Stress leading to overweight/obesity in First M.B; B.S. hosteller girls

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Abstract

Introduction-Stress is body's response to danger or perceived threat. M.B., B.S. students, particularly the freshers are more prone to stress due to academic pressure, cultural and environmental shock and a large number of uncertainties. In addition, the girls are more emotionally attached to their family so the factors like homesickness and worries for the family members prominently contributed to the stress. The first M.B., B.S. hosteller girls thus constituted a relevant subject group for the study.

Aims and objectives-The aims of the study were to list the factors which caused stress and to determine the behavioral patterns that led to overweight/obesity due to stress. The objective was to illustrate a relationship between stress and the development of overweight/obesity.

Methods-The study was retrospective and observational. It included stress and anthropometric assessment which were done simultaneously. Stress levels were determined using two 4-pointers scales-namely, the standard Perceived Stress Scale (Levenstein et al) and a self prepared Diet History Questionnaire. The Perceived Stress Scale included the factors like worries, tension, joy and demands and the aggregate gave the Perceived Stress Index (PSI). The anthropometric data included B.M.I. calculation(according to the WHO BMI recommendations in adult Europids, 1998), waist –to –hip ratio and weight comparsion, taking into account the weight during the study with that at the time of admission. The study was conducted for 2 months time period from April 2009 to June 2009.

Results-Among the 65 girls, 41 showed an increase in weight. The prevalence of overweight and obesity was found to be 21.53% and 3.07% respectively. The multiple regression analysis of weight comparison and PSI showed a significant effect of PSI on weight during the stay in hostel ($F=6.833$, $p<0.05$). A regression study between Diet History Questionnaire and PSI was highly significant ($F=69.227$, $p<0.001$). A positive correlation between PSI and BMI was obtained.
Considering the high degree of association between emotional eating and external eating, it would have been optimal to control emotional eating, however due to space constraints we were not able to do so. Secondly, the results of questionnaire are self-reported by the girls, so are prone to biasing.

Conclusion-The study confirmed the general impression that there is a considerable amount of stress among the medical students. Among the four factors of the Perceived Stress Scale – "demands" was rated the highest, i.e. maximum students felt that they had many things to do and expectations pressurized them. The girls confirmed that they felt nostalgic and longed for the protective environment of school and home. They also found difficulty in sharing emotions which they attributed to the lack of informal conversations. According to the results of Diet history questionnaire, they exhibited behavioral shifts like -an increased consumption of food when stressed, coupled with an increased frequency of emotional eating and sedentary lifestyle. The positive correlation between PSI and B.M.I demonstrated that as stress increases the development of overweight/obesity occurs.

Keywords: Perceived Stress Index, behavioural shift, emotional eating.

INTRODUCTION

Stress is the body's reaction to a change that requires a physical, mental or emotional adjustment or response. The amount of stress experienced by a person may be influenced by the individual's ability to effectively cope with stressful events and the situations[1].

College students, particularly freshers are a group prone to stress[1], due to the transitional nature of college life [2.] The First Year M.B., B.S. students are exposed to a large number of ambiguities and insecurities. New campus, new city and a totally new pattern of teacher student interaction. There is an unconstrained atmosphere of the college as opposed to the protective environment of school. The fear of ragging is also a contributory factor which adds on to the stress. Thus, the first year M.B., B.S. students were chosen for the study.

The stay in the hostel as compared to the homes is a huge change in the environment as there is less privacy, home sickness and social and cultural shock[3]. The responsibilities increase drastically as there is burden of self management including health care and money management. There is a strong peer pressure for lavish lifestyle which may create stress for them[3]. The amount of the material to be absorbed, social isolation, pressure of the examination, discrepancies between expectations and reality all can be anticipated to bring about physiological stress.[4] The most common highlighted are exams and academics, followed by relationship problems in the college or family and homesickness [5].

Very few studies have been conducted till now to gauze the stress levels in medical students, particularly the girls. So out of curiosity this study was undertaken to see "how is stress related to the development of overweight/obesity."

