

*Original Research Article*

# Comparison of frequency of depression, anxiety and stress between overweight and normal weight medical students

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## Abstract

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**This study compared frequency of depression, anxiety and stress in normal weight and overweight medical students. The study was a cross sectional study. Study duration was six months. Participants included 300 medical students from first year to final year MBBS of Bahria University Medical and Dental College. Depression, anxiety and stress levels were assessed using the Depression Anxiety Stress Scale, followed by 24 hour dietary recall. The scale included twenty one questions combined as three separate scales, measuring depression, anxiety and stress levels. SPSS version 23 was used for statistical analysis. Participants having normal weight were 119(39.66%) and overweight was 98(32.66%). Mean weight of participants was 64.72±12.3. The mean height was 163.08±9.17 and the mean value for body mass index was 24.455±3.26. Majority of the participants 171 (55.5%) reported having more than eleven servings of bread, cereal, rice and pasta group. The study revealed that overweight medical students had a higher predisposition towards depression compared to the normal weight medical students. The levels of anxiety and stress did not differ between the overweight and underweight medical students. The 24 hour dietary recall revealed erratic overall eating pattern of students.**

**Keywords:** Anxiety, depression, overweight, stress, students

## INTRODUCTION

Prevalence of obesity is increasing globally. Overall the United States is on the top of list, approximately two-third of U.S adults population is obese with BMI ≥ 25

(Mahmood et al., 2013). A study conducted in UAE showed a huge number of medical students being overweight that can be due to their immobile lifestyles

and high levels of stress (Sajwani et al., 2009). According to previous studies in the medical education literature, there has been investigation into relationships between psychological distress, motivation and academic performance (Lyndon et al. (2017). A study conducted from 1980 to 2005 on US and Canadian medical students showed mental distress was highly frequent among medical students (Melese et al., 2016). Moreover a research in Sub-Saharan Africa revealed that 20 to 30% of medical students suffered from depression and anxiety (Melese et al., 2016). Another research revealed that towards the end of first year of medical college depression in medical students increased from 1.7 to 6.9% (Mouthino et al., 2017). A cross-sectional study conducted in United States, showed that depression or anxiety disorders were affecting 15.6% of undergraduate and 13.0% of graduate students. Furthermore, depression alone was affecting 13.8% of undergraduate students and also 11.3% graduate students (Melese et al., 2016).

As opposed to this anxiety disorders are less common that is having prevalence approximately 3.8% in graduates and 4.2% in undergraduates. In Europe 30% of students studying in medical schools suffers from either depression or anxiety (Mouthino et al., 2017). In Brazil it was noted that about 20 to 50% of the medical students suffer from serious mood disorders. According to a study conducted in Egypt, the prevalence of depression and anxiety was 28.3% and 21.2%, respectively (Amir and Gillany, 2010). Another research conducted in Malaysia in Medical college revealed that the prevalence of moderate to extremely severe level of depression, anxiety and stress among undergraduate students ranged from 13.9% to 29.3%, 51.5% to 55.0% and 12.9% to 21.6% respectively (Teh et al., 2015). In two public and six private medical schools in Bangladesh a cross-sectional study was conducted on medical students. The overall prevalence of stress in the study population was 54% (Eva et al., 2015). Furthermore a study conducted in Allama Iqbal Medical College in Lahore, revealed that about 20.8% of the subjects were subjected to severe stress, while 71.6% had moderate stress and 7.6% had low levels of stress (Sohail, 2013).

Obesity is a condition in which there is excessive fat deposition in the body that adversely affects the health of Mahmood et al. (2013). Over weight and obesity is a huge health problem in many countries and which makes an affected person at risk for many diseases including diabetes, cardiovascular problems, cancer and more. A variety of factors, including diet, genetic predisposition, can cause these health problems (Mahmood et al., 2013). According to WHO, persons having BMI between 18.5 to 24.99 kg/m<sup>2</sup> are considered to have normal body weight, whereas those with BMI  $\geq$  25 to 30kg/m<sup>2</sup> would be considered as overweight and those with (BMI > 30

kg/m<sup>2</sup>) would be considered as obese (Pantenburg et al., 2012).

