

Association Of Perceived Stress With Body Mass Index In Young Adults: A Gender Based Study

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Abstract –

Stressors have a huge sway upon mood, our sense of well-being, behavior and health. Acute stress, counter responses, in young healthy individual may be adaptive and typically do not impose an ill effect on health. However if not treated particularly in older or sick individual, long-term effect of stressor can damage health. The relationship between stressor and disease is affected by the nature, number, and persistence of stressor as well as by the individual's biological vulnerability (genetic, constitutional factors) psychosocial resources and learned pattern of coping.

Now a day's stress and Overweight are universal problematic issue, They are interconnected to each other by different ways. Academic life act as of stressor that may influence weight management. In this cross sectional study, we aimed to investigate the association between Perceived stress and Body Mass Index in young adults

Keywords: Anthropometric measurement Body Mass Index, Eating behavior, Obesity, Perceived stress

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I. Introduction

The Human day to day life is full of worries and mental pressure. So that the present century is called stress era^[1] Stress is a natural physical and mental reaction to life acquaintance. Stress is an undeniable phenomenon in daily human life. We always have to face, handle and adapt to many stressful situations.^[2]

The reason of inclusiveness of stress in human communities is the intricacy of human social, personal, and ecological environment, collaborative and synchronic interaction of human with surroundings and in stress expression.^[3]

Low level of stress might be essential and even healthy. The Eustress in which stress in its positive form, can improve biopsychosocial health and facilitate performance. Furthermore Eustress is considered as an important factor to adaptation and reaction to surrounding environment. However high stress could result in biological, psychological and social problem and harmful. ^[4] According to WHO stress is defined as, state of worry or mental tension caused by difficult situation.^[5]

Stress is a key risk factor for variety of disease affecting many organs of body like heart, kidney, bone etc. ^[6] The psychological stress has powerful impact on both physical as well as mental health. Any intrinsic or extrinsic stimulation that evokes a biological response is known as stress. The counter responses to these are known as stress response. Based on the intensity, duration and severity of applied stimulus stress can exert various action on body ranging from alteration in homeostasis to life threatening effect and ultimately death. Stress is either a triggering or aggravating factor for many disease and pathological condition. ^[7]

Understanding the impact of stress on human body is difficult challenge due to uncoordinated nature of stress, the behavior, endocrine and neural system associated with. ^[8] Some studies showed that stressful people choose unhealthy food items which contains high amount of calories, fat, sugar and carbohydrate. Dietary behavior is important for development and growth of human being. The stress was associated with selection of less healthy food. There was also evidence that women under stress chooses highly palatable food or snack foods. In some individual stress increases appetite while other display decreased desires to eating. This is important that, analysis of dietary or food consumption pattern for assessing the overall diet ^[9]

Increased Body Mass Index is associated with high stress and emotional eating. The term emotional eating characterized by habits that are brought on by feeling other than hunger such as feeling ill tempered, exhaust, sorrow and bored.^[10]

Many trajectory connects stress and High BMI or obesity, universal problem suffering society Firstly, stress interferes with cognitive process such as executive function and self-regulation. Secondly, stress can induces over eating, consumption of food items containing high calorie, fat, sugar by less physical activity and

diminished sleep .Thirdly stress triggers physiological change in hypothalamic pituitary adrenal axis ,reward processing in brain and GUT microflora. Finally stress can modify production of biochemical hormones and peptides such as leptin, ghrelin and neuropeptide Y. Leptin is hormone which works in long term regulation of energy balance and thereby inducing weight loss. Ghrelin on the other hand is a fast acting hormone playing a role in appetite initiation. obesity itself stressful state due to high prevalence of weight stigma. ^[11]

In this cross sectional study, we aimed to investigate the association between Perceived stress and Body Mass Index in young adults. With the help of this study we should enhancing stress coping strategies for individuals could potentially leads to improvement in eating behaviors and reduce risk of obesity.

II. Material And Methods

A cross sectional study was carried out on 324 students of both gender of age group 18 -22 years in National Institution of Medical Science & Research University Jaipur .The sample size was calculated ,estimated sample size was 384 participants, however it was decreased due to students was not interested to participation in this study.

