

## Article

# Stress among undergraduate students: Prevalence, sociodemographic associations and risk factors

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**Abstract: Introduction:** Stress among undergraduate students has become a significant concern in higher education due to its detrimental effects on their health and academic performance. This study aims to investigate the prevalence of stress among students pursuing their undergraduate education in a college in Kerala. By exploring the association between various sociodemographic variables and stress levels and identifying the relationship between different risk factors and stress, this research aims to provide valuable insights into the factors contributing to stress among undergraduate students.

**Materials and Methods:** A cross-sectional study was conducted among 133 undergraduate students. Convenience sampling was utilized to select the participants. A pre-designed closed-ended questionnaire, specifically tailored for this study, was employed to collect data. The questionnaire consisted of relevant items related to stress experienced by undergraduate students. Appropriate statistical analyses were performed on the collected data, with a significance level set at  $p < 0.05$ .

**Results:** The findings of this study revealed that among the study participants, 19% of undergraduate students experienced high perceived stress, 67% experienced moderate stress, and 13% experienced low-stress levels. A statistically significant association was observed between reduced appetite and perceived stress ( $p$ -value = 0.014). Additionally, statistically significant associations were found between stress and poor relationships with faculties ( $p$ -value = 0.003), the warden ( $p$ -value = 0.01), family members ( $p$ -value = 0.003), facing time pressure ( $p$ -value = 0.006), heavy workloads ( $p$ -value = 0.029), fear of failure ( $p$ -value = 0.002), suffering from frequent exams ( $p$ -value = 0.003), and exam patterns and curriculum ( $p$ -value = 0.024).

**Conclusion:** The results of this study highlight the considerable prevalence of stress among undergraduate students, with the majority falling into the category of moderate stress levels. It is imperative to prioritize undergraduate students' mental and physical well-being by incorporating counseling services and preventive mental health programs as integral components of routine clinical services. Encouraging students to engage in regular physical exercise, maintain balanced nutrition, foster positive relationships with peers, family, faculty, and college staff, ensure adequate sleep, and participate in extracurricular activities can significantly reduce stress levels. By addressing these factors, educational institutions can foster a supportive learning environment that promotes undergraduate students' overall health and well-being.

**Keywords:** Academic stress; Perceived stress; Sociodemographic variables; Health risk; Psychological health; Learning abilities; Mental well-being.

## 1. Introduction

Pursuing education presents various challenges that can create sources of stress among undergraduate students, potentially jeopardising their overall well-being and impeding their learning abilities. The significance of identifying factors that positively impact agreeableness and foster positive psychological states cannot be overstated, as they can substantially contribute to students' physical and psychological health [1]. Stress, as a psychological and physical reaction to the demands of a continuously evolving environment, can positively and negatively influence individuals [2]. While stress can serve as a motivating force, prompting action, it can also lead to distress, rejection, anger, and depression, ultimately resulting in health problems [3].

The development of stress has been shown to have adverse effects on students, particularly those pursuing undergraduate degrees, both personally and professionally [3,4].

Within the realm of medical education, worldwide medical colleges are responsible for ensuring that students acquire the necessary knowledge and skills before undertaking professional duties [5]. To achieve this objective, colleges typically employ a curriculum comprising lectures, supervised practice, simulations, mentoring, and hands-on experience to enhance students' skill sets. However, certain aspects of the training process inadvertently negatively affect students' physical and emotional well-being. The life of a student pursuing undergraduate degree demands complete dedication and responsibility towards academic tasks and patient care.[4-5] Studies have reported varying prevalence rates of stress among medical students, ranging from 20.9% to 94.5% [6].

Persistent stress, known as distress, remains unresolved without effective coping or adaptation and has been linked to physical and mental health issues, reduced self-esteem, and potential adverse effects on academic achievement and personal and professional development [7]. Undergraduate students employ diverse coping mechanisms to navigate stress, with strategies involving engagement, such as problem-solving, positive reinterpretation, and emotional expression, facilitating adaptation and reducing anxiety and depression. Engaging in extracurricular activities such as music, watching movies, social media participation, and physical exercise has been associated with decreased stress and burnout levels among preclinical medical students. However, it is important to note that in certain cases, these coping mechanisms may lead to addictions and substance abuse, including drugs, alcohol, and smoking [8,9]. The prevalence of substance abuse among medical students has been reported as high as 20.43% [10].

