

The Prevalence of Academic Stress and Associated Factors among Medical Undergraduates in Sri Lanka: A Cross-sectional Study

Kumari, M.V.

Abstract

Introduction: Medical undergraduates frequently encounter a high level of stress, which can negatively impact on their academic performance. High stress levels further contributes to impairing memory consolidation, learning ability, decision making, and critical thinking. This study aimed to describe the prevalence of perceived academic stress and associated factors among medical undergraduates in two settings in Sri Lanka.

Methods: A cross-sectional survey involving medical undergraduates aged 18 to 29 years was conducted in two medical faculties in Sri Lanka. Participants completed the validated PAS questionnaire to assess the level of perceived academic stress.

Results: Responses of 1,496 medical undergraduates (33.7% male, mean age 22.84 years) revealed a stress prevalence of 60%. Final-year students reported a higher level of stress (68.1%) compared to other academic years (first year-62.8%, second year-66.4%, third year-65.3%, fourth year-61.5%), although this difference was not statistically significant ($p=1.0$). Participants residing in university indoor hostels (67.7%, $p=0.002$) and outdoor hostels (66.4%, $p=0.0001$) indicated higher levels of stress than those living at home (48.6%). Sleep duration and stress levels were significantly associated, with participants sleeping less than 7 hours per night being more likely to experience a high level of stress ($p=0.008$). Students experiencing high levels of stress demonstrate significantly poor sleep quality ($p=0.0005$). BMI and level of stress were not significantly associated.

Conclusion: This study reports a high prevalence of perceived academic stress among medical undergraduates, highlighting the need for the implementation of stress management interventions into their curricula.

Keywords: Academic Stress, Medical Undergraduate, Medical Education

Introduction

Stress is defined as “a state of threatened or perceived as threatened homeostasis”. Inability to cope, feelings of helplessness, increased psychological pressure, and excessive workload are the prominent stress factors for students.

Stress is a major global issue that affects medical undergraduates worldwide (Almojali *et al.*, 2017). The extensive syllabus, examinations, limited time for leisure, and high parental expectations are the main factors contributing to stress among medical undergraduates. In medical undergraduates prevalence of academic stress varies, with 92% in Pakistan, 78% in India and 59% in Saudi Arabia (Krishna *et al.*, 2021). These variations may be partly explained by differences in measurement tools, study settings, and study populations. In the Sri

Department of Physiology, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka

Corresponding author: Dr. Manori Vijaya Kumari
Email: manoadikari@med.rjt.ac.lk



© SEAJME. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

Lankan University system, medical undergraduates are more likely to be exposed to higher levels of academic stress because the MBBS medical course warrants five years period of teaching and experience. It is considered to be the lengthiest and most difficult course with the highest workload for undergraduates in Sri Lanka (Dahanayake *et al.*, 2024).

High levels of stress have been shown to impair cognitive functions such as memory, attention, and executive functioning among medical students (Dahlin *et al.*, 2005). Chronic stress reduces concentration and interferes with academic performance. Over time, this can reduce their ability to make sound clinical judgments, communicate effectively with patients, and manage complex healthcare scenarios. Furthermore, persistent psychological distress may contribute to burnout, reduced empathy, and poor mental health outcomes. If not addressed early, these challenges can compromise the quality of future medical professionals and ultimately impact treatment outcomes (Pabst *et al.*, 2013). In Sri Lanka, the prevalence of stress among medical undergraduates is understudied (Kaushani *et al.* 2023). Thus, this study aimed to determine the prevalence and factors associated with academic stress among medical undergraduates in Sri Lanka, providing insights for the improvement of medical education.

Methods

Study design and setting

This study was cross-sectional and conducted at two selected medical facilities in Sri Lankan State Universities: The University of Jaffna and Rajarata University of Sri Lanka, to obtain a representative sample of medical undergraduates from different geographical regions, and due to feasibility and accessibility of data collection. The medical faculties in Sri Lanka offer a five-year degree program.

Study population and sample size calculation

This cross-sectional study was conducted among medical undergraduates in the Faculty of Medicine, University of Jaffna, and the Faculty of Medicine & Allied Sciences, Rajarata University of Sri Lanka. Medical undergraduates in the first year, second year, third year, fourth year, and final year participated in this study.

