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Toxicological SciencesJournal homepage: <http://www.ijfmts.com/>

Original Research Article

To study the influence of stress level with obesity in medical students of India

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ARTICLE INFO

Article history:

Received 02-09-2021

Accepted 16-09-2021

Available online 21-01-2021

Keywords:

Stress Level

Obesity

Overweight

Body Mass Index (BMI)

Medical Students

ABSTRACT

Introduction: Stress and Obesity are two highly prevalent conditions present in the society, incidence of which are escalating worldwide. Medical education is taxing and tends to bring psychological stress. Eating has been recognized as a coping mechanisms for dealing with emotions and alleviating stress. There is a vicious cycle of stress-obesity-stigma-stress.

Objective: To study the prevalence of stress levels and obesity in the medical students

Material and Methods: A cross-sectional study was conducted among medical students of age group 18-30 yrs of Dr. D.Y. University, School of Medicine, Nerul, India. After the approval of the Institutional Ethical Committee, data was collected from 500 students by using a validated, self-administered questionnaire. Utmost care was taken to maintain the privacy and confidentiality. Waiver consent was taken from students who had participated voluntarily in the study. The data collected was coded and entered in Microsoft Excel and analyzed using SPSS version 17.0 software. Descriptive statistics was used for data analysis and the data was represented in the form of percentages, mean.

Results: The prevalence of overweight and obesity in medical students was found to be 36.8 % (184) and 11.1 % (55) respectively. Prevalence of overweight and obesity was comparatively higher in males 48.3% and 11.5% than in females 30.1% and 10.6%. 45.6% (228) study participants perceived their stress level to be high and 30.8% (154) as medium. Among the study participants who perceives their stress level as high (n=228), 39.04% (89) were overweight and 18.86% (43) were obese.

Conclusion: Developing innovative and effective strategies for managing stress in medical students is the need of the hour. Aggressive management can delay the onset and progression of obesity, and prevent complications.

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1. Introduction

Obesity is an outcome of composite relationship between socioeconomic status, genetics and cultural practices. Prevalence of obesity is determined by individual's lifestyle, habits, consumption pattern and urbanization.¹ Globally, obesity has been recognized as a public health concern and as one of the top five leading causes of morbidity and mortality.²⁻⁵ It increases the risk of chronic conditions like diabetes, sleep apnea, stroke, cardiovascular diseases,

osteoarthritis and ubiquitous types of cancers.²⁻⁵ Due to the time consuming and bustling schedules, medical students are often subjected to a sedentary lifestyle. It correlates with the higher risk of obesity among medical students.⁶ Medical education is very taxing, factors like long hours of working, social isolation, exam anxiety, discrepancies between expectation and the reality, tedious training, high liability, sleep deprivation, increased social expectations, and constant lack of time to relax, all can be anticipated to bring psychological stress. Eating irregularities has been recognized as one of the coping mechanisms for

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dealing with emotions and alleviating stress.^{7–10} It can be either by undereating or over-eating.¹¹ To cope up with the pessimistic emotions and thoughts generated by stressful events, majority people often indulge in emotional eating, involving eating without hunger or eating without planning. Stress and Obesity are two highly prevalent conditions present in the society, incidence of which are escalating worldwide. There is a vicious cycle of stress-obesity-stigma-stress. There are many pathways that have established a link between the two.¹² Various pathways that might play a role in establishing a correlation between stress and obesity are:

1. Stress impinge with cognitive processes such as executive function and self-regulation.
2. Stress is a critical factor in the onset of addiction and in addiction relapse, and may give rise to an increased risk for obesity and other metabolic diseases.
3. Brain reward circuitry may be a crucial player in stress-induced food intake.
4. Stress can influence behaviour by inducing overeating and consumption of foods that are high in calories, fat, or sugar.
5. Uncontrollable stress changes eating patterns and the salience and consumption of hyperpalatable foods; over time, this could lead to changes in allostatic load and trigger neurobiological adaptations that promote increasingly compulsive behaviour
6. Stress can affect an individual by decrease in physical activity; and by changing their sleep pattern.
7. Stress triggers physiological changes in the hypothalamic-pituitary-adrenal axis, reward processing in the brain, and possibly the gut microbiome. Alterations in the glucose metabolism, insulin sensitivity, and other appetite-related hormones and hypothalamic neuropeptides, it can also stimulate production of biochemical hormones and peptides such as leptin, ghrelin, and neuropeptide Y.
8. At a neurocircuitry level, chronic stress can affect the mesolimbic dopaminergic system and other brain regions involved in stress/motivation circuits.
9. Obesity itself can be a stressful state due to the rampant weight stigma associated with it.¹²

The process can be moderated by the type of stressors and individual differences in the susceptibility of obesity. All the various pathways mentioned above, can synergistically potentiate reward system and induce metabolic changes resulting in increased weight and body fat mass.¹³ It is of great Significance to decipher the association of stress levels with obesity and the interactions between the stress, obesity and neurobiological adaptations. It can contribute in the development of effective prevention strategies and treatment regimes for obesity and related metabolic diseases.¹³

2. Objective

To study the prevalence of stress levels and obesity in the medical students.