Currently the basis of major depressive disorder is a clinical course defined by one or more major depressive episodes devoid of a history of manic, mixed or hypomanic episodes (Bondy, 2002). This is in accordance with the criteria of the Diagnostic and Statistical Manual of Mental Health Fourth Edition (DSM-IV). Five of the following nine DSM-IV symptoms must be manifested constantly for a minimal period of two weeks. These include loss of interest, significant weight or appetite changes, altered sleep that is either insomnia or hypsomnia fatigue or loss of energy, psychomotor agitation depressed mood, and decreased ability of thinking or concentrating, feeling of worthlessness, suicidal ideation (Bondy, 2002).

Stress is very common among medical students across the globe (MelakuandMossie,2015). High rates of psychological morbidity among medical students, such as anxiety and depressive symptoms, have been reported in several studies from different western countries 4-6, as well as from other parts of the world (Khan et al., (2006). A wide range of different measures have been used to address these phenomena.

In our society depression and anxiety are most common behavioral and psychological health issues which most individuals encounter at least once in their life span. Depression is considered as a mood disorder which is characterized by a combination of symptoms including depressed mood, constant negative thoughts, loss of interest, guilt and low self-esteem, self-harm, altered sleep, reduced appetite and slowness. Anxiety is an abnormal state in which persons suffers from both psychological and physiological symptoms of anxiety such as palpitations, sweating, tachycardia chest pain, apprehension, and over-activation occurring without any neurological disorder or another psychiatric illness (Deepak et al., 2017). Depression, anxiety and stress are among the psychological problems that are common among students (AlQahtani et al., 2015).

An elevated higher prevalence of overweight and obesity is sharply related to unaccepted diet with high content of macronutrient (Ahmed et al., (2015). A diet of superior quality and correct quantity, in young adult, can have a good impact on the health of the individual (Ahmed et al., 2015). A deviation can lead to over or underweight. In most of the countries, researches on obesity have chiefly been done in endangered population like elderly, women and children. Young adults particularly students tend to have unacceptable diet either in the form of over or under eating. Sizable economic changes culminate in changes in eating, as well as physical activity and quality of life of people in Arabian populations. Amalgamation of high fat diet coupled to sedentary life style play a leading role in the causation of obesity (Ahmed et al., 2015). Discerning the

significance of obesity and factors linked to it, is crucial to propose and put into action the interventions for preventing this public health issue (Ahmed et al., 2015).

The preponderance of obesity all over the world has increased between 1980 and 2014. In 2014, over 1.9 billion adults aged 18 years and more than that were overweight. Regarding this number, more than 600 million were obese. Generally around 13% of the world's adult population, 11% of men and 15% of women, was obese in 2014 (Katuka et al., 2016). University life during medical training encompasses full-time commitment and responsibility of undergraduates related to academic tasks as well as care provided to patients and their companions (Moutinho et al., 2017). Lengthy working plus study hours, environments that are not wonderfully suited to learning, sleep deprivation and factors intrusive with everyday personal life are usual during this period (Moutinho et al., 2017).

There is increasing concern regarding well-being of medical students during medical school (Lyndon et al., 2017). This is not unanticipated keeping with the high rates of burnout and poor quality of life revealed among medical students (Lyndon et al., (2017). A study conducted on 1098 medical students in the US found that 45% of their sample met the criteria for burnout, and had a lower score on mental quality of life scores when compared with the general population. These findings are unvarying from other studies observing that medical students are vulnerable to psychological distress which may impact on their academic achievement and motivation. During education stress can culminate in mental distress and exert a negative brunt on cognitive functioning as well as learning (Khan et al., 2006).

As the hazards correlated to depression, anxiety and stress are numerous, this study aims to assess propensity of overweight medical students towards depression, anxiety and stress as opposed to ones who are normal weight medical students.

## MATERIALS ANDMETHODS

The data was collected using a questionnaire. The questionnaire comprised of socio-demographic details of the participants, along with incorporation of DASS scale version 21 followed by a 24 hour dietary recall. The socio-demographic questions were regarding age, gender, year of medical college, residing in hostel or home and place of birth.

In this study to efficiently elucidate depression, anxiety and stress levels, the Depression Anxiety Stress Scale (Lovibond and Lovibond, 1995a) was used. This questionnaire assesses an individual's depression, anxiety and stress levels. Basically all the items are reported by means of a 4-point response scale. While the original Depression Anxiety Stress Scale has 42 items,

the scale used in this study had 21 items. The scale includes twenty one items combined as three separate scales aimed at measuring depression, anxiety and stress levels. On this 4 point response scale the options range from 0 to 3. For all these three states including, depression, anxiety and stress, the higher score on the rating scale depicts more severe condition. This scale is a valuable measure of presence or absence of symptoms of depression, anxiety and stress in an individual.