Unfortunately, only a limited number of students seek help for their distress, and the effects often persist into residency and beyond, potentially resulting in self-harm and suicide [8]. It has been observed that a significant proportion of students studying under graduation degrees experience a higher risk of suicide ideation and contemplation of dropping out of their medical education [10]. Between 2010 and 2019 in India, 358 suicide deaths were reported among medical students, residents, and physicians [11]. The magnitude of suicide ideation among medical students across 13 Western and non-Western countries ranged from 1.8% to 53.6% [8,10].

Numerous studies have highlighted the high incidence of personal distress among medical students during their undergraduate internships, postgraduate study periods, and subsequent practical life as physicians, with stress levels often reaching burnout. Consequently, it is crucial to understand the risk factors associated with distress among undergraduate students and develop strategies to prevent such scenarios. This study aims to determine the prevalence of stress among undergraduate students, investigate the association between sociodemographic variables and stress levels, and explore the relationship between risk factors and stress. By achieving these objectives, we can shed light on effective interventions and preventive measures to promote the well-being of undergraduate students in their educational journey.

## 2. Material and methods

This cross-sectional study was conducted at a college providing undergraduate degrees to investigate stress levels among undergraduate medical students. The study included participants from the 2019, 2020, and 2021 batches and was conducted over 21 days, from July 26, 2022, to August 15, 2022. Convenience sampling was used to select participants, and the minimum required sample size was determined to be 85 based on a prevalence value of 0.54 from a previous study, but 133 were included in the study.

A predesigned closed-ended questionnaire consisting of two parts was utilised as the study instrument. The questionnaire covered various aspects, including sociodemographic variables (age, gender, year of admission), personal details (sleep hours, phone usage, physical activity), and the perceived stress scale. Four questions pertained to sociodemographic variables, 11 questions focused on personal details, and 10 questions assessed perceived stress [12]. Each question had four alternatives with corresponding scores. The study procedure involved obtaining ethical permission, explaining the study to potential participants, and obtaining informed consent before administering the questionnaire.

Data collection was performed using Google Forms, and the collected data were then transferred to Microsoft Excel spreadsheets for analysis. Descriptive statistics, such as frequency and percentage, were used to summarise qualitative variables, while mean and standard deviation were used for quantitative variables.

**Table 1.** Age distribution

Age	Frequency	Percent
19	14	10.5
20	23	17.3
21	35	28.6
22	41	28.6
23	16	12
24	1	.8
25	2	1.5
26	1	.8
Total	133	100

**Table 2.** Distribution of participants based on the Perceived stress scale [12]

Perceived Stress Scale (PSS)	Frequency	Percentage
Low stress	17	13
Moderate stress	89	67
High perceived stress	25	19
Total	133	100

Graphs and tables were used to present the data when necessary. The association between variables was analysed using the chi-square test, with a significance level of  $p < 0.05$ .

### 3. Results

The age distribution of the 133 undergraduate medical students participating in the study is presented in Table 1. Most participants fell within the age range of 20 to 22 years. Specifically, there were 23 students (17.3%) who were 20 years old, 35 students (28.6%) who were 21 years old, and 41 students (28.6%) who were 22 years old. A smaller proportion of the participants were distributed across the extremes of the age range of 19 to 26 years, with frequencies ranging from 1 to 16. Among all the age groups, 22 was the most common, accounting for 30.8% of the total sample.

Table 2 provides an overview of the results obtained from a survey using the Perceived Stress Scale (PSS). This scale aimed to assess the stress levels experienced by individuals and categorised them into three groups: low stress, moderate stress, and high perceived stress. Out of the total sample of 133 respondents, approximately 13% reported experiencing low stress, with a count of 17 individuals. Most respondents, constituting around 67% of the sample (89 individuals), indicated moderate stress levels. On the other hand, approximately 19% of the respondents (25 individuals) reported high perceived stress. These findings highlight the diverse range of stress levels experienced by individuals, with the majority falling within the moderate stress category. Understanding the distribution of stress levels can be valuable for identifying individuals who may require additional support and interventions to manage their stress effectively.

