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Original Research Article

Study of Perceived Stress and Associated Factors with Vitamin D Levels in under Graduated Medical Students.

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Abstract:

Background of the Study: The primary aim of medical education is to produce community members who can practice medicine safely and competently. Under stressful situations, academic proficiency might be diminished, impacting students' grade point averages, and fostering detrimental behaviors. The Perceived Stress Scale-10 (PSS-10) is a valuable instrument for evaluating psychological stress. Being involved in the neurotransmitter systems in the brain. Vitamin D may have a role in the perception of stress.

Objectives: The aim of this study was to evaluate the perceived stress levels in medical undergraduates and determine its correlation with vitamin D levels.

Materials and Methods: Using the PSS-10, 81 students ranging in age from 18 to 24 years old had their stress levels evaluated. Stress levels are deemed moderate to severe when the overall score exceeds 14. Using the chemiluminescent immunoassay method, the serum vitamin D levels were determined.

Results: There was a substantial difference in the levels of stress experienced by males and females, with females experiencing a considerably higher level of stress (P = 0.002) than males. Hypovitaminosis D affected around 87% of women and 91% of men, and there was no correlation between the sexes. Furthermore, despite the fact that there was a negative correlation between stress and vitamin D, the association was not statistically significant with a P value of 0.5.

Conclusion: The findings of the study indicate that medical students have an elevated incidence of both stress and hypovitaminosis. Vitamin D, on the other hand, does not appear to be connected with the experience of stress.

Keywords: Perceived Stress, Vitamin D, Medical Education, Mental Stress.

Introduction

Many students perceive medical school as one of the most challenging academic disciplines. Students often report that they are stressed out by their heavy coursework, stringent absence regulations, frequent assessments, and majorly patient responsibility [1]. At various periods throughout medical school, several cross-sectional studies have shown elevated levels of stress, anxiety, depression, and exhaustion. Academic stress refers to the personal state that arises from the pursuit of knowledge and education. [2] Stress increases the potential to do poorly academically, which affects grade point averages and promotes bad habits including drinking and smoking, fighting, having unprotected sex, and abusing drugs (such as opiates, psychotropics, and other addictive substances [3]. Compared to other academic fields, medical education is the hardest and most stressful due to its extensive curriculum and the unavoidable need for in-depth knowledge because it deals with human life. [4] Numerous global research involving medical students reveal a concerningly high incidence of stress.[5] Studies carried out in India also produce outcomes that are comparable to those found in other countries.(8] Many students claim that the most common sources of stress are things that are associated with their academic pursuits, such as the anxiety of taking exams and the fear about receiving low scores.

To determine the levels of stress, there are many different instruments available. Among the various stress tests available, some of the most popular ones are the Stress and Adversity Inventory, the Stress Coping Resources Inventory, the Life Events and Difficulties Schedule, the Stress meter, and the Ardell Wellness Stress Test. For the purpose of assessing psychological stress, one such tool is the

perceived stress scale (PSS), which was developed by Cohen et al. for the purpose of evaluating psychological stress. This stress-perception measure is a self-administered questionnaire that inquiries about one's emotional and mental state throughout the past 30 days.

In comparison to other micronutrient deficiencies, vitamin D deficiency (VDD) is acknowledged as a worldwide epidemic in the twenty-first century [6]. An estimated 1 billion or more people worldwide are thought to be affected by VDD. Even in places with enough sunshine, the frequency of VDD is noticeably rising in all age groups of men and women. [7]. The amount of vitamin D in a society varies depending on a number of factors, such as skin tone, heredity, body weight, nutrition, location, and other environmental factors. [8]. Vitamin D is widely recognized for its contribution to calcium homeostasis. It is additionally associated with emotions and cognition, stress, anxiety, and depression, and possesses a multitude of neuropsychophysiological consequences. [9]. Vitamin D is needed for the brain to make serotonin hormone, which affects mood and increases with bright light and lowers with dark light. Vitamin D is needed for the brain to make serotonin hormone, which affects mood and increases with bright light and lowers with dark light. Many studies link decreased blood 25-(OH)D, or calcifediol, levels to mental diseases such depression, eating disorders, and schizophrenia. [10].

