metabolic risk, associated with non-participation in extra-curricular activities.

Conclusions: The study indicated high prevalence of depression, anxiety and stress, nutritional imbalance and risk of metabolic disorders at an early age, that were significantly associated with the low monthly attendance indicating negative impact of such factors on regular education and academic growth. The findings highlight a greater emphasis needed on mental health and nutritional components during the active growth years of adolescent females.

Keywords: Adolescent, Female, Cross-sectional study, Mental health, Nutritional status, Malnutrition

INTRODUCTION

The world health organization (WHO) defines people living between the age groups of 10 and 19 years as adolescents.[1] It is a period of rapid physiological, psychological and social growth in which a person gains nearly 25% of the adult height and up to 50% of the adult weight. With roughly 1.2 billion adolescents worldwide, it is estimated that one in every five people of the world is an adolescent.[2]

Over 85% of the total adolescent population of the world live in developing countries and further makes up for 20% of the total population of the South-East Asian region.[3] In India, this corresponds to 21% of the total population of country or in other words, a staggering 287 million Indians. Rajasthan is the second state after Uttar

Pradesh in the country with highest percentage of adolescent population with 22.9% population in adolescent age group.[4]

Worldwide, 10-20% of the children and adolescents experience mental disorders, half of which begin by the age of 14 years and three quarters by mid-20s. More than 33% of the disease burden and almost 60% of premature deaths among the adults can be associated with behaviors or conditions that can be attributed to have begun during the age of 10-19 years.[5-8] Studies have shown that untreated mental disorders severely influence a child's development, educational attainments and potential to live a fulfilling and productive life. Children with mental disorders face major challenges with stigma, isolation and discrimination, as well as lack of access to health care and education facilities, in violation of their fundamental human rights. Further, mental disorders in such early stages of development raises the possibility of conduct disorders, and risky behaviors related to sexual activity, violence and substance abuse later in life.[9,10]

According to the national mental health survey, 13.7% of the Indians suffer from varying degrees of mental disorders and 10.6% out of them require immediate interventions. The NMHS states that the urban areas are the worst affected and 1.9% of all affected fall under the category of severe mental disorders. Recent studies have identified depression in particular as the single largest cause of the burden of disease among young people in terms of disability adjusted life years (DALYs).[11,12]

Another major debilitating issue in the adolescent age group is Malnutrition, which refers to deficient, excess or imbalanced intake of nutrients by a person. Malnutrition addresses three broad groups of conditions, namely, under nutrition, micro-nutrient related malnutrition and overweight and obesity.[13] Two-fifths of the females in India are either too thin or obese. Owing to the high growth requirements in adolescent years in females, there is a general nutritional vulnerability in these age groups.[14] Inadequate or over nutrition can have many detrimental effects that appear later in life in form of growth retardation and sexual maturation.[15] Moreover the incidence of over-nutrition in form of overweight and obesity in the current times tend to appear simultaneously with underweight in form of stunting and wasting.[16,17]

Due to the resulting rise in such "Double burden of malnutrition" and mental disorders amongst the adolescent girls, and to understand the role of factors such as family size, socio-economic status, marital status, the current study was undertaken with the objectives of assessing mental health and nutritional status of school going adolescent girls in rural and urban areas of Jodhpur.

METHODS

A descriptive cross-sectional study was planned in the months of March to June 2018, in the rural and urban areas of Jodhpur after due permissions from the IEC of AIIMS Jodhpur, the district education officer (DEO) of Jodhpur and the heads of respective schools. Based on the feasibility, three government schools each from rural and urban areas of Jodhpur were selected from the list procured from DEO of Jodhpur.

Adolescent girls of classes 8th to 12th (aged between 10 and 19 years), willing to participate in the study were included as study participants after due approval from the school principal/headmaster/headmistress and after obtaining due informed consent from their parents/guardians. Girls fulfilling the inclusion criteria but not present during the day of data collection and those who were not willing to participate were excluded.