Sample size - Sample size was calculated by following formula

$$\begin{aligned} \text{Sample size } n &= \frac{(Z\alpha/2)^2 * p * (1-p)}{d^2} \\ &= \frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.05)^2} \\ &= \mathbf{384 \text{ Sample}} \end{aligned}$$

Data were collected from the subjects using a case Performa. Subjects were selected based on inclusion and exclusion criteria. Basic anthropometric data was collected . The BMI was calculated by body weight in kilograms divided by height in meter square.

Assessment of Body Mass Index^[12]

Body Mass Index-Range = 18.5-24.9 kg/m²=healthy individual

25.0-29.9 kg/m²= over weight

>30 kg/m²= obese

For assessment of stress level- A authenticable and reliable questionnaire of perceived stress scale was used to asses the stress level of enrolled subjects . The participants were asked to fill up questionnaire of perceived stress scale.

This is a 10 items Questionnaire designed to evaluate the self reported amount of stress in participants by assessing thoughts and feelings during last few months. Items were designed to evaluate how uncertain ,rebellious, and overloaded the enrolled respondents find their lives. The participants had to indicate how often they experience a certain feeling in previous month . Each question is scored from “0” to “5”. The total score from the sum of questions may vary from “0” to “40”, and perceived stress is higher as scores increase.

The PSS is classified in to three groups, which are low perceived stress (low PSS-0-13), medium perceived stress (Medium PSS 14-26) and High perceived stress (high PSS 27- 40)^[13]

PSS scoring calculation – Following scoring is given for particular question .

- Reverse the scores for question number 4, 5, 7 , 8
- Add up the scores for all 10 Questions.