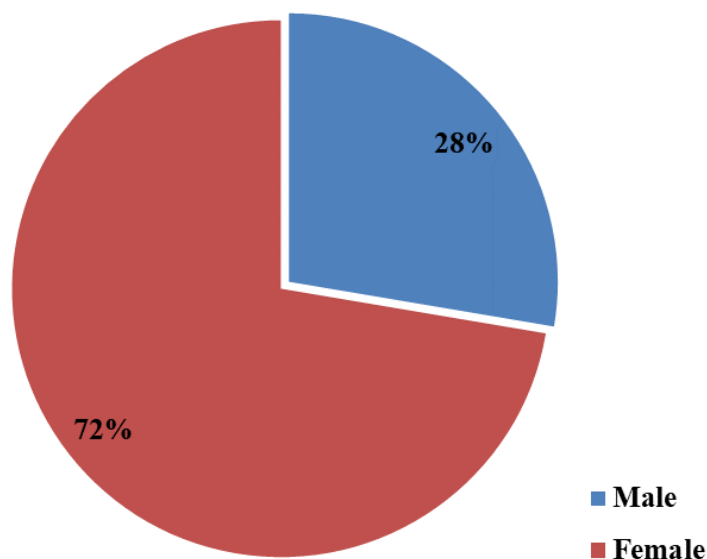
The participants included medical students from first year MBBS to Final year MBBS. Non-probability convenience sampling was used and based on which the total number of participants was 300. The age range of the sample was 18 to 25 years.

The study was initiated after receiving approval from the Ethical Review Committee Bahria University Medical & Dental College Karachi. Informed consent was obtained from all study participants. The study was a descriptive cross-sectional study conducted among the medical students of Bahria University Medical & Dental College. The duration of study was 6 months from March to August 2017. The participants included medical students from first year MBBS to final year MBBS. Written informed consent was obtained from participants who fulfilled the inclusion criteria and all the respondents were assured that the data would be kept confidential. The data was collected by providing a structured questionnaire to all the participants. As the questionnaire also included DASS version 21, the respondents were given instructions regarding completing the DASS scale accurately by giving a response to every item of scale.

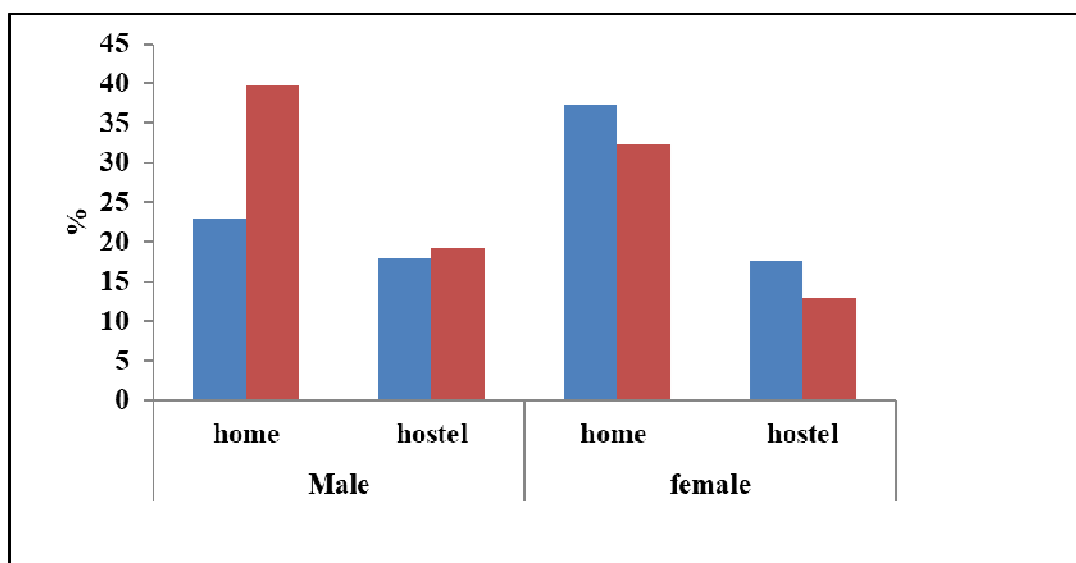
The 24 hour food recall was included to inquire participants regarding number of servings consumed from each of the six food groups included in the balanced diet food pyramid. These groups included bread, cereal, rice and pasta group, milk, yogurt and cheese group, meat, poultry, dry beans, eggs and nuts group, fruit group, vegetable group and fats, oils and sweets group. The participants were not provided any hint regarding the required number of servings per day for each food group. Rather they were simply asked to incorporate the food intake in 24 hours in the 24 hour food recall part.