The sample size is calculated by the following formula.

$$n = \frac{Z^2 p(1-p)}{d^2}$$

n=Total number of subjects to be studied

Z=1.96 (percentile of the standard normal distribution value (at 95% Confidence level=1.93)

Worldwide prevalence of academic stress among medical students ranges between 59% to 92% (Gazzaz *et al.*, 2018) (Sohali *et al.*, 2013). Therefore, the proportional value was considered as 50%.

d=0.05 (acceptable amount of absolute error)

$$n = \frac{1.96^2 * 0.5(1 - 0.5)}{0.05^2}$$

n=384.16

With a 20% non-response rate expected,

Final sample size =384 * 100/80
=480

Therefore, the minimum required sample size was 480.

Data collection and ethical consideration

Ethics approval was granted by the Ethics Review Committee of the Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka (ERC/2024/60).

Students were approached at the end of their lectures or practical classes. They were informed that participation was entirely voluntary and that they could withdraw from the study at any time. Informed written consent was obtained before data collection commenced. Data was collected using self-administered questionnaires, which were distributed through an online platform via Google Sheets. To minimize the impact of

non-response, the questionnaires were distributed to all medical undergraduates in each batch who participated in the lecture/practical classes on the day of data collection, ensuring comprehensive coverage of the target population. The questionnaire consisted of two parts: Part I focused on socio-demographic factors, while Part II included the Perception of Academic Stress Scale (PAS) questionnaire to assess academic stress and the PSQI questionnaire to assess the sleep-related variables. As the MBBS curriculum is completely taught in the English language and the students have a good understanding of the medical terms, all parts of the questionnaires were administered in English. Further clarification was provided by the research assistants, having medical knowledge if requested by any students. After the data collection, students with known psychiatric disorders were excluded from the study and analysis. Data collection took place from September 2024 to March 2025.

Assessment of perceived academic stress

The Perception of Academic Stress (PAS) questionnaire (Bedewy *et al.*, 2015), a validated instrument, was employed in this study to assess the perception of academic stress and its contributing factors among medical undergraduates. The developed instrument had internal consistency reliability of 0.7 (Cronbach's alpha). The PAS, a widely utilized tool for measuring perceived academic stress, has been implemented in numerous studies globally (Marjani *et al.*, 2008; Chandra *et al.*, 2021). However, this tool has not been previously used for medical undergraduates but I administered this questionnaire among medical undergraduates as its original version (English language) because the entire medical course is conducted in English and medical undergraduates have sufficient knowledge to understand. Further clarification was provided by the research assistants, having medical knowledge if requested by any students.

This self-reporting questionnaire comprises 18 items, rated each item on a 5-point scale, where 1 (strongly disagree) to 5 (strongly agree). Reverse scoring was adjusted

accordingly. Total score, ranging from 18 to 90, reflects the level of perceived academic stress, with higher scores indicating greater stress. The levels of perceived academic stress were categorized as follows: Very low <32, low 36-41, Moderate 42-49, High 50-55, Very high >62 (Dewi *et al.*, 2020).

Sleep-related variables

Sleep-related variables, including time of going to bed, actual hours of sleep, and sleep quality, were assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire (Buysse *et al.*, 1989). The PSQI is a validated instrument used to evaluate sleep quality over the preceding month. PSQI had an overall reliability coefficient (Cronbach's alpha) of 0.83. It has 19 items and yields a global PSQI score. The global PSQI score ranges from 0 to 21, with higher scores indicating poorer sleep quality. A total PSQI score greater than 5 was used to classify participants as having poor sleep quality (Buysse *et al.*, 1989). PSQI has been translated and validated to Sri Lankan population and has been used among medical undergraduates in Sri Lanka to assess the sleep quality (Anandakumar *et al.*, 2016; Liyanage *et al.*, 2024).

Data Analysis

The prevalence of stress was determined through frequency and descriptive statistical analyses. One-way ANOVA and unpaired t-tests were conducted to compare stress scores across different variables. The relationship between stress scores and sleep scores was evaluated using Spearman's rank correlation coefficient.