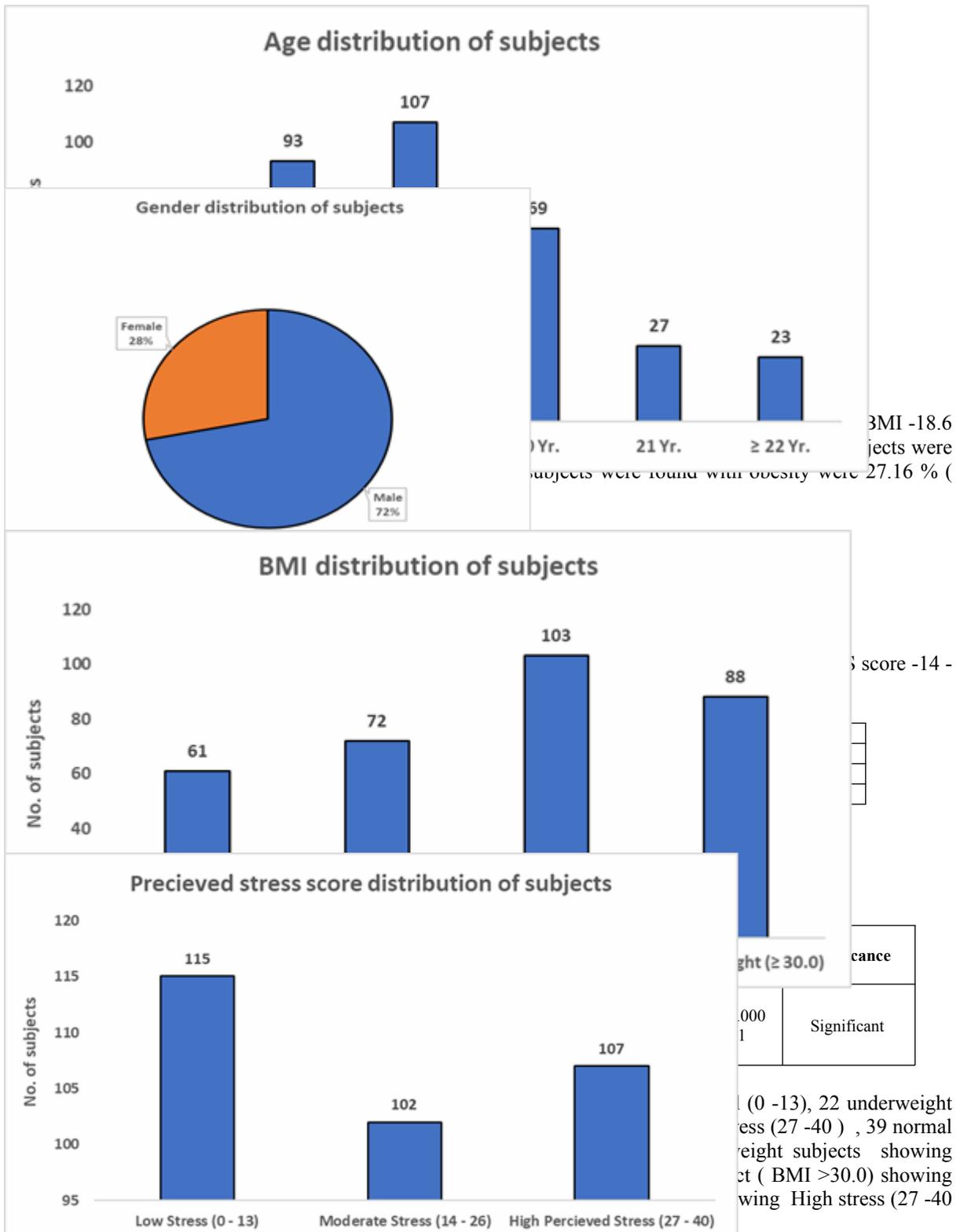
III. Results And Discussions

Table 1.1: Frequency distribution of age of subjects

Age (In Yr.)	n = 324	In %
≤ 17 Yr.	5	1.54%
18 Yr.	93	28.70%
19 Yr.	107	33.02%
20 Yr.	69	21.30%
21 Yr.	27	8.33%
≥ 22 Yr.	23	7.10%

Table 1.1: Frequency distribution of age of subjects

Frequency distribution of age of subjects in this study were 1.54% below 17 years old , 28.70 % were 18 years old ,33.02 % were 19 years old, 21.30 % were 20 years old , 8.33% were 21 years old, 7.10 % were >22 years old



The finding showing positive significance between Body Mass Index and Perceived Stress Score.

Table 6.1: Association of perceived stress score with gender

Category	Low Stress (0-13)	Moderate Stress (14-26)	High Perceived Stress (27-40)	Chi-square Test	P – Value	Significance
Male	88	78	67	6.836	0.03277	Significant
Female	27	24	40			

P value was < 0.03277

The finding shows a positive significance between gender and Perceived Stress Score.

Discussion- A total of 324 subjects were studied in the Department of Physiology at the National Institute of Medical Science & Research, Jaipur, Rajasthan were enrolled after consideration of the inclusion and exclusion criteria. The Observations and Results are discussed in this section in the light of available data, information, and observations made by other researchers in a similar region or elsewhere.

In this study we observed the BMI of 324 subjects was found underweight at 18.83 % (< BMI -18.6 kg /m2) , subjects were found with normal weight at 22.22% (BMI – 18.6 -24.9 kg /m2), subjects were found with overweight at 31.79 % (25.0 -29.9 kg/m2) , subjects were found with obesity were 27.16 % (BMI - > 30 kg /m2).[Table 3.1]

Stress levels were low (PSS score 0- 13) in 35.02 % of subjects, and stress was moderate (PSS score - 14 -26) in 31. In 48 % of subjects, stress was high (PSS score 27 – 40) in 33.02% of subjects .[Table 4.1]

In our study [Table – 8], 8.6 % of Underweight subjects were in a low stress, 6.7% of underweight subjects were in moderate stress,3.9% of underweight subjects were in a high stress, study 8.6 % of Underweight subjects were in a low stress, 6.7% underweight subjects were in moderate stress,12% subjects with normal weight were in a low stress,5.2% subjects with normal weight were in moderate stress, 4.9 % subjects with normal weight were in a high stress, 10.18 % subjects with overweight were in a low stress,12.6 % subjects with overweight were in moderate stress, 8.95 % subjects with overweight were in a high stress, 4.6 % obese subject were in a low stress,6.7 % subjects with overweight were in moderate stress, 15.74 % subjects with overweight were in high stress. p-value was <0.0001

There was a positive significance between perceived stress and Body mass Index.