The association between sociodemographic variables in Table 3 shows, specifically, age and appetite, and stress levels among the participants. The findings revealed an equal distribution of participants across the low, moderate, and high-stress categories within each age group, suggesting that age alone does not significantly influence stress levels. The chi-square analysis supported this finding, as it did not indicate a statistically significant association between age and stress. However, when considering appetite, individuals with increased intake exhibited a minimal presence in the low-stress category and none in the high-stress category. In contrast, those with a normal appetite were distributed across all stress categories, predominantly in the moderate stress category. Notably, participants with reduced intake showed a slightly higher representation in the high-stress category. The chi-square test underscored a significant association between appetite and stress levels, implying that individuals reporting reduced intake are likelier to experience heightened stress levels. These findings emphasise the relevance of incorporating sociodemographic factors, particularly appetite, when investigating the relationship between stress and individual characteristics.

The results indicate significant associations between stress levels and the quality of relationships with family members, faculties, and the warden. For the relationship with family members, participants with

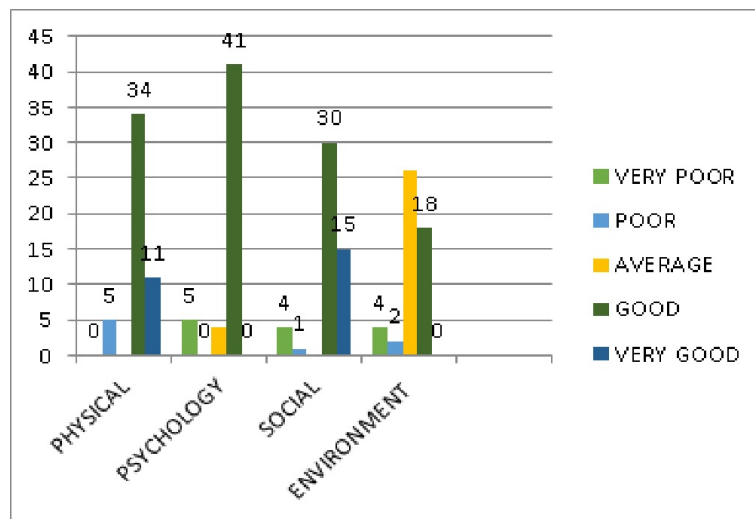


Figure 1. Distribution of participants based on the Perceived stress scale

Table 3. Association of Sociodemographic variables (age, appetite) with stress

Variables		Stress			Chi-Square	P value
		Low	Moderate	High		
Age		19	19	19	18.883	0.169
		20	20	20		
		21	21	21		
		22	22	22		
		23	23	23		
		24	24	24		
		25	25	25		
		26	26	26		
Appetite	Increased intake	1	1	0	12.508	0.014
	Normal	13	72	13		
	Reduced intake	3	16	12		
	Total	15	89	25		