Results

Socio-demographic characteristics

The respondents consisted of 1505 medical undergraduates from two medical faculties in Sri Lanka. After excluding 9 participants with psychiatric illness (Depression - 04, obsessive compulsive disorder - 02, Anxiety - 01, Social anxiety - 01, and Schizophrenia - 01), a total of 1496 was included in the final analysis. The cohort included 992 females (66.3%) and 504 males (33.7%). Participants were aged

between 18 and 29 years (mean=22.84 years, SD=2.0). A significant portion of the participants were in their first (25.3%) and second (25.3%) academic years. Notably, 86.9% of them stayed in university hostels. An overwhelming majority (80.2%) reported sleeping less than 7 hours per night, while 48% reported a normal Body Mass Index (BMI) (Table 1).

The prevalence of perceived academic stress and its associated factors

60% of medical undergraduates showed a high level of academic stress among medical undergraduates across all academic years. (Very low <32, low 36-41, Moderate 42-49, High 50-55, Very high >62) (Dewi *et al.*, 2020). The mean of the PAS score among the population was 52.94 (SD 11.194). Table 2 illustrates the association between stress scores and demographic characteristics. There

is no significant difference in academic stress between males (mean PAS score-52.50) and females (mean PAS score-53.17, $p=0.2$). Participants residing in university indoor hostels and outdoor hostels indicated higher levels of stress than those living at home. Sleep duration and stress levels were significantly associated, with participants sleeping less than 7 hours per night being more likely to experience a high level of stress. Sleep quality was assessed using a cut-off score above 5 on the global PSQI scale, with scores above 5 indicating poor sleep quality. In this study, 58% (877/1496) of undergraduates reported having a poor quality of sleep. Students experiencing high levels of stress demonstrate significantly poor sleep quality (Table 2). PSQI scores indicate a positive correlation with academic stress scores, suggesting that higher stress levels are associated with a lower quality of sleep ($r=0.226$, $p=0.0001$) (Figure 1).

Table 1: Socio-demographic characteristics

Characteristics	Category	Frequency (n)	(%)
Gender	Male	504	33.7
	Female	992	66.3
Academic year	First year	379	25.3
	Second year	378	25.3
	Third year	297	19.9
	Fourth year	257	17.2
	Final year	185	12.4
Place of residence	Home	177	11.8
	University indoor hostel	710	47.5
	Outdoor hostel	590	39.4
Body Mass Index (BMI)	Underweight	257	17.2
	Normal	719	48.1
	Overweight	520	34.8
Time of going to bed	10.00 pm	160	10.7
	11.00 pm	290	19.4
	12.00 am	432	28.9
	01.00 am	202	13.5
	02:00 am	80	5.3
Time of getting up in the morning	4.00 – 4.59 am	142	9.5
	5.00 -5.59 am	395	26.4
	6:00 – 6:59 am	679	45.4
	7:00 – 7:59 am	174	11.6
Hours of actual sleep at night	< 7 hours	1200	80.2
	7 hours or more	296	19.8

Discussion

The study population comprised 1496 medical undergraduates from two medical faculties in Sri Lanka, with a gender distribution of 992 females (66.3%) and 504 males (33.7%). This distribution reflects the current trend in Sri Lankan medical faculties. 60% of medical undergraduates showed a high level of academic stress among medical undergraduates across all academic years.

A study conducted in Sri Lanka reported that 53.7% of medical undergraduates experienced stress (Kaushani et al. 2023). A cross-sectional study conducted among medical undergraduates in Sri Lanka reported a stress

prevalence of 42.2% (Liyanage et al., 2024). Other studies have shown varying prevalence rates of stress among medical undergraduates in different nations: 92% in Pakistan (Sohali et al., 2013), 59% in Saudi Arabia and 78% in India (Gazzaz et al., 2018; Sohali et al., 2013; Krishna et al., 2021). Variations in prevalence in different nations could be attributed to several factors, such as variations in scales and instruments used to assess stress levels, socio-cultural factors that influence how stress is perceived, early childhood experiences, and individual coping skills.