## Statistical Analysis

The data was analyzed using SPSS version 23. The participant responses were recorded and given coding. Descriptive for the variables depression, anxiety, stress and body mass index included mean and standard deviation. The descriptive for gender, year of medical college included frequencies and percentages. Independent T-test was applied to make a comparison in levels of depression, anxiety and stress between normal weight and overweight medical students.



**Figure 1.** Number of Participants  
Overall female participants were more than male participants.  
Males were 28% and females were 72%



**Figure 2.** Weight according to place of residence  
Amongst males residing at home overweight were more 39.75% compared to normal weight 22.89%. Amongst males residing in hostel overweight were 19.27% and normal weight were 18%. Amongst females living at home normal weights were more 37.3% and overweight were less 32.25%. Amongst females residing in hostel normal weight were 17.5% and overweight were 12.9%.

## RESULTS

The total number of participants in this study was 300. Total number of participants residing in hostel was 97 (31.5%), while participants residing in home were 203 (65.9%). In this study, male students were 83 (28%), whereas female students were 217(72%) as shown in figure 1. The mean age of participants was  $21.0 \pm 1.54$ .

In this study normal weight students were 153 (51%) and overweight students were 147 (49%). Out of this female students having normal weight were 122 (39.66%) and overweight were 98 (32.66%). Among the male students 34(11.33%) had normal weight, while 49(16.33%) were overweight. Weight comparison between male and female students, residing at home as well as hostel based is shown in figure 2.

**Table 1.** Mean values of depression, stress, anxiety, weight, height, body mass index

<b>Depression, Stress, Anxiety, Weight, Height and Body Mass Index</b>	<b>Mean Value</b>
Depression	12.16
Stress	14.13
Anxiety	11.50
Weight(kg)	64.72
Height (cm)	163.08
Body mass index	24.45

**Table 2.** Association between gender and preference of food group in dietary recall

<b>FOOD GROUP</b>	<b>MALES</b>	<b>FEMALES</b>	<b>P-value</b>
<b>Bread, cereal, rice and pasta group</b>			0.012
6-11	4	3	
More than 11	37	134	
Less than 6	42	80	
<b>Meat, poultry, Dry beans, eggs and nuts group</b>			0.001
Did'nt have	30	129	
2-3	27	52	
Less than 2	26	36	
4			

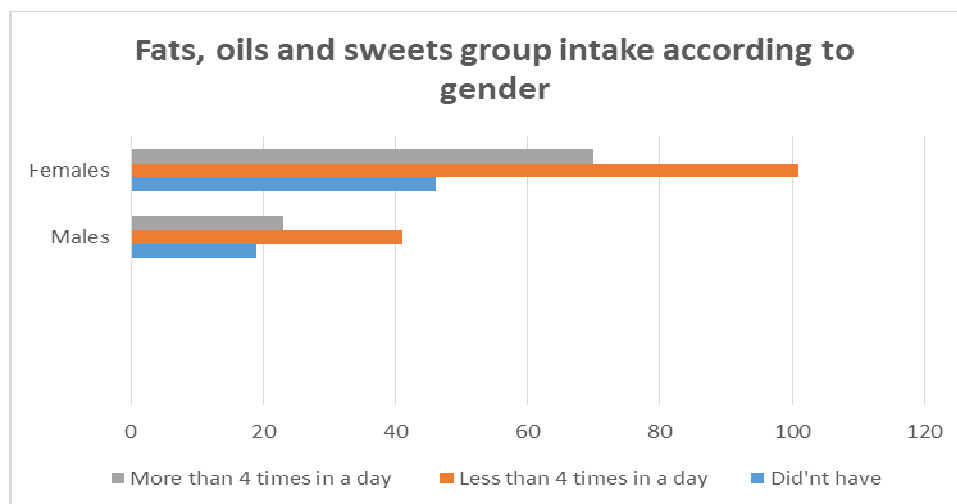
The mean of depression scale was  $12.16 \pm 9.59$ . The mean of stress scale was  $14.13 \pm 10.92$ . The mean of anxiety scale was  $11.50 \pm 8.61$ . The mean value for weight was  $64.72 \pm 12.3$  kg. Furthermore the mean value for height was  $163.08 \pm 9.17$  cm and the mean value for body mass index (BMI) was  $24.45 \pm 3.26$ , as shown in table 1.