DIETARY CORRELATES OF STRESS

It is observed that people cope up with negative emotions generated by stressful events by engaging in emotional eating[6]. Emotional eating involves eating without hunger and usually

without any planning. Thus, one is liable to eat unhealthy foods. Adolescents report that stress is associated with a shift towards unhealthy eating practices [7].

Perceived stress and binge eating frequency three times greater than reported by individuals with low negative stress[8]. It entails eating large amounts of food in a short period of time. The overeating and bingeing are often associated with feeling out of control and followed by depression, guilt or disgust.
The choice of food is also particularly important in this aspect. The gender stratified analysis has revealed the differences in dietary outcomes of emotional eating in boys and girls[9]. Stress induced eating studies have found that a preference for high energy dense food in response to stress, specifically women preferred sweets.[10]

As obesity grows as a public health problem, the challenge the health researchers and health professionals face is to develop more effective and innovative strategies for managing psychological stress which reduce stress induced eating.

SEDENTARY LIFESTYLE AND STRESS

During the enrollment and stay at the hostel there is a general disregard of health and a decrease in physical activity. This is partially due lack of motivation and parental support.
The previous studies of stress, have examined the role of decreases in physical activity, however the emphasis has been on changes in diet, which may not reflect the main area of behavior change related to body weight[11]. Thus both the factors that are physical activity and dietary behavior were taken into account while examining the development of overweight/obesity.

MATERIAL AND METHODS

SELECTION OF PARTICIPANTS

The hosteller girls who were in first M.B., B.S. and those who had de developed overweight /obesity constituted the study group.
If there was a family history of overweight/obesity or the student was suffering from any psychiatric illness or under any anti-depressant medication or if a student refused to grant consent, then such student was excluded from the study.

The duration of the study was from April 2009 to June 2009 and number of subjects was 65 including 30 controls. Those hostellers who had developed obesity/overweight after coming to the hostel were chosen as subjects. Those who did not show any change in weight substantial despite being stressed were considered under control.

STUDY DESIGN

It was a retrospective observational study. Stress was taken as an independent variable and overweight/obesity as the dependent variable. It entailed anthropometric and stress assessment.

STRESS ASSESMENT- For the assessment of stress two scales were employed the standard **Perceived** Stress Questionnaire (Levenstein et al)[12] and the Diet History Questionnaire . The

Perceived Stress Questionnaire was utilized to estimate the stress levels, the stress reaction and the effect of external stressors. The completed questionnaire was analyzed to obtain the Perceived Stress Score Index (PSSI) .It was obtained by calculating the aggregate of all the four factors that is tension, worries, joy and demand with the joy scale reversed. Higher the score index, greater the stress level.

A Diet History Questionnaire was designed specifically for the hostellers (girls). It was prepared by inputs from the hostellers themselves unknowingly through general conversations. The stress scale had 30 questions and was a 4-pointer scale for a better assessment of the level of stress in the hostellers. It incorporated the subject identity which included the name, age, sex, year of admission. It also inquired whether the subject was under any prolonged medication and if there was a family history of obesity.

It was ensured that the subjects were comfortable and filled in the questionnaire while at rest mentally and physically and not in a single sitting but in two sessions. The girls were informed of the motive and type of study conducted .A signed consent was obtained from all the students.

ANTHROPOMETERIC ASSESMENT - The conventional anthropometric methods were included for the measurement of obesity/overweight, like- weight comparison (with the weight taken at the time of medical examination on the first day in college), B.M.I. (Quetelet Index, WHO criteria) and waist-to-hip ratio.

After B.M.I calculation the hostellers were classified under various group of conditions as per the WHO recommendations for adult Europids, 1998-(TABLE 1)[13]

The study also integrated the waist-to-hip ratio calculation .A waist-to-hip ratio > 0.9 in women and > 1.0 in men is abnormal. Waist measurement was taken at the narrowest circumference and hip measurement was taken at the widest circumference.

After the collection of the relevant data an analogy was drawn between stress and obesity/overweight. This was done using statistical and graphical tools.

