

Association between body weight, body image perception, self-esteem and depression among adolescent population

Devendra Ratnani¹, Nishant Sahu^{2*}

^{1,2}Assistant Professor, Department of Psychology, CM medical College, Durg Chhattisgarh, Maharashtra, INDIA.

Email: nishin625@gmail.com

Abstract

Background: The prevalence of overweight or obesity in adolescents is increasing worldwide. Over weight and obesity can have plethora of adverse consequences among adolescents, which is often ignored due to paucity of studies on the subject. **Aims:** Study was conducted to determine the association between overweight/obesity and body image perception and also to identify the impact of body image perception on self-esteem and depression among adolescent population. **Methods:** A cross sectional study was conducted in a population of 175 subjects. The adolescent boys and girls aged between 11 to 15 years were enrolled for the study. Body Mass Index was classified according to International Obesity Task Force (IOTF) and the body image perception was assessed by 14 item version of Body Shape Questionnaire. Self-esteem and depression were assessed by PHQ 9 and Rosenberg self-esteem questionnaire. **Results:** Majority (29.1%) of the participants were in the age of 16 years. The predominance of females were high with 55.4% as compared to males with 44.6%. Most of the fathers were educated up to secondary schooling with 35.4%, whereas majority mothers were studied up to middle school with 31.4%. In case of socioeconomic status majority of the participants were from lower middle class (44%) followed by upper middle class (33.7%). BMI category was normal in 44.6% whereas overweight in 37.1% and obesity in 18.3%. The mean BSQ score and mean PHQ- 9 score were higher among the people with overweight and obesity, as compared to normal subjects. Whereas, the mean self-esteem score was higher among the people with normal weight, as compared to overweight and obesity subjects. **Conclusion:** The present study concluded that overweight and obesity will have negative influence on body image perception, self-esteem and may be associated with increased risk of depression among adolescents.

Key Word: Adolescents, Depression, Overweight and Obesity.

*Address for Correspondence:

Dr. Nishant Sahu, Assistant Professor, Department of Psychology, CM Medical College, Durg Chhattisgarh, Maharashtra, INDIA.

Email: nishin625@gmail.com

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INTRODUCTION

Worldwide, the prevalence of obesity in adolescents is rapidly increasing.¹ Because of its prevalence, cost and health effects obesity is considered as one of the major healthcare problem. Accumulation of excessive fat in the

body can lead to long term health consequences. Obesity is an abnormal accumulation of body fat usually 20% above the normal ideal weight to an extent that it may have an adverse effect on body.² In both the developing and developed countries the prevalence of overweight or obesity is rapidly increasing.³ In Arab countries 18% - 44% is the prevalence of overweight and obesity in adolescents.⁴ Based on gender the proportion of overweight is higher than that of obese in general. In case of adolescents, the prevalence of overweight is higher in girls as compared to boys.^{5,6} In developed countries the prevalence of overweight or obese is about 23.8% in boys and 22.6% in girls in the year 2013. Whereas, the prevalence of overweight in boys increased from 8% to 12.9% in boys and 8.4% to 13.4% in girls in the year 2013 in developing countries.^{7,8} In the year 2008, around