The student participation from first year MBBS was 60 (19.5%). From second year students participation was 60 (19.5%). Third year students included 61 (19.8%), while participation from fourth year students was 59 (19.2%) and final year students included were 60 (19.5%).

The difference in depression levels between overweight and underweight medical students was significant, p-value 0.098. There was no significant difference observed in levels of stress and anxiety between overweight and underweight medical students.

Out of the total number of participants the correct number of servings for bread, cereal, rice and pasta group, being six to eleven servings, were consumed by only small number of participants -7 (2.3%). Majority of the participants -171 (55.5%) reported as having more than eleven servings of bread, cereal, rice and pasta group. Around 122 (39.6%) individuals mentioned having consumed less than six servings of bread, cereal, rice and pasta group. Association between gender and intake

of bread, cereal, rice and pasta group as well as meat, poultry, dry beans, eggs and nuts group was significant,  $P < 0.05$  as shown in table 2. The consumption of meat, poultry, fish, dry beans, eggs and nuts group was reported by the participants as majority 159 (51.6%) having not consumed this group. As opposed to the bread, cereal, rice and pasta group, which has more required number of servings in a day as balanced diet, for the meat, poultry, dry beans, eggs and nuts group, the participants reported as around 79 (25.6%) participants who had consumed the normal required serving size for this group being two to three servings. Less than two servings of meat, poultry, fish, dry beans, eggs and nuts group were reported by 62 (20.1%). Association between gender and intake of bread, cereal, rice and pasta group as well as meat, poultry, dry beans, eggs and nuts group was significant,  $P < 0.05$  as shown in table 2. For the milk, yogurt and cheese group, majority of participants responded as consuming less than two servings of this group in a day being around 122 (39.6%). The normal intake of the milk, yogurt and cheese group was reported by around 86 (27.9%) participants. Around 92 (29.9%) participants reported as having not consumed milk, yogurt and cheese group. For the vegetable group the correct number of servings for a balanced diet is 3-5 servings per day. For this group the participants who didn't have intake of vegetable group were 130 (42.2%).



**Figure 3.** 24 hour dietary recall

In 24 hour dietary recall for intake of fats, oils and sweets group, more than 4 times in a day response was given by 41 males and 101 females. The response less than 4 times in a day for fats, oils and sweets group was given by 23 males and 70 females. For fats, oils and sweets group intake the response didn't have was given by 19 males and 46 females

**Table 3.** Comparison of 24 hour dietary recall of hostel based students and students residing at home

FOOD GROUP	HOSTEL	HOME
<b>Bread, cereal, rice and pasta group</b>		
6-11	5	2
More than 11	57	114
less than 6	35	87
<b>Meat, poultry, fish, dry beans, eggs and nuts group</b>		
Didn't have	49	110
2-3	26	53
Less than 2	22	40
<b>Milk, yogurt and cheese group</b>		
Didn't have	33	59
2-3	29	57
Less than 2	35	87
<b>Vegetable group</b>		
Didn't have	41	89
3-5	33	63
Less than 3	23	51
<b>Fruit group</b>		
Didn't have	6	22
2-4	34	67
Less than 2	57	114
<b>Fats, oils and sweets</b>		
Didn't have	5	8
Less than 4 times in a day	27	49
More than 4 times in a day	65	146

The consumption of 3-5 servings of vegetable group was reported by 96(31.2%) and less than 3 servings of vegetable group in a day were reported by 74 (24%). The

consumption of fruit group was also erratic as only 101 (32.8%) participants had normal number of servings of fruit group as part of 24 hour dietary recall. Majority of

participants -171 (55.5%) reported as having less than two servings of fruit group. Only around 28 (9.1%) participants mentioned having not taken any serving from fruit group. Regarding the recommended serving size for the fats, oils and sweets group was to be used sparingly. It was revealed that around 211(68.5%) students had more than four servings of this group in a day. Around 76 (24.7%) students had less than four servings of this group in a day and around 13(4.2%) reported as not having had a single serving of this food group. The difference according to gender in the intake of fats, oils and sweets group is shown in figure 3. The differences in dietary recall responses between students based in hostel and residing at home are shown in table 3.