STRESS, LOW, MODERATE and HIGH

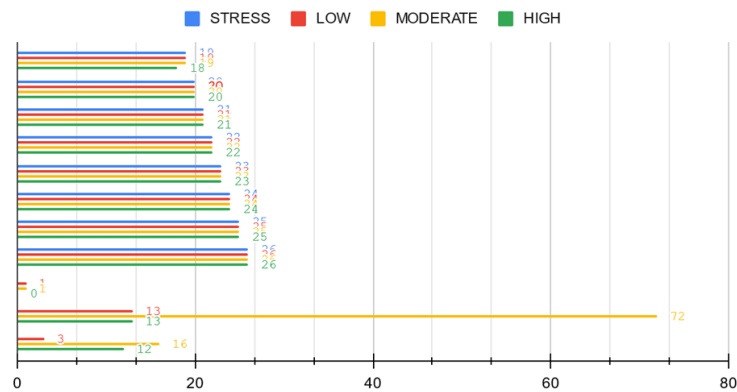
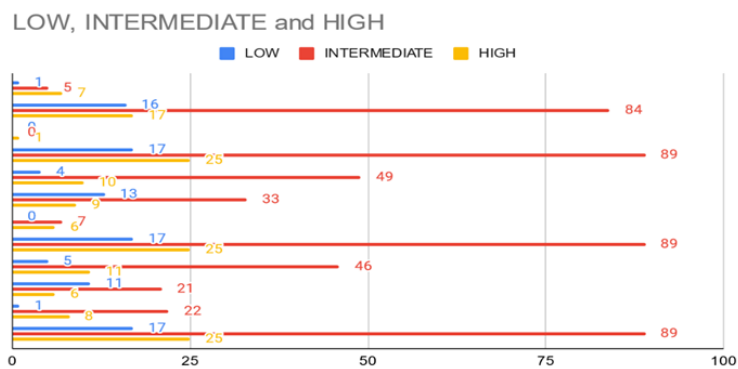


Figure 2. Association of Sociodemographic variables (age, appetite) with stress

**Table 4.** Association of Relationship with family members, faculties and Warden with stress.

Variables		Stress			Chi-Square	P value
		Low	Intermediate	High		
Relationship with family members	Fair	1	5	7	15.986	0.003
	Good	16	84	17		
	Poor	0	0	1		
	TOTAL	17	89	25		
Relationship with faculties	Fair	4	49	10	15.968	0.003
	Good	13	33	9		
	Poor	0	7	6		
	TOTAL	17	89	25		
Relationship with warden	Fair	5	46	11	13.199	0.01
	Good	11	21	6		
	Poor	1	22	8		
	Total	17	89	25		



**Figure 3.** Association of Relationship with family members, faculties and Warden with stress

Table 5. Association of academics and stress

Variables		Stress			Chi-Square	P value
		Low	Intermediate	High		
Academics (time pressure)	no	6	9	1	10.386	0.006#
	yes	11	80	24		
	total	17	89	25		
Academics (workload)	no	6	11	2	7.109	0.029#
	yes	11	78	23		
	total	17	89	25		
Academics (fear of failure)	no	9	15	3	12.76	0.002#
	yes	8	74	22		
	total	17	89	25		
Academics (exam pattern and curriculum)	no	8	19	3	7.423	0.024#
	yes	9	70	22		
	total	17	89	25		
Academics (exam frequency)	no	10	23	3	11.506	0.003#
	yes	7	66	22		
	Total	17	89	25		

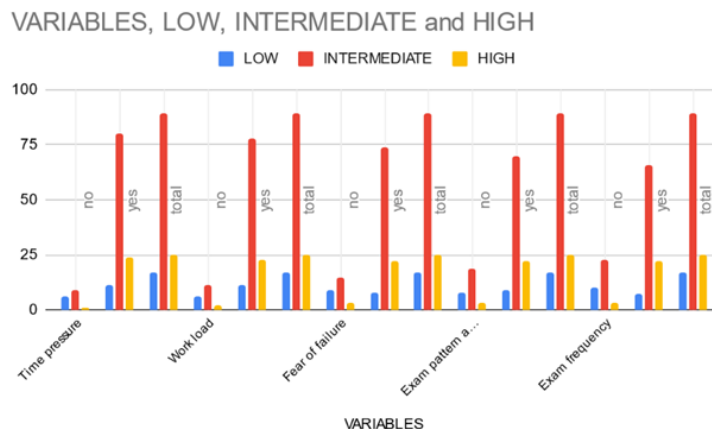


Figure 4. Association of academics and stress

high-stress levels were likelier to have fair relationships, while those with low-stress levels tended to have good relationships. This association was found to be statistically significant ( $p = 0.003$ ). Similarly, concerning the relationship with faculties, participants experiencing higher stress levels were likelier to have fair or poor relationships, whereas those with low-stress levels had a higher likelihood of having a good relationship. This association between stress levels and relationship quality with faculties was also statistically significant ( $p = 0.003$ ). Lastly, regarding the relationship with the warden, participants with high-stress levels were likelier to have fair or poor relationships. In contrast, those with low-stress levels were likelier to have a good relationship. This association was statistically significant ( $p = 0.01$ ).