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170 million children under the age of 18 years are overweight or obese.⁹ In European countries 20.5% is the overall prevalence of overweight among the adolescents in which the proportion of overweight and obesity are 15.6% and 4.9% respectively. In Eastern Asia countries, the prevalence of overweight and obesity in the school children are 24.5% whereas 11.9% in the Western Asia countries.¹⁰ The prevalence of obesity in the adolescents is reported high in the Asia.¹¹ The prevalence of obese or overweight children is high in the developing countries as compared to the developed countries.¹² The individual, behavioral and environmental factors are influenced by the childhood obesity. The prevalence of obesity and overweight are increasing due to the lifestyle and behavioral changes such as consumption of foods rich in refined sugars and saturated fats, decreased physical activities, increased sedentary behavior and lack of sleep.¹³ Body image is a multidimensional construct encompassing how we perceive, think, feel and act towards our bodies and lies in a continuum from healthy body perception to an unhealthy body perception. Interest in the body image perception increases the public health concern regarding the weight status, lack of physical activities, obesity, eating disorders and the associated spectrum of the health consequences.¹⁴ Unhealthy body image is closely related to the obesity and physical in-activities.¹⁵ Low self-esteem is a risk factor for developing the eating disorders especially in adolescents which can lead to obesity.¹⁶ Being overweight or obese is a risk factor for chronic diseases.¹ One of the important step involved in the prevention and control of chronic non-communicable diseases like cardiovascular diseases, diabetes mellitus and hypertension is the obesity management.¹⁷ Around 60% of the overall morbidity and mortality are caused due to these diseases.¹⁸ Shortness of breath, back pain, decreased mobility, poor quality of life, increased physiological and social burden are closely related with the obesity.² Emotional and physiological changes occurred due to obesity can cause low self-esteem, anxiety, clinical depression and suicidal attempts. The prevalence of depression in obese individuals are 3 - 4 higher than that of non-obese individuals. The emotional changes caused by obesity can lead to binge eating, lower level of confidence, social isolation and humiliation.² The present study was performed to determine the association between overweight/obesity and body image perception among adolescent population and also to identify the impact of body image perception on self-esteem and depression among the study population Worldwide, the prevalence of obesity in adolescents is rapidly increasing.¹ Because of its prevalence, cost and health effects obesity is considered as one of the major healthcare problem. Accumulation of

excessive fat in the body can lead to long term health consequences. Obesity is an abnormal accumulation of body fat usually 20% above the normal ideal weight to an extent that it may have an adverse effect on body.² In both the developing and developed countries the prevalence of overweight or obesity is rapidly increasing.³ In Arab countries 18% - 44% is the prevalence of overweight and obesity in adolescents.⁴ Based on gender the proportion of overweight is higher than that of obese in general. In case of adolescents, the prevalence of overweight is higher in girls as compared to boys.^{5,6} In developed countries the prevalence of overweight or obese is about 23.8% in boys and 22.6% in girls in the year 2013. Whereas, the prevalence of overweight in boys increased from 8% to 12.9% in boys and 8.4% to 13.4% in girls in the year 2013 in developing countries.^{7,8} In the year 2008, around 170 million children under the age of 18 years are overweight or obese.⁹ In European countries 20.5% is the overall prevalence of overweight among the adolescents in which the proportion of overweight and obesity are 15.6% and 4.9% respectively. In Eastern Asia countries, the prevalence of overweight and obesity in the school children are 24.5% whereas 11.9% in the Western Asia countries.¹⁰ The prevalence of obesity in the adolescents is reported high in the Asia.¹¹ The prevalence of obese or overweight children is high in the developing countries as compared to the developed countries.¹² The individual, behavioral and environmental factors are influenced by the childhood obesity. The prevalence of obesity and overweight are increasing due to the lifestyle and behavioral changes such as consumption of foods rich in refined sugars and saturated fats, decreased physical activities, increased sedentary behavior and lack of sleep.¹³ Body image is a multidimensional construct encompassing how we perceive, think, feel and act towards our bodies and lies in a continuum from healthy body perception to an unhealthy body perception. Interest in the body image perception increases the public health concern regarding the weight status, lack of physical activities, obesity, eating disorders and the associated spectrum of the health consequences.¹⁴ Unhealthy body image is closely related to the obesity and physical in-activities.¹⁵ Low self-esteem is a risk factor for developing the eating disorders especially in adolescents which can lead to obesity.¹⁶ Being overweight or obese is a risk factor for chronic diseases.¹ One of the important step involved in the prevention and control of chronic non-communicable diseases like cardiovascular diseases, diabetes mellitus and hypertension is the obesity management.¹⁷ Around 60% of the overall morbidity and mortality are caused due to these diseases.¹⁸ Shortness of breath, back pain, decreased mobility, poor quality of life,

increased physiological and social burden are closely related with the obesity.² Emotional and physiological changes occurred due to obesity can cause low self-esteem, anxiety, clinical depression and suicidal attempts. The prevalence of depression in obese individuals are 3 - 4 higher than that of non-obese individuals. The emotional changes caused by obesity can lead to binge eating, lower level of confidence, social isolation and humiliation.² The present study was performed to determine the association between overweight/obesity and body image perception among adolescent population and also to identify the impact of body image perception on self-esteem and depression among the study population