3. Material and Methods

A cross-sectional study was among medical students of age group 18-30 yrs of Dr. D.Y. University, School of Medicine, Nerul, India. After the approval of the Institutional Ethical Committee, data was collected from 500 students by using a validated, self-administered questionnaire. Utmost care was taken to maintain the privacy and confidentiality. Waiver consent was taken from students who had participated voluntarily in the study. The data collected was coded and entered in Microsoft Excel and analyzed using SPSS version 17.0 software. Descriptive statistics was used for data analysis and the data was represented in the form of percentages, mean.

4. Results

The study was conducted among 500 medical students of the age group 18-30 yrs, out of which 36% (180) were males and 64% (320) were females. There was a clear female preponderance. The prevalence of overweight and obesity in medical students was found to be 36.8 % (184) and 11.1 % (55) respectively. The prevalence of overweight and obesity was comparatively higher in males 48.3% and 11.5% than in females 30.1% and 10.6% respectively. The demographic details of the study participants are given in Table 01.

Table 1: Demographic details of study participants (n=500)

Parameter	Result
Mean Age (years)	22.38
Mean Height (cm)	167.31
Mean Weight (kg)	64.85
Mean BMI	23.0796
Age	
18-20 years	145 (29%)
21-23 years	188 (37.6%)
24-26 years	128 (25.6%)
>26 years	39 (7.8%)
Gender	
Male	180 (36%)
Female	320 (64%)
Education	
Undergraduate Students	380 (76%)
Postgraduate Students	120 (24%)

Out of the 500 study participants, 24% (120) were Postgraduate (PG) students and 76% (380) were Undergraduate (UG) students. The education status of the study participants and BMI is given in Figure 1.

Stress level among the students was assessed through a validated, self-administered questionnaire, through which degree to which situations in one's life are perceived as

Figure 01. Education Status of the Study Participants

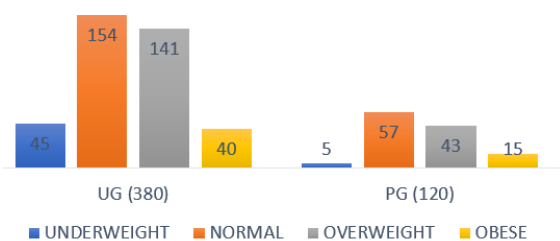


Fig. 1: Education status of the study participants

stressful were measured. The study participants were also asked to rate their feelings and stress levels on a scale of Low, Medium and High. This rating was completely based on the individual’s perception. With respect to stress levels, 45.6% (228) perceived their stress level as high and 30.8% (154) as medium. BMI was calculated and graded according to the WHO Asia-pacific guidelines, which identifies overweight when BMI is 23-24.9 and obese when BMI is 25 and above. The perceived stress level of the study participants and their BMI is established in Table 2. Participants with high stress level and their BMI is given in Figure 2.

Table 2: Perceived stress level of the study participants and their BMI (n=500)

Parameter	Low Stress Level	Medium Stress Level	High Stress Level
Underweight	14 (2.8%)	17 (3.4%)	19 (3.8%)
Normal	66 (13.2%)	68 (13.6%)	77 (15.4%)
Overweight	33 (6.6%)	62 (12.4%)	89 (17.8%)
Obese	5 (1%)	7 (1.4%)	43 (8.6%)

Figure 02. Study Participants with high stress level and their BMI (n=228)

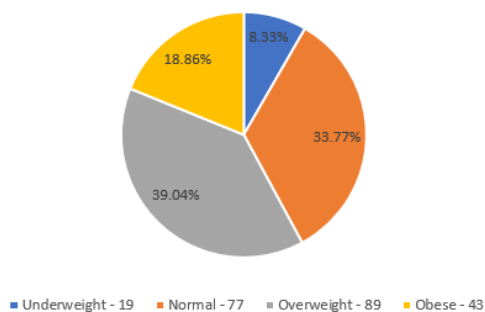


Fig. 2: Study participants with high stress level and their BMI (n=228)