Statistics

The correlation of BMI AND PSSI was done using Pearson's correlation coefficient. The proportional influence of PSSI on body weight was estimated by multiple regression analysis. All statistical work was done on SPSS version 10.0.

RESULTS

Among the 65 girls included in the study 41 gained weight during their stay in the hostel.

A correlation between BMI and PSI was drawn. A positive and significant correlation was found between PSI and

BMI $r = 0.313$, $p < 0.05$) i.e. with increase in the PSI level, BMI increases. (Figure 1).

The student demographics were tabulated and descriptive statistics was obtained. (Table 2)

The prevalence rates of overweight and obesity came out to be 21.53% and 3.07% respectively.(Figure 2)

The effect of PSI on present weight was found to be significant as p value was less than 0.05 ($F = 6.833$, $p < 0.05$).However, the effect of PSI on weight at the time admission was not found to be significant statistically ($F = 1.785$, $p > 0.05$). This showed that there was a weight gain in relation to stress.

A regression study was done between diet history (recorded through questionnaire) and PSI. The effect of PSI on diet was found to be highly significant as shown by p value less than 0.001 ($F = 69.227$, $p < 0.001$). $R^2 = 0.524$ shows that the explanatory variable explain 52% variation in dependent variable.

The mean values of individual questions of PSI of all 65 subjects showed the following results.

Among the 4 factors of the scale it was seen that the most dominating external sources was that is "demands". Maximum students felt that they had many things to do and many expectations were made of them. Between tension and worries, tension emerged as the more prevailing factor. Many of the subjects were of the view that they had fear of not attaining of their goals and were afraid of the future.

It has been widely reported that psychological stress and food consumption are related [14 15 16].The analysis of the Diet History Questionnaire confirmed the above fact as it demonstrated that there were behavioral shifts that lead to increased consumption of food when stressed. The girls also exhibited increased frequency of emotional snacking and binge eating. They agreed that they had a sedentary life style due to academic pressure according to the Diet History Questionnaire.

DISCUSSION

The study confirmed the general impression that there is a considerable amount of stress in medical students.[17]

The analysis of the diet scale outlines the common behavioral pattern among medical students which lead to overweight/obesity.

Interestingly, dramatic factor in BMI related behavior is physical activity and not the dietary habits. This finding probably reflects the major change in daily routine that occurs during stress.[11]

Among their behavioral changes in response to stress observed are:

- Increased consumption of food when stressed as they agreed on devouring more food during the semesters. They also approved of an increased intake of tea and coffee subsequent to their stay in hostel.

Emotional eating has often been examined as a possible risk factor for obesity.[16,18] The association between perceived stress and haphazard planning of meal suggests that, during stressful periods individuals are less likely to plan their meals carefully. Consequently, they are more likely to indulge in those foods which are characteristically high in fat.[9] The consumption of comfort foods may lead to a more positive dispositional state for several reasons including sensory pleasure, reduction of hunger, and the diminution of aversive physiological symptoms[19]. These highly palatable foods called the "comfort foods" eliminate or reduce the intensity of negative emotional state[20]. However, in the process, a large intake of calories takes place which invites overweight/obesity.

- Sleep deprivation- The hostellers concurred that sleep deprivation was principally due to the disturbance in sleep as the other fellow hostellers created noise. This was again seen as a difficulty in adjusting and leading to irritability among the hostellers.

  Prolonged sleep deprivation increases both food intake and energy consumption, as also a hormone imbalance is observed, leading to weight gain.[21]

- Increased frequency of snacking in between the meals- The hostellers attributed the increased incidence of food consumption to a longer duration between the lunch and the dinner.

  The study provides a significant contribution to emotional eating literature, as it is specific for the first year M.B. B.S. students and also provides information about correlation of stress and overweight/obesity in a unique population.

  Among the various stressors emotional factors are found to be significantly more in First year M.B., B.S. students[22] particularly in the girls. The girls confirmed that they –
- They felt nostalgic and longed for the shielding environment of the school and home.
- The girls also found difficulty in sharing their emotions as there was a lack of informal conversation.
- They found the stay in the hostels to be stressful due to the monotonous routine and a lack of recreational facilities provided by the campus.