MATERIALS AND METHODS

The current study was a cross sectional study, conducted in the selected schools in the field practice area of CM Medical College, Durg between November 2018 to October 2019 for a period of 12 months. The study population included adolescent boys and girls aged between 11 to 15 years, studying in 6th to 10th standards in the selected schools. Only those participants, whose parents have signed informed written consent to participate in the study were included in the analysis. All the participants have signed ascent form. The study was

approved by institutional ethical committee and the participants personal data was kept confidential. Sample size was calculated assuming the proportion of Overweight and obesity as 30% as per previous literature. We have considered 95% confidence level and 7% precision, based on which the required number of subjects to be included in the study were 165. To account for a non-participation rate of 5%, another 8 participants were needed sampled. The final analysis included 175 subjects. After the initial history regarding the key sociodemographic parameters like age, gender, class, family details all the participants were assessed for anthropometric parameters including weight and height. Standardized instruments and procedures were used to do so. BMI was classified according to International Obesity Task Force (IOTF). The 14 item BSQ was administered to each of the participants by the investigator. The body image perception was assessed by 14 item version of Body Shape Questionnaire (BSQ), which was originally developed by Evans, C *et al*¹⁹, as a 34 item questionnaire. This was later concise to a 14 item scale and validated by Dowson, J *et al*.²⁰ Depression was assessed by Patient Health Questionnaire (PHQ-9) and self-esteem was assessed by Rosenberg Self-Esteem Scale. Higher self-esteem scores indicate higher self-esteem.²¹

RESULTS

Table 1: Descriptive analysis of age, gender in study population (N=175)

Parameter	Frequency	Percent
Age group		
11 and 12 years	18	7.3%
13 years	35	20.0%
14 years	30	17.1%
15 years	41	23.4%
16 years	51	29.1%
Gender		
Male	78	44.6%
Female	97	55.4%

Among the study population, the age was 11/12 years in 18 (7.3%), 13 years in 35(20%), 14 years in 30(17.1%), 15 years in 41(23.4%), 16 years in 51(29.1%). Among the study population, the number of females 97 (55.4%) was slightly higher than males 78 (44.6%).(Table 1)

Table 2: descriptive analysis of demographical parameter in the study population (N= 175)

Parameter	Frequency	Percent
Religion		
Hindu	98	56.0%
Muslim	36	20.6%
Christian	33	18.9%
Others	8	4.6%
Father education		
Illiterate	14	8.0%
Up to middle school	45	25.7%
Up to secondary school	62	35.4%

Diploma or graduate	40	22.9%
Post graduate and professional	14	8.0%
Mother education		
Illiterate	30	17.1%
Up to middle school	55	31.4%
Up to secondary school	45	25.7%
Diploma or graduate	36	20.6%
Postgraduate and professional	9	5.1%
Father occupation		
Unemployed	5	2.9%
Unskilled/Semiskilled	41	23.4%
skilled worker	52	29.7%
clerical/Business	52	29.7%
Professional	25	14.3%
Mother occupation		
Housewife	85	48.6%
Unskilled/Semiskilled	32	18.3%
skilled worker	35	20.0%
clerical/Business	19	10.9%
Professional	4	2.3%
SES Category		
Upper	10	5.7%
Upper middle	59	33.7%
Lower middle	77	44.0%
Upper lower	29	16.6%

The majority (56%) of the study subjects were Hindus, followed by 20.6% Muslims (18.9%) Christians (18.9%) and other religions(4.6%). Most of the fathers were educated up to secondary schooling (35.4%), whereas majority mothers (31.4%) were studied up to middleschool. Among study participants, majority of the fathers were skilled workers (29.7%) or employed in clerical jobs or businessmen (29.7%). Majority of mothers were housewives (48.6%). Among study population majority of the participants were from lower middle class (44%) followed by upper middle class (33.7%). The proportion of participants in the upper lower class was 16.6%. The proportion of subjects in Upper class was 5. 7%.(Table 2)