5. Discussion

In India, Obesity has reached epidemic proportions, with morbid obesity affecting approximately 5% population in the country. There was a clear female preponderance. The prevalence of overweight and obesity in medical students was found to be 36.8 % (184) and 11.1 % (55) respectively. The prevalence of overweight and obesity was comparatively higher in males 48.3% and 11.5% than in females 30.1% and 10.6% respectively. There are some studies available which are based on WHO Asia-Pacific guidelines. In one of the study, similar findings were found which was conducted by Guddegowdai K S et al. in 2018.¹⁴

In the present study, we have studied the prevalence of obesity and stress level in the study participants, using a validated and self-administered questionnaire. BMI was calculated and graded according to the WHO Asia-pacific guidelines, which identifies overweight when BMI is 23-24.9 and obese when BMI is 25 and above. The questionnaire was primarily based on the individual’s perception of stress level. Perceived stress is the personal assessment of an individual of the stress level they are experiencing/undergoing at a given point in time or over a given period. Perception of stress is considered as a multidimensional concept with medical, psychological and psychosocial aspects. Perceived stress of each individual varies with the type of stressor involved, stress threshold of an individual, type of personality, his/her control over the situation, coping resources, and support. 45.6% (228) study participants perceived their stress level to be high and 30.8% (154) as medium, and the remaining as low. Among the study participants who perceive their stress level as high (n=228), 8.33% (19) were underweight, 33.77% (77) were normal, 39.04% (89) were overweight and 18.86% (43) were obese.

Mild/Low stress level among the medical students can be favorable, as it can prepare an individual to work at an optimum level.¹⁵ But if the individual is unable to cope up with the stress, it can have detrimental effects. The inability broadly depends on the perception of stress by the individual and on the degree of stressor.¹⁶ In a study conducted among 171 female students from 1st year medical and paramedical, it was observed that there was high prevalence of stress level among the obese patients, in comparison to those with normal BMI.¹⁷

According to another study, overweight and obese students perceive higher levels of stress, often related to social stress. Social related stress includes factors which stem from the social environment such as frequent interruption of work by others, talking to patients about personal problems, the lack of quality time for family and friends, peer pressure to get involved in social activities, facing illness and death of patients, and insufficient time for relaxation.¹⁸ Stress caused by psychological problems such as low self-esteem, anxiety, depression and physiological

problems of being overweight in addition to chronic exposure to the common stressors in an average medical student's life may affect the ability of the individual to cope with the stressor and the level of stress the individual perceives.^{19–22}

A study was conducted by Sani M et al. (2012), which demonstrated that BMI had significant association with stress level in medical students of Saudi Arabia.²³ Another study by Gupta et al. (2009) which was conducted among male medical students of Kolkata, helped in establishing a correlation between BMI and PSS-I, which was found to be statistically significant ($r = 0.362$, $P < 0.01$).²⁴ Medical students are the future of the healthcare system of any nation. It is of utmost importance to evaluate their physical and mental well-being, to improve their quality of life and productivity. We require various interventions that can become an essential part of the curriculum for improvement of physical and mental well-being and lifestyle of the future health care provider. Various interventions like organization of courses and groups focusing on stress management, fitness, and proper diet might turn out to be a helping hand in the current situation.²⁵

6. Conclusion

Medical students who perceived high level of stress were more likely to be overweight or obese. With the increasing spike in Stress and Obesity globally, they have become extremely prevalent in our society. This has become a daunting nightmare for the researchers and the professionals. Various factors like- irregular sleep cycle, peer pressure, monotony, fright and tedious training have cumulated in great amount of psychological stress among the medical students. Medical students form the future of medicine and health worldwide. It is of utmost importance to evaluate their physical and mental well-being, to improve their quality of life and productivity. Coming up with innovative and efficacious strategies to cope up with stress in medical students is definitely the need of the hour. Early screening and diagnosis of stress can be a modifiable risk factor for obesity. Aggressive treatment can lead to delay in onset and progression of obesity, preventing the obesity related complications like diabetes, sleep apnea, stroke, cardiovascular diseases, osteoarthritis and various types of cancers.

7. Ethical Approval Code

8. Source of Funding

None.

9. Conflict of Interest

None.

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Cite this article: Sonawane S, Sharma H, Tetarbe T. To study the influence of stress level with obesity in medical students of India. *IP Int J Forensic Med Toxicol Sci* 2021;6(4):153-157.

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