Numerous evaluations have addressed the connection between hypovitaminosis D and stress. Nevertheless, no research has been conducted to compare stress and vitamin D levels in undergraduate medical students. The consequences of stress associated with medical education might be lessened by identifying any associations and treating vitamin D insufficiency, which is a controllable factor and easily curable. The main objective of this study was to evaluate the correlation among stress and vitamin D in medical undergraduate students.

Materials and Methods

This was a cross-sectional analytical study conducted in the Department of Community Medicine and collaboration with Biochemistry, Prakash Institute of Medical Sciences and Research. This was carried out between July and August of 2021, with the approval of the Institutional Ethical Committee. Participants in the study were male and female first and third-year medical students at the undergraduate level, ranging in age from 18 to 24 years The students were provided with an explanation of the study's procedure, and those who expressed their willingness and provided written informed consent were enrolled in the research. Following the comprehensive clinical history that was obtained, a general physical examination was conducted. The participants were administered the PSS questionnaire, and their individual total scores were computed. The correlation between levels of stress and vitamin D was investigated in greater depth.

PSS-10

The participants' stress levels were assessed using this. Ten items on this self-administered questionnaire assess the respondent's thoughts and feelings during the month before. Each question must be scored by the participants on a 5-point scale that goes from never to very often. Usually there are two types of queries. The individuals' sense of helplessness is measured by questions 1, 2, 3, 6, 9, and 10, while their lack of self-efficacy is shown by questions 4, 5, 7, and 8. The questions are structured in a manner that there are four items expressed in a positive manner, but their values are inverted when calculating the overall result. Aggregating all the components provides us with the overall PSS score. Stress levels are categorized as low when scores range from 0 to 13, moderate when scores range from 14 to 26, and high when scores range from 27 to 40.

measurement of vitamin D The chemiluminescent immunoassay method was used to measure the vitamin D3 levels in the participant's serum samples. The following categories applied to vitamin D levels: 20–29.9 ng/mL is the insufficiency, 30–100 ng/mL is the sufficiency.

Analysis of Data

The data were entered in Excel sheets and analyzed using the SPSS software (version 16.0). The proportion of stress was calculated. Spearman’s correlation coefficient was used to estimate the association between stress and vitamin D levels.

Results

Perceived stress was assessed in 81 students; of which 56 (69.6%) were female. A total of 70 of those who did the PSS questionnaire had undergone vitamin D level assessment. The mean age of the study population was 19.63 years and BMI was 22.4 ± 3.3 kg/m2. Table 1 illustrates the correlation between PSS score and gender. Approximately 94.4% of the female subjects and 66.2% of the male students exhibited moderate to high levels of stress. The chi-square test revealed a correlation between gender and Perceived stress. (P = 0.003). Table no 2 shows that there was a deficiency or insufficiency in 87% of the females and 91% of the males. Vitamin D levels were not associated with gender, according to a chi-square test. (Relative Probability = 0.8). Table no 3 shoes that This group of young people had a high stress prevalence and an equally high hypovitaminosis rate. Additionally, there was a relationship between gender and high stress. Therefore, a link between found a correlation between levels of perceived stress and vitamin D

using the Spearman's coefficient. No correlation was found (P = 0.5).

Table 1: Shows the difference in PSS scores between men and women.