## DISCUSSION

The results of this study showed that there is a significant difference in depression levels between overweight and normal weight medical students whereas there is no difference between overweight and normal weight medical students in terms of levels of anxiety and stress. According to assessment by the World Health Organization, in 2008 over 10% of the world's adult population was obese (Mahmood et al., 2013). Although overweight and obesity were formerly prepended as problems of high-income countries, rapid elevations in obesity rates have also been reported in the developing world (Pantenburg et al., 2012). The study is similar to a study by Arsh et al. (2017), in which most of the study participants were females 137 (64.3%), while 76 (35.7%) participants were male. Likewise in this study, females were in majority being around 217 (70.5%) and males were less compared to females being 83 (26.9%) (Arsh et al., 2017).

A similar study was conducted by Eldin et al. amongst medical students in 2017, which revealed that the frequency of depression among the students having participated in the study, did not vary in relation to their body mass index(Shams-Eldin et al.,(2014). Although the study was conducted on medical students, but it differed from this study as a significant difference in level of depression amongst medical students has been observed in this study based on the body mass index (Shams-Eldin et al., 2014).

A study was conducted at Banha University in Egypt in 2014, including male and female students. The results of the study were synchronous with this study as it was revealed that overweight students had more chances of being depressed 24.4% compared to underweight students being around 15.3% (Mohamed, 2014). However in contrast to this study the difference in levels of depression was also observed as compared between normal weight and underweight students. In this study no comparison was assessed in levels of depression

between underweight and normal weight medical students (Mohamed, 2014).

As advocated by experts expanding frequency of depression is linked to the high preponderance of obesity (Tashakori et al., 2016). Depression may lead to diminished physical activity (AlQahtani et al., 2015). There is an escalated risk of weight gain due to depression by means of effect of depression on binge eating (AlQahtani et al., (2015). Weight gain may also emanate from medications utilized to manage mood or anxiety disorders. The results of this study for 24 hour food recall are similar to a study conducted by Chourdakis et al. (cited by AlQahtani et al., 2015). In the current study the dietary pattern of medical students was erratic as the most consumed and in excess of servings required for the day, food group was bread, cereal, rice and pasta group. The pattern of dietary intake was not that of a balanced diet and majority of the students did not have intake of all six foods groups in a day. The results by Chourdakis et al. also revealed an incorrect pattern of eating amongst medical students (AlQahtani et al., 2015). According to the study in medical students by Chourdakis et al., the degree of snacking as well as fried food consumption was high being 30% and 70%. This study is comparable to a similar study conducted on high school students by Javadi et al. (2017). The study by Javadi et al. (2017) revealed a poor as well as positive correlation between depression and BMI. It was also observed in study by Javadi et al. (2017) that depression symptoms were more in obese compared to underweight students. A study conducted by Katuka et al. (2016) revealed a dietary intake pattern similar to this study. As part of the study conducted by Kayaka et al. (2016), it was found that around 76% of the medical students were consuming diet based on carbohydrate, whereas only 24% were on diet including protein as the dominant component (Katuka et al., 2016). The unhealthy eating behavior shown by students in this study is similar to a study by Al-Asadi (2014). The study by Al-Asadi (2014) revealed that characteristically unhealthy eating habits including skipping breakfast, infrequently daily meals and infrequent fruits consumption were revealed by students with eminent level of stress. Furthermore eating habits including snacks between meals, eating fast meals, scanty vegetable consumption were also frequent in students who were stressed (Al-Asadi, 2014).

In this study participants were not inquired about physical activity and exercise routine. Dietary recall was only of 24 hours. It should have been of longer duration. The sedentary lifestyle related parameters were not included such as time spent watching tv, on computer and time spent in desk bound activities. Indulgence into sports was not inquired from participants, it should have been inquired as most young students are into sports. The students should have been specifically asked about frequency of dining out over a week and the pattern of

difference should have been assessed between overweight and underweight medical students regarding frequency of dining out. There should have been inquisition regarding exercise routine of students participating in this study.

## CONCLUSION

As a result of this study, it was concluded that being overweight was correlated to depression amongst the participating medical students, but there was no difference in anxiety and stress levels amongst normal weight and overweight medical students. Overall the study revealed that eating pattern of all the participants was erratic and the students in this study did not have a tendency to eat a balanced diet.

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