Tion Tan And Clindy W Leung et al.(2021) [19]– study exhibited an association between the quintile of PSS score, BMI, and waist circumference and observed that there is an inverse relation between PSS score and adiposity in people. Overall, the mean perceived stress score was 22.7, the mean BMI was 24.3kg/m2, and the prevalence of obesity (BMI >30 kg /m2) was 6.0 %. There was an inverse association between perceived stress quintiles with continuous BMI (P< 0.001), and BMI categories (p= 0.015) Compared to adults in the lowest quintiles of perceived stress, adults highest quintile of perceived stress had a lower mean BMI of 0.44 kg /m2. Our study did not support this study.

However, the observation differs from the report of R Jbir, R Masmoudi et al.(2023) [23] Exhibited an association between PSS level and BMI in medical students and found that medical students especially underweight or overweight are more susceptible to developing stress symptoms.

According to PSS scoring 21.1% of students had severe stress, 69.5% had moderate stress levels while 9.5 had a low level. The stress level among underweight subjects (BMI <18.5) and overweight (BMI <25) subjects, observing a significant association between stress and BMI. Our study is partially supported by this study

[Table 6.1] There were 88 (27.16 %) male subjects were seen with low perceived stress (PSS =0 - 13), 78 (24%) males were seen with moderate perceived stress (PSS =14 -26), 76 (23.4%) males were with high perceived stress (PSS=27-40) and 27 (8.3%) females subjects were seen with low stress (PSS =0-13), 24 (7.4 %) females subjects were seen with moderate stress level (PSS =14 -26) , 40 (12.3%) females subjects were seen with high-stress level (PSS =27 -40)

The P value estimated was 0.03277

The result indicates that females are more prone to stress compared to males.

IV. Conclusion

This Study findings focused on the correlation between Perceived stress and Body Mass Index in young adults. Our findings have supported evidence for significant association between these factors , indicating that young adults acquaintance with stress are more likely to be overweight or obese . These results emphasize the importance of multifarious approach to body weight management in this population .University programs and initiatives can play a pivotal role play in promoting healthy lifestyles and well being . Investing in comprehensive wellness programs that address stress, sleep ,diet ,and physical activity can empower young adults to make positive lifestyle choice that can promote healthy body weight management and overall well being throughout their academic journey and beyond.

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References

- [1] Shahsavarani AM, Et Al. Stress: Facts And Theories Through Literature Review. 2015;2:230-241.
- [2] Japaridze LMK, Et Al. ; Stress As An Integral Part Of Our Life. Oct 2022 , Pg -812 Doi 1019044/Esi Preprint.
- [3] Edward JA, Websters, Vanlaar D Et Al. ; Psychometric Analysis Of U.K Health And Safety Standard Tool Executive's Management Standard Work Related Stress, 2008 ;22; Pg 96 -107
- [4] Tucker J, Sinclair R, Mohrc, Adler A Et Al ; A Temporal Investigation Of Diver Sect Interactive And Reverse Relation Between Demand And Control And Ffective Strain , Work & Stress. 2008 22; Pg – 81 -95
- [5] World Health Organization. 21 February 2023.
- [6] Muscalell KA, Et Al. A Social Neuroscience Perspective On Stress And Health. 2012;6(12):890- 904.
- [7] Yaribeygi H, Et Al. The Impact Of Stress On Body Function: A Review. July 2017;16:1057-1072. Doi:10.17179/Excli2017-480.
- [8] Hill D, Corner M, Clancy Et Al . Stress And Eating Behaviour In Healthy Adults , A Systematic Review And Meta Analysis , May 2021, Doi Org/10.1080/1743199.2021. Pg -280 -304
- [9] Choi J, Et Al. Impact Of Stress Level On Eating Behaviour Among College Students. May 2020;12(5):1241.
- [10] Javed Arjmand E, Et Al. Change In BMI And Their Association With Psychological Distress, Worries, And Emotional Eating During Covid-19 Pandemic: A Norwegian Cohort Study. Sep 2023;15(17):3834.
- [11] Tomiyama J, Et Al. Stress And Obesity. Jan 2019;70:703-718. Doi:10.1146/Annurev-Psych-010418-102936.
- [12] Nuttall FQ, Et Al. Body Mass Index. May 2015;50(3):117-128. Doi:10.1097/NT.0000000000000092.
- [13] Cohen S, Kamarck T , Marmelstein R, Perceived Stress Scale , Journal Of Health And Social Behavior, 1983 ,24, Pg – 386 – 396