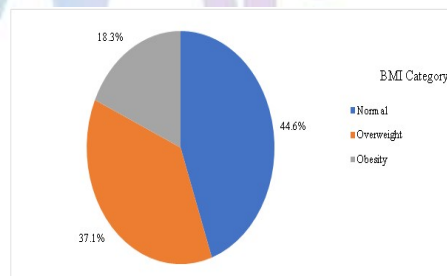


Figure 1: pie chart of BMI Category in study population (N=175)

Among the study population, the BMI category was Normal in 78(44.6%), Overweight in 65(37.1%) and obesity in 32(18.3%). Hence the overall prevalence of either overweight or obesity was 55.4% in the study population. (Figure 1)

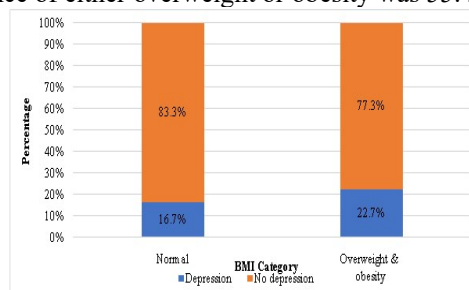


Figure 2: Cluster bar chart of comparison of BMI category between depression status(N=175)

The proportion of overweight and obesity was higher among overweight and obese population, as compared to normal subjects (22.68% Vs 16.67%, P value 0.336), but the difference was statistically not significant.(Figure 2)

Table 3: Comparison of mean total BSQ, PHQ and Self-esteem score of between BMI(N=175)

Parameter	BMI (Mean \pm SD)		Mean difference (95% CI)	P value
	Overweight and obesity (N=97)	Normal (N=78)		
Total BSQ	35.93 \pm 6.13	24.7 \pm 6.98	11.23 (9.27 to 13.18)	<0.001
PHQ-9	11.12 \pm 2.3	8.6 \pm 1.7	2.52 (1.90 to 3.13)	<0.001
SELF ESTEEM	16.98 \pm 3.47	18.75 \pm 4.06	1.77 (0.64 to 2.89)	0.002

The mean BSQ score was higher among the people with overweight and obesity, as compared to normal subjects (Mean difference 11.23, 95% CI 9.27 to 13.18, P value < 0.01), which was statistically significant. The mean PHQ- 9 score was higher among the people with overweight and obesity, as compared to normal subjects (Mean difference 2.52, 95% CI 1.90 to 3.13, P value < 0.01), which was statistically significant. The mean self-esteem score was higher among the people with normal weight, as compared to overweight and obesity subjects (Mean difference 1.77, 95% CI 0.64 to 2.89, P value 0.002), which was statistically significant. (Table 3)

Table4: Comparison of mean total BSQ, PHQ and Self-esteem score of between depression (N=175)

Parameter	Depression		Mean difference (95% CI)	P value
	Depression (PHQ <11) (N=35)	No depression (PHQ \geq 11) (N=140)		
BMI	26.92 \pm 4.51	19.57 \pm 3.82	7.35 (5.87 to 8.82)	<0.001
BSQ	39.42 \pm 5.65	26.54 \pm 4.23	12.88 (11.18 to 14.57)	<0.001
SELF esteem score	15.77 \pm 2.84	18.93 \pm 3.13	3.16 (2.01 to 4.30)	<0.001

The mean BMI was higher among the adolescents with depression as compared to people without depression (mean difference 7.35, 95% CI 5.87 to 8.82 P value < 0.001), which was statistically significant. The mean BSQ was higher among the adolescents with depression as compared to people without depression (mean difference 12.88, 95% CI 11.18 to 14.57 P value < 0.001), which was statistically significant. The mean self-esteem score was higher among the adolescents without depression as compared to people with depression (mean difference 3.16, 95% CI 2.01 to 4.30 P value < 0.001), which was statistically significant. (Table 4)