LIMITATIONS

However, some discrepancies are observed from the expected outcome. Considering the high association between emotional eating and external eating, it would have been optimal to control for external eating in these analyses in order to identify relationship purely associated with emotional eating. However, due to space constraints we were unable to include this scale in our study. Future studies should include on assessment of other eating styles to control for their confounding effects.

Another potential limitation of study is that stress questionnaire data are self reported. Self reported measures are known to be subject bias, with over estimations of physical activity and underestimation of diet.[23] However, we employed previously validated questionnaire in our study which should yield legitimate results.

Several important questions emerge from the study. Is stress and eating a one way relationship among overweight/obese or it is a circular problem? Does stress contribute to obesity, or does obesity contributes to stress or does an interaction exists?

CONCLUSION

Study concluded that stress in medical students is common and is process oriented. Academic factors are greater perceived cause of stress in the students especially of I M.B; B.S students and more so in girls. Emotional factors are found to be significantly more in first MBBS students. A highly positive correlation between diet history questionnaire and PSI showed that there is a significant effect of stress on eating behavior also.

SUGGESTIONS

As obesity grows as a public health problem the challenge for health researchers and professionals is to develop more effective and innovative strategies for managing psychological stress which reduce stress induced eating.

Also, it was realized that stress levels must be regularly gauged among medical students, and the highly stressed students must be counseled by professionals.

CONFLICT OF INTEREST

None declared.

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TABLE 1*-

BMI	CONDITION
< 18.5	Underweight
18.50-24.99	Normal
25.0-29.9	Overweight
30.0-34.9	Class I obesity
35.0-39.9	Class II obesity
≥ 40.0	Class III obesity

*According to WHO BMI recommendations for adult Europids, 1998.

TABLE 2-Descriptive statistics

Variable	**Min**	**Max**	**Mean**	**SD**
Body Mass Index	14.90	32.80	20.83	3.69
Levenstein PSQ (Total)	37.00	82.00	51.57	9.42
Weight at admission	35.00	76.00	50.74	7.79
Present weight	37.00	82.00	53.20	8.88
Diet scale	37.00	94.00	62.03	12.45