S. No.	PSS Score	Total (n=81)	female (n=25)	male (n=56)	P value
1	0-13	12(14)	09(34.1)	3 (5.5)	0.003
2	14-25	45 (58)	10(44.9)	36(64)	
3	26-40	23(28)	6(21)	17(30.5)	

Table 2: Vitamin D distribution according to gender

Vit D	Total No (n= 70)	Female (n=47)	male (n= 23)	P value
Deficient	28 (41.2)	20 (43)	8 (36.)	**0.008**
Insufficient	33 (47.6)	20 (43)	12 (54.)	
Sufficient	9 (11.2)	7(14.0)	3 (1)	

Table 3: The correlation between vitamin D and the perceived stress score

Variable	Perceived stress score				
	Total (n=81)	0-13 (n=11)	14-25 (n=46)	>25 (n=22)	P-value
Vitamin D	21.8±7.3	25.0±15.4	23.1±4.6	22.0±9.7	**0.05**
Missing	**13**	**4**	**7**	**2**	

Discussion

One of the most stressful curriculums is that of medicine, and research on medical students have revealed a greater estimated frequency of emotional disturbance than in the general population worldwide. Student performance in the classroom and their ability to learn are both negatively impacted by elevated stress levels. This creates a self-perpetuating loop where poor academic performance increases stress levels. Undetected, it may result in a range of health and psychological issues, such as sadness, anxiety, and changes in behavior. This highlights the significance of identifying and addressing such occurrences promptly. We thus determined the frequency of stress among the students as a preliminary assessment. This research found that 86.1% of participants had moderate to high levels of stress, as assessed by the Perceived Stress Scale (PSS). Higher education students have a range of challenges in adapting to the new environment, including educational, social, environmental, and psychological obstacles. These challenges can have an impact on their overall well-being and academic performance. This disparity arises due to the distinct pedagogical approaches, academic prerequisites, faculty dynamics, and even student interactions that distinguish college education from schooling. [11].

Perceived stress was more common among women, according to our study. Among individuals experiencing moderate to severe stress, 75% were female, but among those experiencing mild stress, just 33% were female. The chi-squared test revealed a significant association between stress and the feminine gender (P = 0.003There are 1.9 women with an anxiety disorder for every stressed-out guy. Women under 35 are most likely to have an anxiety disorder. [12] Other studies have also found that women are more stressed than men. Researchers Ng and Jeffrey found that women were more likely to think they were under more stress. [13] Also, female students said they were having problems because of worry, like low self-esteem, test stress, and depression. [14] How women see life events and the tasks of playing a social role can make them feel more worried. They also deal with things more deeply than men do; men deal with things in a more logical, non-emotional way. Researchers have found that dealing with emotions doesn't work and is more likely to be linked to mental discomfort than coping with problems. [15]

This study found that 88.3% of participants had vitamin D insufficiency. Eighty to ninety percent of the liposoluble micronutrient vitamin D is produced by the body naturally when exposed to UV B rays from the sun. Foods such as milk and its derivatives, as well as fatty fish, contain it in its exogenous form. Thus, food and sun exposure levels would have a direct impact on vitamin D insufficiency. Low vitamin D levels have been linked to adult mood and cognitive impairments, premenstrual women's moods, and severe depression. [16]. All of these findings indicate the likely involvement of vitamin D in regular brain functioning and in different neuropsychiatric disorders, such as mental stress resulting from a lack of vitamin D. Numerous researchers, like Neshatbini et al., Chen et al., and Chu et al., have studied this association and shown that hypovitaminosis D is linked to mental stress. [17,18] As a result, we investigated the relationship between vitamin D and stress in our students. We discovered a negative correlation between vitamin D and stress, although it was not statistically significant. Callegari et al.'s Safe D research in young Australian women likewise found no link between mental stress and vitamin D levels.34 Similarly, Husemoen's research of 5308 Danish adults aged 18 to 64 found no link between stress and vitamin D levels. [19] According to Black et al., vitamin D concentration is not connected with

symptoms of depression or mental stress in females, whereas it is associated with depression but not with mental stress in males. [20]

Conclusion

According to the study's findings, female students reported higher levels of psychosocial stress than male students. The significant incidence of vitamin D insufficiency and moderate to high stress, together with the lack of a connection, suggests independent action. Reviewing this study following vitamin D supplementation might aid in a better understanding of their relationship.

Recommendation

For relief from the stress that comes with assignments, it is recommended that kids take vitamin D supplements and expose their skin to UV radiation from the sun.

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