The results of Table 5 reveal significant associations between stress levels and various academic factors. Participants experiencing higher stress levels were likelier to report time pressure, workload, fear of failure, problems with exam patterns and curriculum, and frequent exams. Specifically, for time pressure, moderate and high-stress levels were more prevalent among participants facing this issue. The association between stress and time pressure was statistically significant ( $p = 0.002$ ). Similarly, participants with moderate and high-stress levels were likelier to have a heavy workload, and this association was also statistically significant ( $p = 0.029$ ). Fear of failure was more common among participants with moderate and high-stress levels, indicating a significant association between stress and fear of failure ( $p = 0.002$ ). Problems with the exam pattern and curriculum were more prevalent among participants with moderate and high-stress levels, with a statistically significant association found ( $p = 0.024$ ). Lastly, participants facing frequent exams were likelier

to have moderate and high-stress levels, and a significant association between stress and exam frequency was observed ( $p = 0.003$ ).

#### 4. Discussion

The present study explored the relationship between sociodemographic variables, individual characteristics, and stress levels among undergraduate medical students. The study sample consisted of 133 participants, and their age distribution was presented in Table 1. Most participants were 20 to 22 years old, with 22 being the most common age group. The association between age and stress levels was examined, and it was found that age alone did not significantly influence stress levels among the participants. Table 2 summarises the results of a survey using the Perceived Stress Scale (PSS) to assess stress levels. Of 133 respondents, 13% reported low stress, 67% reported moderate stress, and 19% reported high perceived stress. Most fell within the moderate stress category, highlighting a diverse range of stress levels among individuals. These findings emphasise the importance of identifying individuals needing additional support to manage their stress effectively. The association between appetite and stress levels was explored in Table 3. It was observed that individuals with increased intake had a minimal presence in the low-stress category and none in the high-stress category. Participants with a normal appetite were distributed across all stress categories, primarily in the moderate stress category. Notably, those with reduced intake showed a slightly higher representation in the high-stress category. The findings indicated a significant association between appetite and stress levels, suggesting that individuals reporting reduced intake are likelier to experience heightened stress levels. Furthermore, Table 4 highlighted the associations between stress levels and the quality of relationships with family members, faculties, and the warden. Participants with high-stress levels were likelier to have fair or poor relationships, while those with low-stress levels tended to have good relationships. These associations were statistically significant, emphasising the impact of relationship quality on stress levels. Table 5 delved into the associations between stress levels and various academic factors. Participants experiencing higher stress levels reported issues such as time pressure, heavy workload, fear of failure, problems with exam patterns and curriculum, and frequent exams. Moderate and high-stress levels were more prevalent among those facing these academic challenges, and statistically significant associations were identified.

A study by Esraa Ahmed Ragab et al. revealed that the overall prevalence of stress among participants was 31.7% [13]. Similar to our study, the main sources of stress identified were time pressure, heavy workload, fear of failure, and examination frequency. This study highlights the commonality of stress factors experienced by medical students.

In another study conducted by Parmeshwar Satpathy et al. in 2020, 91% of participants reported a high-stress level [14]. Factors such as the vastness of the curriculum, frequency of examinations, competition with peers, performance in examinations, worries about the future, feelings of loneliness, relationships with the opposite sex, and food quality contributed significantly to additional stress. These findings emphasise the multifaceted nature of stressors faced by medical students.

Furthermore, a study by Stewart et al. in Hong Kong demonstrated that high self-reported stress levels were associated with poorer academic performance among medical students [15]. This highlights the impact of academic-related stress on students' academic achievements. A study by Ganesan et al. found that stress levels among undergraduate students were high during academic training [16]. The study emphasises the prevalence of stress among students pursuing higher education.

Another study conducted among undergraduate medical students in Mumbai reported a high prevalence of perceived stress, with various sources of stress identified [17]. This study sheds light on the stress experienced by medical students and the need to address these stressors. Moreover, research by Salam et al. found that stress among Malaysian medical students was prevalent, with academic and examination-related stressors being the most significant sources of stress [18]. This study emphasises the impact of academic factors on stress levels among medical students.