Table 2: Perceived Academic Stress score compared with socio-demographic characteristics

Characteristics	Category	PAS Score (Mean±SD)	P value
Gender	Female	53.17 (10.6)	0.2
	Male	52.50 (12.1)	
Academic year	First year	52.62 (11.3)	1.0
	Second year	53.57 (11.6)	
	Third year	52.91 (10.8)	
	Fourth year	52.05 (10.08)	
	Final year	53.61 (11.8)	
Accommodation	Home	49.73 (13.1)	0.002
	University indoor hostel	53.14 (10.5)	
	Outdoor hostel	53.74 (11.1)	
BMI	Normal	52.99 (11.5)	1.0
	Underweight	52.67 (10.2)	
	Overweight	53.01 (11.1)	
Actual hours of sleep	7 hours or more	51.40 (12.0)	0.008
	Less than 7 hours	53.32 (10.9)	
Sleep quality	Good	50.81 (11.8)	0.0005
	Poor	54.45 (10.4)	

PAS - Perception of Academic Stress

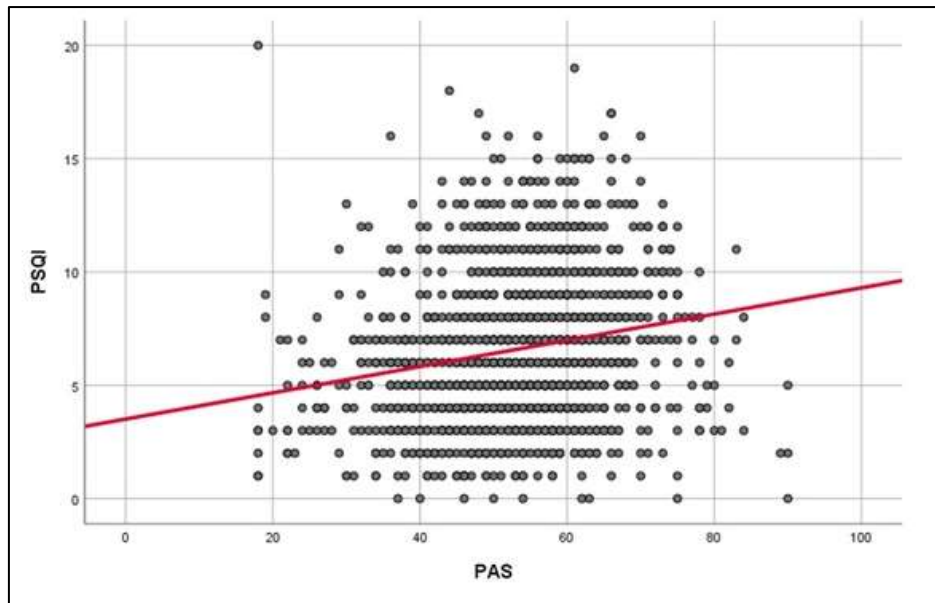


Figure 1: Correlation between sleep and stress score. Spearman Correlation Coefficient ($r=0.226$, $p=0.0001$), PAS - Perceived Academic Stress, PSQI - Pittsburgh Sleep Quality Index

In the current study, final-year students exhibited elevated stress levels (68%) relative to students in other academic years, although this disparity did not reach statistical significance. This observation aligns with a cross-sectional study conducted among medical undergraduates in Sri Lanka, which reported that final year undergraduates had significantly high psychological impairment (Liyanage G. *et al.*, 2017). Another study conducted among medical undergraduates in Sudan reported heightened stress among final-year students compared to their junior counterparts (Ragab *et al.*, 2021). Moreover, a cross-sectional study conducted among medical undergraduates in India reported that final-year medical students experienced mild to moderate levels of stress (Madhyastha *et al.*, 2014). Final-year medical undergraduates often face significant academic stress primarily due to their transition from student to professional roles. This transition entails increased responsibilities, heightened performance expectations, critical career decisions, and the necessity to prove competence in real-world clinical settings.

In the current study, students residing in both indoor and outdoor university hostels experience a high level of stress compared to those living at home. This finding aligns with a study conducted in Pakistan, which reported

that medical undergraduates living in hostels exhibited higher stress levels than their peers who were living at home (Hydrie *et al.*, 2024). Several factors may contribute to the heightened stress experienced by hostel residents, including adjusting to new environments, managing daily routines independently, and coping with academic pressures, along with irregular meal schedules.

