Research Article

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CROSS SECTIONAL STUDY ON HEALTH-RELATED STRESS AMONG UNDERWEIGHT, OBESE AND OVERWEIGHT UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

The aim of this pilot study is to evaluate the stress among underweight, overweight and obese undergraduate medical students using BMI as a primary indicator. A total of 234 students were selected for the Study comprising of 143 females and 91 males, after obtaining the written informed consent. Participants were classified into overweight, obesity and underweight according to WHO guidelines. DASS-42 was used to assess depression, anxiety and stress. We have not observed significant difference in depression, anxiety and stress among normal, obese, over weight and underweight females and males. We recommend further detailed, multi center studies in this area.

Keywords: Body mass index, Depression, Anxiety, Stress

INTRODUCTION

Obesity is quickly becoming one of the most prominent conditions affecting children and adolescents¹. The unabated rise in the prevalence of overweight in children and adolescents is one of the most alarming public health issues facing the world today². Overweight and obesity are risk factors for non-communicable diseases like cardiovascular diseases, hypertension, diabetes, cancers (breast, colon and endometrial), osteoarthritis and fractures and increased risk of breathing difficulties³. A high prevalence of overweight and obesity has been observed in adolescent students.

Abnormal physiological stress reactivity is being considered as a vulnerable marker for various physical and psychological health problems in children and adolescents⁴. There is a strong correlation between perceived stress, depression, and food consumption in college students⁵. Children facing stressful situations in families had significantly higher ratio for obesity proving that psychological stress in the family may be a major contributing factor for childhood obesity⁶. Perceived stress has been hypothesized to be a risk factor for obesity and studies have shown that adolescents aged 11-16 years had a higher perceived stress⁷.

In undergraduate medical students, stress was shown to influence the body weight and studies have shown that practice of regular exercise and taking care of the stress precipitators improved the health of the medical students⁸. Studies in young female college students have clearly shown that the stress experience interacts with emotional eating to influence body mass index⁹.

Higher stress was associated with higher prevalence of overweight and obesity in college students¹⁰. The aim of this pilot study is to evaluate the stress among underweight,

overweight and obese undergraduate medical students using BMI as a primary indicator.

MATERIALS AND METHODS

Participants

A total of 234 students were selected for the Study comprising of 143 females and 91 males, after obtaining the written informed consent. The study protocol was approved by institutional ethical committee. Body mass index (BMI), according to WHO is a simple index of weight-for-height that is commonly used to classify overweight, obesity and underweight in adults. BMI was calculated using the standard BMI formula - person's weight in kilograms divided by the square of height in meters (kg/m²)^{5,6}. The following criteria was used to select the participants

Inclusion criteria

1. All undergraduate MBBS students in the age group 18-25 years studying in Saveetha Medical College
2. Willing participants
3. Apparently healthy
4. Not suffering with any major diseases
5. Not under any therapy or treatment

Assessment of depression, anxiety and stress

DASS-42 was used to assess depression, anxiety and stress¹¹.

Data analysis

Data was analysed by SPSS 20.0. Statistical tests used are One way ANOVA followed by Tukey HSD post hoc test and student t test. P value less than 0.05 was considered as significant.

RESULTS

Results are presented in table 1 to 8. Comparison of normal female vs obese shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 1). Comparison of normal female vs overweight females shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 2). Comparison of normal female vs underweight females shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 3). Comparison of normal males vs

obese males shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 4). From this table comparison of normal males vs overweight males shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 5). From this table comparison of normal females vs underweight males shows that p value did not show any variation and depression, stress and anxiety appears to be normal (Table 6). Depression, anxiety and stress levels are not statistically significant among normal, obese, overweight and underweight male and female participants (Table 7,8).