Additionally, a study by Iqbal Ahmed et al. revealed a significant association between poor sleep quality and student stress [19]. This highlights the interplay between stress and sleep disturbances among medical students. Similarly, a study conducted by Shubhada Gade et al. in 2014 concluded that perceived stress levels among medical students were high, with academic-related problems being the primary stressors. The study recommended various measures such as academic reviews, improved examination schedules and patterns,

enhanced faculty-student interactions, proper guidance, intervention programs, and counselling to alleviate stress levels in medical students [20].

Ratana Saipanish's study in 2003 reported that 2.4% of students experienced a high level of stress, with academic problems, particularly test and examination-related stress, being the major contributors [21]. Additionally, Abdus Salam et al.'s study in 2013 found that stress among Malaysian medical students was 56%, with factors such as the year of study, financial problems, and relationship issues with parents, siblings, and lecturers identified as significant determinants of stress. Academic and examination-related stressors were reported as the most significant sources of stress [22].

In a study conducted by Khadija Qamar et al. in 2015, a significant number of undergraduate students experienced stress, with various factors identified as stressors, including environmental factors, adjusting to a new college environment, student abuse, demanding study routines, and personal factors. These findings indicate the complex interplay between academic and emotional factors contributing to stress among medical students.

While these studies shed light on the prevalence and sources of stress among students, it's important to acknowledge some limitations. Firstly, the studies primarily relied on self-report measures subject to bias and individual perceptions of stress. Additionally, the studies were conducted in specific geographical locations and may need to fully capture the experiences of medical students globally. Furthermore, longitudinal studies examining the long-term impact of stress and evaluating the effectiveness of interventions are warranted.

Providing supportive learning environments and prioritising student well-being is imperative to address these issues. Institutions should consider implementing comprehensive well-being programs integrating mental health support, stress management strategies, and mentorship opportunities. Open communication and support among faculty and students can create a more conducive learning environment.

In conclusion, the studies discussed underscore the prevalence of stress among Undergraduate students and highlight the diverse array of stressors they face. By recognising and addressing these stressors, medical institutions can better support the well-being and success of their students, ultimately contributing to the cultivation of resilient and competent healthcare professionals.

## 5. Conclusion

Students face various stressors during their studies, and understanding their stress levels, sources, and associated factors is crucial. Research has shown that stress can negatively affect students personally and professionally. Our study revealed a strong correlation between high stress and anxiety levels, leading to reduced student interactions, compromised class performance, hindered clinical practice, and overall academic underperformance. These findings emphasise the urgent need to integrate counselling and preventive mental health services into routine clinical care for medical students. However, it is important to acknowledge the limitations of our study, such as the inclusion of only one college, which limits the generalizability of the results to all healthcare workers. Additionally, online data collection methods may have impacted the quality of responses. Undergraduate students are advised to prioritise physical exercise, maintain healthy relationships with friends, family, teachers, and wardens, ensure adequate sleep, and engage in extracurricular activities to mitigate stress. These proactive measures can contribute to their overall well-being and success in their medical education.

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**Conflicts of Interest:** Authors declare no conflict of interests.

## References

- [1] Alborzkouh, P., Nabati, M., Zainali, M., Abed, Y., & Ghahfarokhi, F. S. (2015). A review of the effectiveness of stress management skills training on academic vitality and psychological well-being of college students. *Journal of medicine and life*, 8(Spec Iss 4), 39.
- [2] Stress management. Portjeffpsychological.com n.d. <http://www.portjeffpsychological.com/services/stress-management-2/> (accessed Feb 23, 2023).
- [3] Stress management. Mayo clinic 2022. <https://www.mayoclinic.org/healthy-lifestyle/stress-management/basics/stress-basics/hlv-20049495> (accessed Feb 23, 2023).