Sample size was calculated considering the prevalence of depression among adolescent girls as 55% with 95% confidence interval, 10% precision and 20% non-response rate. 205 girls from each urban and rural area were planned to be included to meet the sample size of 409 and finally, 238 girls from urban and 205 girls from rural area were selected.

After explaining the study objectives to teachers and students, a pre-tested semi-structured questionnaire was self-administered, to collect data regarding socio-demographic profile, parents' income and occupation, students' attendance in previous month and participation in extracurricular activities/sports. Anthropometric measurements were also recorded in the same visit.

For mental health status, pre-validated depression, anxiety, stress scales-21 items (DASS-21) and short version moods and feelings questionnaire (SMFQ) for child self-reporting (translated to Hindi and back translated) were used. DASS-21 is a 21-item scale set to measure depression, anxiety and stress through self-report and categorize as Normal, mild, moderate, severe and very severe. While, SMFQ is a 13-item self-reporting instrument to screen depressive symptoms and moods and feelings in the respondents.

For nutritional status, body mass index (BMI) calculation using height and weight measurements and Waist-hip ratio calculation was done. To assess the nutritional status, BMI for age was calculated using WHO growth reference standards for girls.

Waist-hip ratio was calculated using waist and hip circumference (using WHO steps protocol) and the risk of metabolic complication were opined to increase at a ratio of ≥ 0.85 as per WHO guidelines.

The collected data was analyzed using SPSS v19, proportions for categorical variables and mean, standard deviation and standard error were calculated for numerical variables. Chi square test was used as a test of significance for categorical variables and independent t

test was used for numerical variables considering p<0.05 to be significant.

RESULTS

Out of the 3 schools of urban and 3 schools of rural Jodhpur, a total of 443 school going adolescent girls were included in the study. Among them, 238 (53.7%) were from urban and 205 (46.3%) were from rural areas. The mean age of the participants was 15.32±1.39, ranging from 12 to 18 years. The 24 girls (8 from urban and 16 from rural area) were married at the time of the study and were below 18 years of age.

As per the modified BG Prasad socioeconomic classification, majority of the participants (n=173, 39%) were from lower middle class followed by lower class (n=142, 32%), middle class (n=72, 16%), upper middle class (n=44, 10%) and upper class (n=12, 3%). Distribution of the participants according to socioeconomic status and other detailed demographic findings are mentioned in Table 1.

Mental health status assessment

Among the participants for urban area, 14.7% had mild depression, 12.2% had moderate depression, 5.5% had severe depression and 1.3% had very severe depression. Whereas, in rural area 16.6% of the participants had mild depression, 15.1% had moderate depression, 2.9% had severe depression and 0.5% had very severe depression. Overall, 152 (34.3%) out of the total 443 adolescent girls were having depression score ≥10, including 80 (18.1%) girls from urban and 72 (16.2%) girls from rural area. Moreover, 50 (11.3%) such girls were early adolescents and 102 (23%) were late adolescents. Presence and absence of depression was found to be significantly associated with mean monthly attendance amongst the students (t=3.6; p<0.001) (Table 2).

Mild anxiety was observed in 10.1% girls, moderate anxiety in 32.8%, severe anxiety in 9.2% and very severe anxiety in 12.2% in urban areas. Whereas, in rural area,

13.2% of the participants had mild anxiety, 27.8% had moderate anxiety, 12.7% had severe anxiety and 11.7% had very severe anxiety. Overall, 287 (64.8%) out of the total 443 adolescent girls were having anxiety score ≥10. Presence and absence of anxiety was found to be significantly associated with socio economic class (χ^2=4.89; p<0.03) and mean monthly attendance amongst the students (t=2.6; p<0.001).

Mild stress was observed in 11.8% girls, moderate stress in 8.4%, severe stress in 4.2% and very severe stress in 0.4% in urban areas. Whereas, in rural area, 10.2% of the participants had mild stress, 12.2% had moderate stress, 3.9% had severe stress and 1.5% had very severe stress. Overall, 116 (26.2%) out of the total 443 adolescent girls were having stress score ≥10. Presence and absence of stress was found to be significantly associated with mean monthly attendance amongst the students (t=2.4; p=0.02).