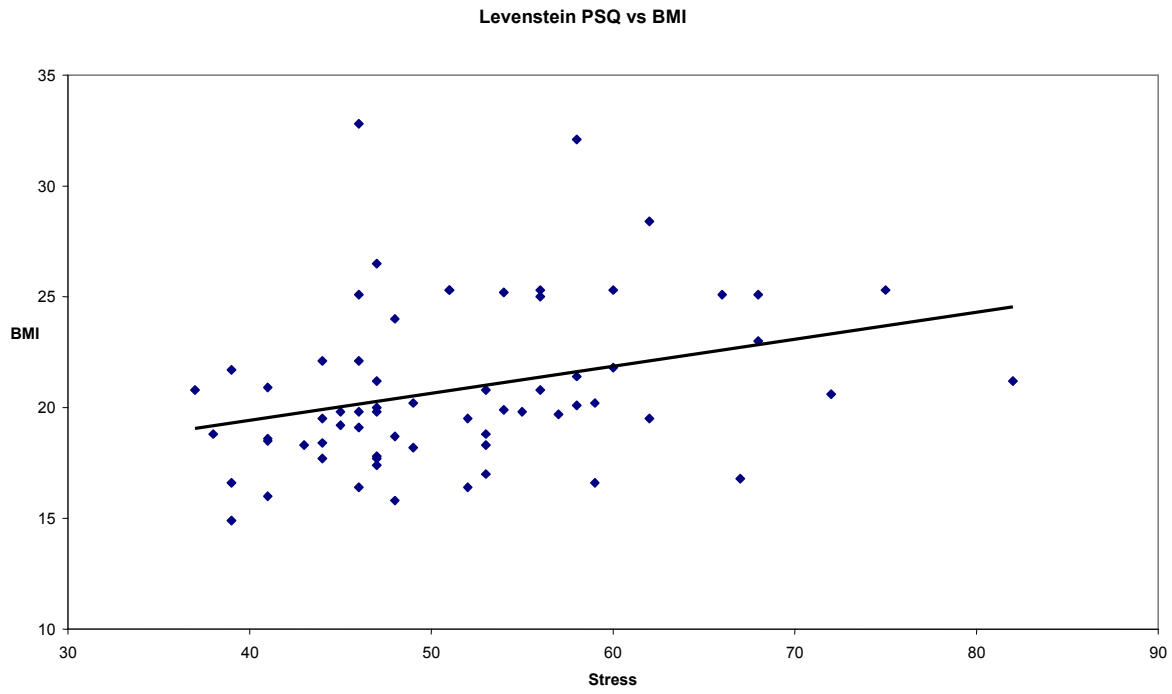

Figure 1:

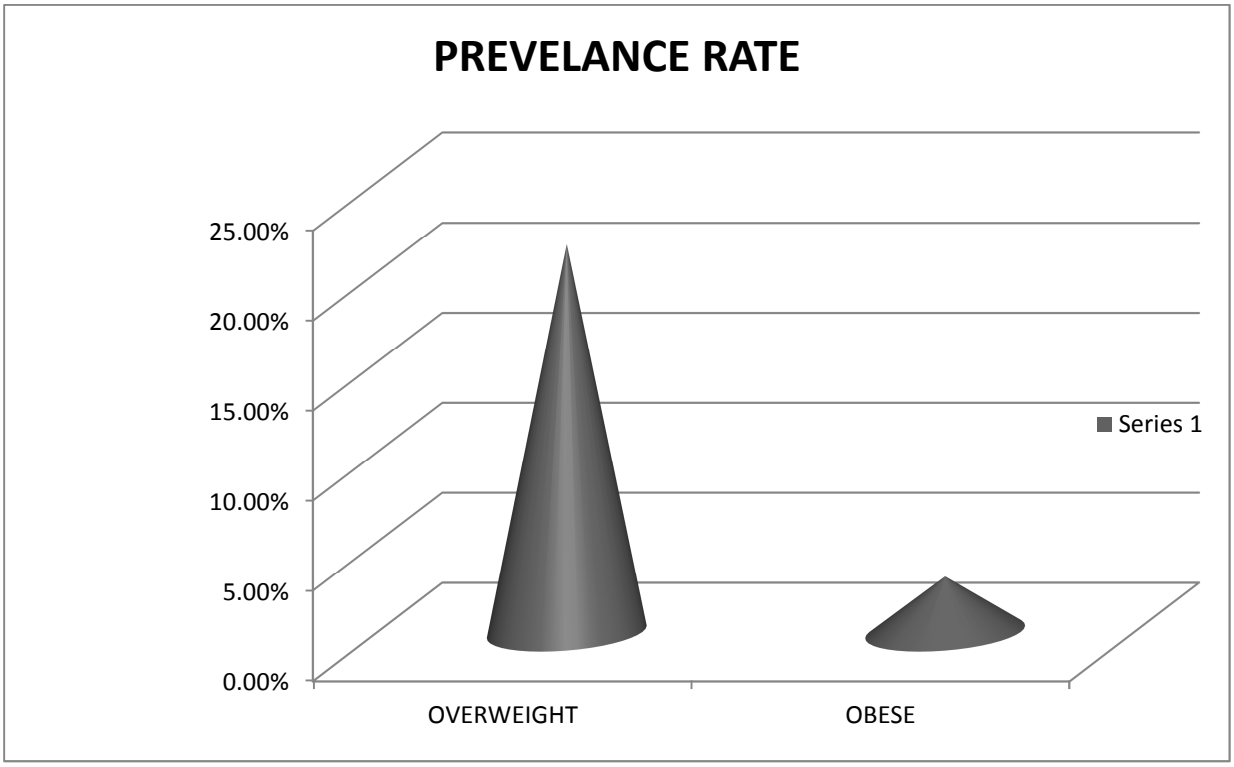

Figure 2: