

## Stress and Obesity in Health Professional Students: Myth or Reality

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### Abstract

**Background:** Stress is a negative emotional, cognitive, behavioral and physiological process occurs as individual adjusts with stressors. Stress-induced eating may be one of the factors that leads to obesity due to increased calorie intake, associated with excess cortisol secretion. Present study aimed to assess the level of perceived stress and its association with BMI in health professional beginners. The objectives were to assess the level of stress by pre-validated perceived stress scale and the relationship between stress and obesity in first year health professional students. **Material and Methods:** A cross sectional study was conducted in the Department of Biochemistry, SBKS MI & RC, SVDU for consecutive two batches 2016-17 & 2017-18. Total 506 first year MBBS, BDS & BPT students were studied for age, gender and demographic parameters as weight, height & BMI. Stress was assessed by PSS-10 scale. Two groups were identified as their PSS score, stressed and non-stressed. **Results:** PSS score showed that among all participants 71.74% (N=363) students were stressed and 28.26% (N=143) students were non stressed. Out of 506 students 151 (approx 30%) students were having above normal BMI. BMI & PSS score showed significant association (X<sup>2</sup>, p < 0.05). PSS score found to be significantly more when compared for overweight and obese categories than Normal and underweight. **Conclusion:** The significant association between stress level and increasing BMI shows that prompt measures should be taken to control obesity in young health professionals to control the stress and anxiety also to prevent the occurrence of life-threatening diseases such as diabetes and hypertension.

**Keywords:** Perceived stress scale, Body Mass Index.

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### INTRODUCTION

Stress is defined as an imbalance between environmental conditions necessary for survival and the ability of individuals to adapt for those conditions. Stress in medical students has been recognized for a long time. Medical education is considered as being stressful as it is characterized by many psychological changes in students [1]. Compared to the general population, medical students are the most distressed [2]. Although some stress is necessary for personal growth to occur, the amount of stress if overwhelming: the student ability to cope is affected [3]. Stress in medical education often exerts negative effect on the academic performance, physical health and psychological wellbeing of the students [4].

A decline in physical and mental health among medical students has been associated with academic events such as exams, elevated workload or cognitive tasks [5]. There is strong evidence from both human and animal studies that stress can alter eating behavior and

food intake [6-9]. The prevalence of obesity is a major public health problem because of the association of obesity with chronic health conditions such as hypertension, hyperlipidemia, coronary heart diseases, type-2 diabetes and cerebrovascular accidents [10]. Hence the purpose of the current study was to investigate the possible association of perceived stress with obesity in beginners of medical and allied sciences.

### MATERIALS AND METHODS

Cross sectional study was conducted in Department of Biochemistry, SBKS MIRC after Ethical clearance (SVIEC/ON/MED/PHD/16086). Total 506 health professional's beginners, who volunteered and gave consent, were recruited. Study was conducted for consecutive two years (2016-17 & 2017-18 batches) of first year students of MBBS, BDS & BPT. All the students were explained the objectives of present study in detail. Students of any kind of self-reported psychological disorders considered as excluded.

After recording of age, gender and demographic aspects such as weight, height, BMI was calculated by the formula according to the NHLBI (National Heart Lung and Blood Institute) criteria's [11] as weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ) and is categorized into four groups according to the Asian-Pacific cutoff point

[12] underweight ( $<18.5 \text{ kg}/\text{m}^2$ ), normal weight ( $18.5\text{--}22.9 \text{ kg}/\text{m}^2$ ), overweight ( $23\text{--}24.9 \text{ kg}/\text{m}^2$ ), and obese ( $\geq 25 \text{ kg}/\text{m}^2$ ). Stress was assessed with the pre-validated questionnaire PSS-10 (Table-1) [13]. Data was analysed using unpaired t-test between stress and non-stress and the association between PSS score and BMI was measured by chi square test.

**Table-1: Global measure of perceived stress scale (PSS-10) [13]**

Questions
In the past month, how often have you been upset because of something that happened unexpectedly?
In the past month, how often have you felt unable to control the important things in your life?
In the past month, how often have you felt nervous or stressed?
In the past month, how often have you felt confident about your ability to handle personal problems?
In the past month, how often have you felt that things were going your way?
In the past month, how often have you found that you could not cope with all the things you had to do?
In the past month, how often have you been able to control irritations in your life?
In the past month, how often have you felt that you were on top of things?
In the past month, how often have you been angry because of things that happened that were outside of your control?
In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?

### Perceived Stress Scoring

- Reverse your scores for questions 4, 5, 7, and 8.
- On these 4 questions, change the scores like this: 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.
- Now add up your scores for each item to get a total.
- Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores less than 13 would be considered no stressed. Scores more than 13 would be considered as stressed

### RESULTS

On the basis of final PSS score the whole group was divided in two groups. PSS > 13 considered as stressed group (N=363) with mean PSS score  $22.32 \pm 4.32$ . PSS < 13 considered as non-stressed (N=143) with mean PSS score  $10.96 \pm 1.69$ . PSS score is significantly high in stressed group as compared with non-stressed group.

**Table-2: Association of BMI and PSS score in stressed and nonstressed groups**

BMI Category	Stressed (N=363)	%	Non stressed (N=143)	%	chi square value	p value
Underweight( $<18.5 \text{ kg}/\text{m}^2$ )	38	10.47%	15	10.49%	9.347	0.025*
Normal( $18.5\text{--}22.9 \text{ kg}/\text{m}^2$ )	204	56.20%	98	68.53%		
Overweight( $23\text{--}24.9 \text{ kg}/\text{m}^2$ )	68	18.73%	21	14.69%		
Obese( $\geq 25 \text{ kg}/\text{m}^2$ )	53	14.60%	9	6.29%		

**Table-3: Comparison of BMI and PSS score in stressed and nonstressed groups**

BMI Category	Mean PSS Stressed	Mean PSS Non Stressed	p value
Underweight( $<18.5 \text{ kg}/\text{m}^2$ )	$21.89 \pm 1.87$	$15.65 \pm 2.56$	0.0001*
Normal( $18.5\text{--}22.9 \text{ kg}/\text{m}^2$ )	$14.2 \pm 2.47$	$13.95 \pm 3.25$	0.3510
Overweight( $23\text{--}24.9 \text{ kg}/\text{m}^2$ )	$27.08 \pm 1.98$	$15.69 \pm 1.26$	0.0001*
Obese ( $\geq 25 \text{ kg}/\text{m}^2$ ).	$31.75 \pm 0.65$	$16.25 \pm 3.25$	0.0001*

### DISCUSSION

Present study results showed that more than 30% of students were having BMI  $>23 \text{ kg}/\text{m}^2$  (overweight and obese), similar to the published studies by Shah T. *et al.*, and S Gopalkrishnan *et al.*, found 34.05% and 30.7% students overweight respectively [14, 15]. Elevated workload and cognitive task results in increased energy intake in medical students [16, 17]. Studies observed that people cope up with negative emotions generated by stressful events by engaging in emotional eating [18], leads to weight gain.

Simultaneously prolonged sleep deprivation and sadantary lifestyle increases both food intake and energy consumption enhanced by hormonal imbalance is leading causes of weight gain [19].

The participants were divided as 'stressed' and 'non stressed' groups based on the calculated PSS-10 score and found that 71.74% students were stressed and 28.26% students were non stressed. PSS-10 as an instrument to assess the stress among health professionals by author as it is brief, easy to apply and

has been documented by its reliability and validity.<sup>20,21</sup> Similar studies reported that majority of medical students were stressed as reported by Supe et al (73.5%) and Saipanish *et al* (61.4%). Competitive environment with long working hours due to huge burden of curriculum framed by the council; frequent assessment and limited time for revision leads to fear of failure and high perceived stress. Several studies conducted in India and Saudi Arabia found the same results [22, 23], while the studies in other countries found the lower PSS score reported in India, Malaysia [24, 25]. On the contrary a study done in Iran stated that 83% students had perceived stress [26]. The possible explanation for this difference may be setup difference, technological difference, and curricular approach.

Study found that the PSS score of stressed and non stressed group in obese ( $p < 0.05$ ) and overweight ( $p < 0.05$ ) category were found to be more significantly. Present study also found significant association (chi square;  $p < 0.05$ ) when compared for BMI and PSS score. Many studies in literature found no correlation between PSS and BMI [19-21] some reported the positive correlation of PSS with BMI [27]. Chronic psychosocial stress may lead to obesity through physiological effects, such as excess cortisol secretion, or could contribute to the development of obesity through an association with poorer behavioral risk factors, increased caloric intake and sedentary lifestyle [29]. Dietary habits are major aspects of people's lifestyles that influence health, morbidity, and mortality for a range of conditions [28]. Carbohydrate consumption has been hypothesized to relieve depressive moods [30] and this has been considered as part of the causal link for developing obesity.

## CONCLUSION

Present study reported a higher level of perceived stress in health professional beginners. Probably, the most important reason could be academic and peer pressure. The association between stress level and increasing BMI indicate that prompt measures like regular stress assessments, mentoring and counseling, conducting monthly tests, mock examinations can reduce the impact of academic examination stressor on physical and mental health of medical students.

Author suggests that an effective inclusion and implementation of regular exercise, sports and cultural activities and stress management program like meditation, yoga in the medical curriculum may be a key to reducing and or preventing stress-induced psychological distress and overweight/obesity.

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