Nearly 10% of the participants were found to have depressive symptoms as per the SMFQ. However, depressive symptoms assessed by mood and feeling questionnaire were not found to be associated with study area, age group, marital status, family size, number of siblings, socioeconomic status, participation in extracurricular activity or percentage of monthly attendance (Table 3).

Nutritional status assessment

Amongst the study participants, 17.4% adolescent girls were found to be thin and 4.7% were found to fall under the category of overweight or obese. The BMI status was found to be significantly associated with rural and urban location (χ^2=12.13; p=0.002), age groups of early and late adolescence (χ^2=7.59; p=0.02) and socioeconomic class (χ^2=6.46; p=0.04) as described in Table 4.

As per the waist-hip ratio 22 girls (5%) were found to be at an increased risk of metabolic complication, i.e., waist-hip ratio>0.85. WHR was found to be significantly associated with participation in extra-curricular activities (χ^2=12.13; p=0.002) by study participants.

Table 1: Demographic distribution and characteristics of the study population.

Variables	Demographic distribution characteristics of the study population					
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)
Age group (Years)	Early adolescence (10-14)		Late adolescence (15-19)		Total	
Urban	71	29.8	167	70.2	238	53.7
Rural	52	25.4	153	74.6	205	46.3
Total	123	27.8	320	72.2	443	100
	χ^2=1.095			p=0.29		
Marital status	Married		Unmarried		Total	
Urban	8	3.4	230	96.6	238	100
Rural	16	7.8	189	92.2	205	100
Total	24	5.4	419	94.6	443	100
	χ^2=4.244			p=0.039		

Continued.

Demographic distribution characteristics of the study population						
Variables	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)
Family size	**≤5 members**		**>5 members**		**Total**	
Urban	89	37.4	149	62.6	238	100
Rural	49	23.9	156	76.1	205	100
Total	138	31.2	305	68.8	443	100
	χ^2=9.348			p=0.002		
Numbers of siblings	**≤2 Siblings**		**>2 Siblings**		**Total**	
Urban	52	21.8	186	78.2	238	100
Rural	8	3.9	197	96.1	205	100
Total	60	13.5	383	86.5	443	100
	χ^2=29.493			p=0.001		
Socio-economic class*	**Lower class**		**Middle and upper class**		**Total**	
Urban	176	73.9	62	26.1	238	100
Rural	139	67.8	66	32.2	205	100
	χ^2=2.024			p=0.155		
Total	315	71.1	128	28.9	443	100

*In the socio-economic classification, Lower and lower middle classes of modified BG Prasad socioeconomic classification were clubbed into lower class. Similarly, middle, upper middle and upper class were grouped in to middle and upper class.

Table 2: Distribution of adolescent girls based on DASS-21 scale with univariate analysis.

Variables	Distribution of adolescent girls based on DASS-21 scale with univariate analysis						P value
	Normal, n (%)	Mild, n (%)	Moderate, n (%)	Severe, n (%)	Very severe, n (%)	Total, n (%)	
Depression							
Location							
Urban	158 (66.4)	35 (14.7)	29 (12.2)	13 (5.5)	3 (1.3)	238 (100)	0.74
Rural	133 (64.9)	34 (16.6)	31 (15.1)	6 (2.9)	1 (0.5)	205 (100)	
Age groups (Years)							
Early adolescent	73 (59.3)	29 (23.6)	16 (13)	3 (2.4)	2 (1.6)	123 (100)	0.08
Late adolescent	218 (68.1)	40 (12.5)	44 (13.8)	16 (5)	2 (0.6)	320 (100)	
Married							
Yes	14 (58.3)	5 (20.8)	3 (12.5)	1 (4.2)	1 (4.2)	24 (100)	0.44
No	277 (66.1)	64 (15.3)	57 (13.6)	18 (4.3)	3 (0.7)	419 (100)	
Family size							
<5 members	93 (67.6)	20 (14.5)	22 (15.9)	3 (2.2)	0 (0.0)	138 (100)	0.61
>5 members	198 (64.9)	49 (16.1)	38 (12.5)	16 (5.2)	4 (1.3)	305 (100)	
Siblings							
<2 siblings	46 (76.3)	9 (15.3)	5 (8.5)	1 (1.7)	0 (0.0)	60 (100)	0.12
>2 siblings	246 (64.2)	60 (15.7)	55 (14.4)	18 (4.7)	4 (1.0)	383 (100)	
Socio-economic class							
Lower class	104 (73.2)	17 (12)	13 (9.2)	7 (4.9)	1 (0.7)	142 (100)	
Lower middle class	109 (63.0)	26 (15)	29 (16.8)	7 (4)	2 (1.2)	173 (100)	
Middle class	42 (58.3)	16 (22.2)	10 (13.9)	4 (5.6)	0 (0)	72 (100)	
Upper middle class	28 (63.6)	8 (18.2)	7 (15.9)	0 (0)	1 (2.3)	44 (100)	
Upper class	8 (66.7)	2 (16.7)	1 (8.3)	1 (8.3)	0 (0)	12 (100)	
Lower class	213 (67.6)	102 (32.4)				315 (100)	0.18
Mid-upper class	78 (60.9)	50 (39.1)				128 (100)	
Extra-curricular participation*							
Yes	174 (64.9)	40 (14.9)	37 (13.8)	13 (4.9)	4 (1.5)	268 (100)	0.62
No	115 (67.3)	28 (16.4)	22 (12.9)	6 (3.5)	0 (0)	171 (100)	
Monthly attendance**							
>80%	88 (78.6)	8 (7.1)	11 (9.8)	4 (3.6)	1 (0.9)	112 (100)	0.001
<80%	203 (61.3)	61 (18.4)	49 (14.8)	15 (4.5)	3 (0.9)	331 (100)	
Total	291 (65.7)	69 (15.6)	60 (13.5)	19 (4.3)	4 (0.9)	443 (100)	

Continued.

| Variables | Distribution of adolescent girls based on DASS-21 scale univariate analysis | | | | | | P value |
	Normal, n (%)	Mild, n (%)	Moderate, n (%)	Severe, n (%)	V. severe, n (%)	Total, n (%)	
Anxiety							
Location							
Urban	85 (35.7)	24 (10.1)	78 (32.8)	22 (9.2)	29 (12.2)	238 (100)	0.81
Rural	71 (34.6)	27 (13.2)	57 (27.8)	26 (12.7)	24 (11.7)	205 (100)	
Age groups (years)							
Early adolescent	42 (34.1)	20 (16.3)	32 (26)	12 (9.8)	17 (13.8)	123 (100)	0.77
Late adolescent	114 (35.6)	31 (9.7)	103 (32.2)	36 (11.3)	36 (11.3)	320 (100)	
Married							
Yes	8 (33.3)	1 (4.2)	6 (25)	6 (25)	3 (12.5)	24 (100)	0.84
No	148 (35.3)	50 (11.9)	129 (30.8)	42 (10)	50 (11.9)	419 (100)	
Family size							
< 5 members	45 (32.6)	16 (11.6)	51 (37)	14 (10.1)	12 (8.7)	138 (100)	0.44
> 5 members	111 (36.4)	35 (11.5)	84 (27.5)	34 (11.1)	41 (13.4)	305 (100)	
Siblings							
<2 siblings	23 (37.3)	8 (13.6)	20 (33.9)	4 (6.8)	5 (8.5)	60 (100)	0.70
>2 siblings	133 (34.7)	43 (11.2)	115 (30)	44 (11.5)	48 (12.5)	383 (100)	
Socio-economic class							
Lower class	58 (40.8)	17 (12)	41 (28.9)	12 (8.5)	14 (9.9)	142 (100)	
Lower middle class	63 (36.4)	21 (12.1)	47 (27.2)	19 (11)	23 (13.3)	173 (100)	
Middle class	18 (25)	5 (6.9)	26 (36.1)	12 (16.7)	11 (15.3)	72 (100)	
Upper middle class	12 (27.3)	7 (15.9)	16 (36.4)	5 (11.4)	4 (9.1)	44 (100)	
Upper class	5 (41.7)	1 (8.3)	5 (41.7)	0 (0)	1 (8.3)	12 (100)	
Lower class	121 (38.4)	194 (61.6)				315 (100)	0.03
Mid-upper class	35 (27.3)	93 (72.7)				128 (100)	
Extra-curricular participation*							
Yes	91 (34)	31 (11.6)	88 (32.8)	28 (10.4)	30 (11.2)	268 (100)	0.46
No	64 (37.4)	20 (11.7)	44 (25.7)	20 (11.7)	23 (13.5)	171 (100)	
Monthly attendance**							
>80%	48 (42.9)	15 (13.4)	29 (25.9)	8 (7.1)	12 (10.7)	112 (100)	0.05
<80%	108 (32.6)	36 (10.9)	106 (32.0)	40 (12.1)	41 (12.4)	331 (100)	
Total	156 (35.2)	51 (11.5)	135 (30.5)	48 (10.8)	53 (12)	443 (100)	
Stress							
Location							
Urban	179 (75.2)	28 (11.8)	20 (8.4)	10 (4.2)	1 (0.4)	238 (100)	0.47
Rural	148 (72.2)	21 (10.2)	25 (12.2)	8 (3.9)	3 (1.5)	205 (100)	
Age groups (years)							
Early adolescent	92 (74.8)	14 (11.4)	12 (9.8)	4 (3.3)	1 (0.8)	123 (100)	0.77
Late adolescent	235 (73.4)	35 (10.9)	33 (10.3)	14 (4.4)	3 (0.9)	320 (100)	
Married							
Yes	14 (58.3)	4 (16.7)	4 (16.7)	2 (8.3)	0 (0)	24 (100)	0.08
No	313 (74.7)	45 (10.7)	41 (9.8)	16 (3.8)	4 (1.0)	419 (100)	
Family size							
<5 members	103 (74.6)	15 (10.9)	12 (8.7)	5 (3.6)	3 (2.2)	138 (100)	0.79
>5 members	224 (73.4)	34 (11.1)	33 (10.8)	13 (4.3)	1 (0.3)	305 (100)	
Siblings							
<2 siblings	46 (76.3)	7 (11.9)	3 (5.1)	2 (3.4)	2 (3.4)	60 (100)	0.64
>2 siblings	281 (73.4)	42 (11)	42 (11)	16 (4.2)	2 (0.5)	383 (100)	
Socio-economic class							
Lower class	113 (79.6)	15 (10.6)	10 (7)	3 (2.1)	1 (0.7)	142 (100)	
Lower middle class	127 (73.4)	18 (10.4)	20 (11.6)	7 (4)	1 (0.6)	173 (100)	
Middle class	47 (65.3)	8 (11.1)	9 (12.5)	6 (8.3)	2 (2.8)	72 (100)	
Upper middle class	29 (65.9)	7 (15.9)	6 (13.6)	2 (4.5)	0 (0)	44 (100)	
Upper class	11 (91.7)	1 (8.3)	0 (0)	0 (0)	0 (0)	12 (100)	
Lower class	240 (76.2)	75 (23.8)				315 (100)	0.07
Mid-upper class	87 (68)	41 (32)				128 (100)	

Continued.

Variables	Distribution of adolescent girls based on DASS-21 scale with univariate analysis						P value
	Normal, n (%)	Mild, n (%)	Moderate, n (%)	Severe, n (%)	V. severe, n (%)	Total, n (%)	
Extra-curricular participation*							
Yes	192 (71.6)	30 (11.2)	31 (11.6)	12 (4.5)	3 (1.1)	268 (100)	0.25
No	131 (76.6)	19 (11.1)	14 (8.2)	6 (3.5)	1 (0.6)	171 (100)	
Monthly attendance**							
>80%	91 (81.3)	6 (5.4)	9 (8)	6 (5.4)	0 (0)	112 (100)	0.04
<80%	236 (71.3)	43 (13)	36 (10.9)	12 (3.6)	4 (1.2)	331 (100)	
Total	327 (73.8)	49 (11.1)	45 (10.2)	18 (4.1)	4 (0.9)	443 (100)	

*4 participants did not respond to the question on participation in extra-curricular activities, **For numerical data on monthly attendance, independent t tests were conducted to obtain p value.

Table 3: Depression distribution and characteristics-assessed by mood and feeling questionnaire.

Variables	Absent		Present		Total		P value
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	
Location							
Urban	216	90.8	22	9.2	238	100	0.60
Rural	183	89.3	22	10.7	205	100	
Age groups (years)							
Early adolescent	115	93.5	8	6.5	123	100	0.14
Late adolescent	284	88.8	36	11.3	320	100	
Married							
Yes	19	79.2	5	20.8	24	100	0.07
No	380	90.7	39	9.3	24	100	
Family size							
<5 members	122	88.4	16	11.6	138	100.0	0.43
>5 members	277	90.8	28	9.2	305	100.0	
Siblings							
<2 siblings	50	83.3	10	16.7	60	100.0	0.14
>2 siblings	348	90.9	35	9.1	383	100.0	
Socio-economic class							
Lower class	286	90.8	29	9.2	315	100	0.42
Mid-upper class	113	88.3	15	11.7	128	100	
Extra-curricular participation*							
Yes	244	91	24	9	268	100	0.46
No	152	88.9	19	11.1	171	100	
Monthly attendance							
>80%	103	92	9	8	112	100.0	0.44
<80%	296	89.4	35	10.6	331	100.0	
Total	399	90.1	44	9.9	443	100.0	

*4 participants did not respond to the question on participation in extra-curricular activities.

Table 4: Distribution of BMI status amongst study participants

Variables	Normal		Thin		Overweight/ obese		Total		P value
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	
Location									
Urban	190	79.8	31	13.6	17	7.1	238	100	0.002
Rural	155	75.6	46	22.4	4	2	205	100	
Age groups (years)									
Early adolescent	95	77.2	17	13.8	11	8.9	123	100	0. 022
Late adolescent	250	78.1	60	18.8	10	3.1	320	100	

Continued.

Variables	Normal		Thin		Overweight/ obese		Total		P value
	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	
Married									
Yes	20	83.3	3	12.5	1	4.2	24	100	0.794
No	325	77.6	74	17.7	20	4.8	419	100	
Family size									
<5 members	100	72.5	29	21	9	6.5	138	100.0	0.164
>5 members	245	80.3	48	15.7	12	3.9	305	100.0	
Siblings									
<2 siblings	48	80.0	8	13.3	4	6.7	60	100.0	0.696
>2 siblings	297	77.5	69	18.0	17	4.4	383	100.0	
Socio-economic class									
Lower class	252	80	46	14.6	17	5.4	315	100	0.039
Mid-upper class	93	72.7	31	24.2	4	3.1	128	100	
Extra-curricular participation*									
Yes	205	76.5	52	19.4	11	4.1	268	100	0.276
No	137	80.1	24	14.0	10	5.8	171	100	
Monthly attendance									
>80%	260	78.5	58	17.5	13	3.9	331	100.0	0.384
<80%	85	75.9	19	17.0	8	7.1	112	100.0	
Total	345	77.9	77	17.4	21	4.7	443	100.0	

*4 participants did not respond to the question on participation in extra-curricular activities.

Table 5: Univariate analysis of factors associated with Waist-Hip Ratio

Variables	Normal		Increased risk		Total		P value
	N	Percentage, (%)	N	Percentage, (%)	N	Percentage, (%)	
Location							
Urban	222	93.3	16	6.7	238	100.0	0.067
Rural	199	97.1	6	2.9	205	100.0	
Age groups (years)							
Early adolescent	116	94.3	7	5.7	123	100.0	0.632
Late adolescent	305	95.3	15	4.7	320	100.0	
Married							
Yes	21	87.5	3	12.5	24	100.0	0.081
No	400	95.5	19	4.5	419	100.0	
Family size							
<5 members	130	94.2	8	5.8	138	100.0	0.588
>5 members	291	95.4	14	4.6	305	100.0	
Siblings							
<2 siblings	56	93.3	4	6.7	60	100.0	0.494
>2 siblings	365	95.3	18	4.7	383	100.0	
Socio-economic class							
Lower class	298	94.6	17	5.4	315	100.0	0.513
Mid-upper class	123	96.1	5	3.9	128	100.0	
Extra-curricular participation*							
Yes	158	92.4	13	7.6	171	100.0	0.047
No	259	96.6	9	3.4	268	100.0	
Monthly attendance							
>80%	315	95.2	16	4.8	331	100.0	0.826
<80%	106	94.6	6	5.4	112	100.0	
Total	421	95.0	22	5.0	443	100.0	

*4 participants did not respond to the question on participation in extra-curricular activities

DISCUSSION

From the study conducted, it was observed that more than a third of urban and rural school going adolescent girls were found to be suffering from various grades of depression as per DASS-21 scale and 10% of the study subjects were found to be having depressive symptoms as per the SMF questionnaire. The prevalence thus observed was lower than the prevalence of 55% in Patna (Bihar) as observed by Jha et al and higher than the prevalence of 23% amongst adolescents in South India observed by Trivedi et al.[18,19] Nearly two-thirds adolescent girls in both rural and urban areas were found to be having anxiety which was higher than the previously known value of 22.7% for adolescent girls in North India, as determined by Madasu et al 30% for adolescent school going girls in Karachi as determined by Farooq et al and similar to the findings of Wahab et al who observed a prevalence of 67% in schools of Kuala Lumpur.[20-22] More than one-fourth of the school going adolescent girls of urban and rural areas were found to be having stress in the study. This prevalence was lower than the previous values obtained in the studies of Wahab et al and Watode et al.[22,23] Such difference in observations across geographical locations may be due to regional variations in literacy rates, cultural practices and levels of development.

Results for nutritional status indicated that 17.4% adolescents were thin and 4.7% were either overweight or obese and nearly 7% of the urban and 3% of rural school going adolescent girls were having high risk of metabolic complications as indicated by the waist-hip ratio. Such findings were in contrast with the findings of previous studies such as those of Deshmukh et al where majority (53.8%) adolescent girls were thin and only 2.2% were overweight/obese, Choudhary et al with 69% prevalence of undernutrition and Shahabuddin et al with prevalence of thinness amongst 59% of the adolescent girls.[24-26] Such variations can be attributed to differences in socio-cultural practices, level of development, value attached to girl child and dietary practices across different settings.

Further, it was found that the presence depression, anxiety and stress were independently significantly associated with lower mean monthly attendance indicating that poor mental health may lead to academic loss of the students. While anxiety was also found to be significantly associated with socioeconomic class of the family, no significant associations were observed with urban or rural location, early or late adolescence, marital status, family size or participation in extracurricular activities.

On the other hand, BMI status of the participants were found to be significantly associated with rural and urban locality, early and late adolescent and socio-economic status of the family, while increased waist-hip ratio was found to be significantly associated with lesser participation in extra-curricular activities.

Limitations

The study was conducted using convenient sampling which has its own limitations in terms of the possibility of sampling error and lack of representation of population.

CONCLUSION

The study indicated a high prevalence of depression, anxiety and stress was observed among school going adolescent girls that were significantly associated with the low monthly attendance which indicates a negative impact of such factors on regular education and academic growth of the students. Over 17% of the adolescent girls were found to be thin and nearly 5% were obese/overweight which was significantly associated with locality age group and socio-economic status, while 5% were at increased risk of metabolic complication with waist hip ratio more than 0.85. Waist hip ratio was significantly associated with participation in extra-curricular activity which indicates a positive impact of such activities in reduction of risk of metabolic disorders. The findings highlight a greater emphasis needed on mental health as well as nutritional components during the active growth years of adolescent females.

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