DISCUSSION

The present study was conducted to determine the association between overweight/obesity and body image perception among adolescent population and also to identify the impact of body image perception on self-esteem and depression among the study population. A total of 175 participants were included for the final analysis. Among the study population, the age was 11/12 years in 7.3% of participants followed by 13 years in 20%, 14 years in 17.1%, 15 years in 23.4% and 16 years in 29.1%. Among the study population, the number of females 55.4% was slightly higher than males 44.6%. Lee, J *et al.*²² conducted a study in a population of 6445 subjects in which majority of the patients were females with 53.3%. The growth spurt and body fat increase during the puberty can cause the predominance of females in the present study population. The majority with 56% of the study subjects were Hindus, followed by 20.6% Muslims 18.9% Christians 18.9% and other religions by 4.6%. Most of the fathers were educated up to secondary schooling (35.4%) followed by middle school, Diploma or graduate, illiterate, Post graduate and

professional with 25.7%, 22.9%, 8% and 8% respectively. In a population of 2101 participants Ozmen, D *et al.*²³ conducted a cross sectional study in which fathers of the participants were uneducated with 3.3% followed by secondary education, university graduate, high school and primary school with 14.1%, 21.1%, 27.1% and 34.4% respectively. A cross sectional study was conducted by Eidsdottir, ST *et al.*²⁴ in 11388 subjects in which 36% of fathers had university degree and 31% were educated up to secondary school education. In the study population majority mothers (31.4%) were studied up to middle school followed by secondary school, diploma or graduate, illiterate and postgraduate and professional with 25.7%, 20.6%, 17.1% and 5.1% respectively. In Ozmen, D *et al.*²³ study 9.1% of participants mother were uneducated followed by university graduate, secondary school, high school and primary school with 9.5%, 11.8%, 22.5% and 47.1% respectively. Eidsdottir, ST *et al.*²⁴ performed a cross sectional survey in 11388 subjects in which 43% of the participants mother had university degree followed by secondary school education with 23%. Among study participants, majority of the fathers

were skilled workers (29.7%) or employed in clerical jobs or businessmen (29.7%). Majority of mothers were housewives (48.6%). Among study population majority of the participants were from lower middle class (44%) followed by upper middle class (33.7%). The proportion of participants in the upper lower class was 16.6%. The proportion of subjects in Upper class was 5.7%. Ozmen, D *et al.*²³ performed a cross sectional study in 2101 participants in which 7.6% of the subjects were from low class, 86.1% from middle class and 6.3% from upper class. Among the study population, the BMI category was Normal in 78(44.6%), Overweight in 65(37.1%) and obesity in 32(18.3%). Hence the overall prevalence of either overweight or obesity was 55.4% in the study population. The mean BSQ score was higher among the people with overweight and obesity, as compared to normal subjects (Mean difference 11.23, 95% CI 9.27 to 13.18, P value < 0.01), which was statistically significant. The mean PHQ- 9 score was higher among the people with overweight and obesity, as compared to normal subjects (Mean difference 2.52, 95% CI 1.90 to 3.13, P value < 0.01), which was statistically significant. The mean self-esteem score was higher among the people with normal weight, as compared to overweight and obesity subjects (Mean difference 1.77, 95% CI 0.64 to 2.89, P value 0.002), which was statistically significant. The mean BMI was higher among the adolescents with depression as compared to people without depression (mean difference 7.35, 95% CI 5.87 to 8.82 P value < 0.001), which was statistically significant. The mean BSQ was higher among the adolescents with depression as compared to people without depression (mean difference 12.88, 95% CI 11.18 to 14.57 P value < 0.001), which was statistically significant. The mean self-esteem score was higher among the adolescents without depression as compared to people with depression (mean difference 3.16, 95% CI 2.01 to 4.30 P value < 0.001), which was statistically significant.

CONCLUSION

The present study concluded that overweight and obesity will have negative influence on body image perception, self-esteem and may be associated with increased risk of depression among adolescents. But the cross-sectional nature of study precludes us from drawing any temporal relationship between obesity and occurrence of depression. Also the generalizability of the findings is limited. There is need to conduct large-scale studies to explore the adverse psychological impact of overweight and obesity among adolescent population. All the stakeholders including parents, teachers, peers and health care practitioners needs to be sensitized through

appropriate educational interventions to create a healthy environment and avoid adverse psychological impact.

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