Table 1: Comparison of demographic data and quality of life domains in normal with obese female participants

Normal females vs Obese females			
	Normal Females (n=59)	Obese Females (n=19)	P value
Age (years)	19.54±1.56	19.58±1.3	0.9267
Weight (kg)	59.68±24.23	76.74±6.96	0.0035***
Height (cm)	153.95±27.103	159.53±6.89	0.379
BMI (kg/m ²)	20.817±1.26	30.198±2.54	0.0001***
Depression	8.2±7.52	7.11±5.36	0.5573
Stress	8.53±6.49	8±6.74	0.762
Anxiety	8.37±5.78	7.21±6.37	0.4593

From this table 1 comparison of normal female vs obese shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)

Table 2: Comparison of demographic data and quality of life domains in normal with overweight female participants

Normal females vs overweight females			
	Normal Females (n=59)	Overweight Females (n=39)	P value
Age (years)	19.54±1.56	19.51±1.65	0.9287
Weight (kg)	59.68±24.23	64.15±6.15	0.262
Height (cm)	153.95±27.103	159.41±4.82	0.217
BMI (kg/m ²)	20.817±1.26	25.04±1.59	0.0001***
Depression	8.2±7.52	8.55±6.65	0.8159
Stress	8.53±6.49	10.24±7.21	0.2282
Anxiety	8.37±5.78	8.13±5.78	0.8444

From this table 2 comparisons of normal female vs overweight females shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)

Table 3: Comparison of demographic data and quality of life domains in normal with underweight female participants

Normal females vs underweight females			
	Normal Females (n=59)	Underweight Females (n=26)	P value
Age (years)	19.54±1.56	18.85±1.35	0.0515
Weight (kg)	59.68±24.23	44.38±3.8	0.002***
Height (cm)	153.95±27.103	158.47±20.94	0.4523
BMI (kg/m ²)	20.817±1.26	16.16±3.05	0.0001***
Depression	8.2±7.52	8.81±6.66	0.7248
Stress	8.53±6.49	8.35±5.47	0.9026
Anxiety	8.37±5.78	8.15±5.95	0.8736

From this table comparison of normal female vs underweight females shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)

Table 4: Comparison of demographic data and quality of life domains in normal with obese male participants

Normal males vs Obese males			
	Normal Males (n=26)	Obese Males (n=22)	P value
Age (years)	19.27±1.54	19.77±1.69	0.2855
Weight (kg)	60.288±5.66	93.182±13.69	0.0001***
Height (cm)	172.64±6.87	174.17±7.373	0.4621
BMI (kg/m ²)	20.18±1.11	30.777±3.567	0.0001***
Depression	8.92±6.49	11.59±9.08	0.2427
Stress	10.42±6.47	12.73±8.89	0.3052
Anxiety	10.15±5.82	10.86±8.17	0.7276

From this table comparison of normal males vs obese males shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)

Table 5: Comparison of demographic data and quality of life domains in normal with overweight male participants

Normal males vs overweight males			
	Normal Males (n=26)	Overweight Males (n=28)	P value
Age (years)	19.27±1.54	19.32±1.63	0.9044
Weight (kg)	60.288±5.66	78.05±20.48	0.0001***
Height (cm)	172.64±6.87	168.65±20.73	0.3542
BMI (kg/m ²)	20.18±1.11	24.73±1.39	0.0001***
Depression	8.92±6.49	10.61±8.92	0.4343
Stress	10.42±6.47	11.11±8.4	0.7402
Anxiety	10.15±5.82	10.18±9.16	0.9907
From this table comparison of normal males vs overweight males shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)			

Table 6: Comparison of demographic data and quality of life domains in normal with underweight male participants

Normal females vs underweight males			
	Normal Males (n=26)	Underweight Males (n=15)	P value
Age (years)	19.27±1.54	19±1.2	0.5633
Weight (kg)	60.288±5.66	50.733±4.64	0.0001***
Height (cm)	172.64±6.87	173.06±6.27	0.8476
BMI (kg/m ²)	20.18±1.11	16.83±1.05	0.0001***
Depression	8.92±6.49	8.27±8.55	0.7829
Stress	10.42±6.47	9.2±9.24	0.6217
Anxiety	10.15±5.82	10.33±8.67	0.9371
From this table comparison of normal females vs underweight males shows that p value did not show any variation and depression, stress and anxiety appears to be normal. Data was expressed as mean ± SD. (*p<0.05, **P<0.01, ***P<0.001)			

Table 7: Comparison of depression, stress and anxiety in normal, underweight, over weight and obese female participants

Parameter	Normal	Obese	Overweight	Underweight	P value
Age (years)	19.54±1.56	19.58±1.3	19.51±1.65	18.85±1.35	0.2223
Weight (kg)	59.68±24.23	76.74±6.96	64.15±6.15	44.38±3.8	<0.0001
Height (cm)	153.95±27.103	159.53±6.89	159.41±4.82	158.47±20.94	0.4959
BMI (kg/m ²)	20.817±1.26	30.198±2.54	25.04±1.59	16.16±3.05	<0.0001***
Depression	8.2±7.52	7.11±5.36	8.55±6.65	8.81±6.66	0.8754
Stress	8.53±6.49	8±6.74	10.24±7.21	8.35±5.47	0.7037
Anxiety	8.37±5.78	7.21±6.37	8.13±5.78	8.15±5.95	0.9031
Data was expressed as mean ± SD. One way Anova followed by Tukey HSD post hoc test. (*p<0.05, **P<0.01, ***P<0.001)					

Table 8: Comparison of depression, stress and anxiety in normal, obese, over weight and underweight male participants

Parameter	Normal (n=26)	Obese (n=22)	Overweight (n=28)	Underweight (n=15)	P value
Age (years)	19.27±1.54	19.77±1.69	19.32±1.63	19±1.2	0.4863
Weight (kg)	60.288±5.66	93.182±13.69	78.05±20.48	50.733±4.64	<0.0001***
Height (cm)	172.64±6.87	174.17±7.373	168.65±20.73	173.06±6.27	0.4497
BMI (kg/m ²)	20.18±1.11	30.777±3.567	24.73±1.39	16.83±1.05	<0.0001***
Depression	8.92±6.49	11.59±9.08	10.61±8.92	8.27±8.55	0.5606
Stress	10.42±6.47	12.73±8.89	11.11±8.4	9.2±9.24	0.604
Anxiety	10.15±5.82	10.86±8.17	10.18±9.16	10.33±8.67	0.9893
. Data was expressed as mean ± SD. One way Anova followed by Tukey HSD post hoc test. (*p<0.05, **P<0.01, ***P<0.001)					

DISCUSSION

One of the most common problems related to the lifestyle is overweight. Obesity is often defined simply as a condition of abnormal or excessive fat accumulation in the fat tissues (adipose tissue) of the body leading to health hazards. Earlier studies reported that stress, has positive correlation with weight gain but not weight loss. However, this correlation varied based on age and type of stressors¹². Under-weight females are reported to be highly depressed when compared with healthy females¹³. First three years of medical education was reported to be more stressful and higher stress was reported in females¹⁴. Significantly higher depression and stress levels were reported in female students¹⁵. Animal and human studies reported that increase in the body weight was observed followed by stress¹⁶.¹⁷. Production of stress hormones was found to be higher in obese children¹⁸. Earlier studies reported positive correlation between obesity and stress in children and adolescents^{19,20}. In

contrast, in adults, there exists contradictory results regarding association of obesity and stress^{21,22}. Stalder et al reported positive correlation between body mass index and hair cortisol²³.

In the present study, we have not observed significant difference in depression, anxiety and stress among normal, obese, over weight and underweight females. In males, depression and stress levels was slightly higher in obese and overweight participants, however, it was not statistically significant.

LIMITATIONS

The study results may not be generalized as the study was conducted at one center only.

CONCLUSION

We have not observed significant difference in depression, anxiety and stress among normal, obese, over weight and underweight females and males. We recommend further detailed, multi center studies in this area.

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