- [4] Abdulghani, H. M., AlKanhah, A. A., Mahmoud, E. S., Ponnampereuma, G. G., & Alfaris, E. A. (2011). Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *Journal of health, population, and nutrition*, 29(5), 516.
- [5] Eva, E. O., Islam, M. Z., Mosaddek, A. S. M., Rahman, M. F., Rozario, R. J., Iftekhhar, A. F., ... & Haque, M. (2015). Prevalence of stress among medical students: a comparative study between public and private medical schools in Bangladesh. *BMC research notes*, 8(1), 1-7.
- [6] Satpathy, P., Siddiqui, N., Parida, D., & Sutar, R. (2021). Prevalence of stress, stressors, and coping strategies among medical undergraduate students in a medical college of Mumbai. *Journal of Education and Health Promotion*, 10.
- [7] Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: psychological, behavioral, and biological determinants. *Annu. Rev. Clin. Psychol.*, 1, 607-628.
- [8] Fares, J., Al Tabosh, H., Saadeddin, Z., El Mouhayyar, C., & Aridi, H. (2016). Stress, burnout and coping strategies in preclinical medical students. *North American journal of medical sciences*, 8(2), 75.
- [9] Arora, A., Kannan, S., Gowri, S., Choudhary, S., Sudarasan, S., & Khosla, P. P. (2016). Substance abuse amongst the medical graduate students in a developing country. *The Indian journal of medical research*, 143(1), 101.
- [10] Coentre R, Góis C. Suicidal ideation in medical students: recent insights. *Adv Med Educ Pract.* 2018 Nov 29;9:873–80.
- [11] Chahal, S., Nadda, A., Govil, N., Gupta, N., Nadda, D., Goel, K., & Behra, P. (2022). Suicide deaths among medical students, residents and physicians in India spanning a decade (2010–2019): An exploratory study using on line news portals and Google database. *International journal of social psychiatry*, 68(4), 718-728.
- [12] Cohen S. Perceived stress scale. Slu.edu n.d. <https://www.slu.edu/medicine/family-medicine/pdfs/perceived-stress-scale.pdf> (accessed Feb 28, 2023).
- [13] Ragab, E. A., Dafallah, M. A., Salih, M. H., Osman, W. N., Osman, M., Miskeen, E., ... & Ahmed, M. H. (2021). Stress and its correlates among medical students in six medical colleges: an attempt to understand the current situation. *Middle East Current Psychiatry*, 28(1), 75.
- [14] Satpathy, P., Siddiqui, N., Parida, D., & Sutar, R. (2021). Prevalence of stress, stressors, and coping strategies among medical undergraduate students in a medical college of Mumbai. *Journal of Education and Health Promotion*, 10.
- [15] Chyu, E. P. Y., & Chen, J. K. (2022). The correlates of academic stress in Hong Kong. *International journal of environmental research and public health*, 19(7), 4009.
- [16] Ganesan, Y., Talwar, P., Fauzan, N., & Oon, Y. B. (2018). A study on stress level and coping strategies among undergraduate students. *Journal of Cognitive Sciences and Human Development*, 3(2), 37-47.
- [17] PUBLIC HEALTH Stress among Medical Students in Malaysia: A Systematic Review of Literatures Abdus Salam1. Rabeya Yousuf(2) 2013;20:649–55.
- [18] Iqbal, S., Gupta, S., & Venkatarao, E. (2015). Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. *The Indian journal of medical research*, 141(3), 354.
- [19] Gade S, Chari S, Gupta M. Perceived stress among medical students: To identify its sources and coping strategies. *Arch Med Health Sci* 2014;2:80.
- [20] Saipanish, R. (2003). Stress among medical students in a Thai medical school. *Medical teacher*, 25(5), 502-506.
- [21] Salam, A., Mahadevan, R., Rahman, A. A., Abdullah, N., Abd Harith, A. A., & Shan, C. P. (2015). Stress among first and third year medical students at University Kebangsaan Malaysia. *Pakistan journal of medical sciences*, 31(1), 169.
- [22] Qamar, K., Khan, N. S., & Bashir Kiani, M. R. (2015). Factors associated with stress among medical students. *J Pak Med Assoc*, 65(7), 753-755.