In the current study, shorter sleep duration is associated with increased levels of stress. A study conducted among medical undergraduates in Sri Lanka reported a significant association between stress and quality of sleep (Liyanage *et al.*, 2024). Studies have reported a significant association between a high level of stress and shorter sleep duration. Moreover, a positive correlation was observed between PSQI scores and academic stress scores, suggesting an inverse relationship between stress levels and sleep quality. A cross-sectional study of medical undergraduates in India found a positive correlation between stress and sleep (Rebello *et al.*, 2018). Existing literature indicates that a higher level of stress is associated with the hypothalamic-pituitary-adrenal (HPA) axis, resulting in altered cortisol secretion (Tsigos *et al.*, 2002; Ly *et al.*, 2015). Consequently, elevated glucocorticoid levels can increase

wakefulness and decrease sleep duration. Furthermore, research suggests that heightened psychological stress in the evening, particularly near bedtime, can elevate evening cortisol levels and trigger physiological arousal, thereby impairing sleep quality (Kumari *et al.*, 2009; Yap *et al.*, 2020).

Stress significantly impacts cognitive functions, and sustained exposure to stress can result in neuronal loss, especially within the hippocampus. These alterations are likely implicated in cognitive impairments, notably affecting declarative memory. A Study conducted among medical undergraduates in Sri Lanka reported that high levels of stress may lead to poor academic performance (Wijekoon *et al.*, 2017). Stress can impair concentration, decision-making abilities, and clinical judgment, all of which are essential for effective patient care. If unaddressed, stress may extend into professional practice, elevating the risk of medical errors and adverse patient outcomes. Therefore, managing stress effectively and improving sleep habits may play a crucial role in enhancing their concentration, memory, problem-solving ability, and overall academic success. This highlights the importance of early interventions and awareness programs aimed at promoting mental health and healthy lifestyle practices among medical undergraduates. Furthermore, the medical curriculum is often dense and demanding, involving continuous assessments, high academic expectations, and limited leisure time, all of which contribute significantly to elevated stress levels (Wimberly *et al.*, 2022). Addressing these academic and curricular stressors through structured mental health support and lifestyle education may help enhance students' well-being, academic performance, and long-term professional development. Therefore, in the field of medical education, the incorporation of stress management interventions into their curriculum, such as mindfulness meditation, time management programs, regular physical activity, and peer support programs, is recommended during their course period to help reduce stress levels among medical

undergraduates (Wunsh *et al.*, 2017; Chiesa *et al.*, 2009).

This study possesses several strengths and limitations that warrant consideration. A key strength lies in the substantial sample size, exceeding 1,000 participants, coupled with the application of validated questionnaires, which has enhanced the quality of the data collected. However, the inclusion of only two out of the twelve medical faculties in Sri Lanka represents a limitation, impacting the generalizability of the results. Furthermore, this study did not rule out other organic disorders that may be linked to high levels of stress. In addition, several other factors that may influence stress among medical students, such as financial stability, social media use, and personal or family-related factors, were not assessed in this study.

Conclusion

This study found a significant burden of perceived academic stress among medical undergraduates, highlighting the need for the implementation of stress management interventions into their curriculum.

Acknowledgement

I wish to thank all the medical undergraduates who enthusiastically participated in this study.

Ethics approval

This study involves human participants and all procedures involving research, consent of study participants, data analysis, and publication were approved by the Ethics Review Committee, Faculty of Medicine and Allied Science, Rajarata University of Sri Lanka; Reference number: (ERC/2024/60).

Funding

Investigator funded

Author contributions

MVK conceptualized the study, contributed to designing the study, project administration,

data analysis, data interpretation, and wrote the final manuscript.

Patient and public involvement

Students and/or the public were not involved in the design, conduct, reporting, or dissemination plans of this research.

Data availability statement

Data are available on reasonable request. Please contact Dr. Manori Vijaya Kumari (manoadikari@med.rjt.ac.lk).

References

- Almojali A.I., Almalki S.A., Allothman A.S., Masuadi E.M., Alaqeel M.K. The prevalence and association of stress with sleep quality among medical students. *Springer*. 2017;7(3):169-174. <https://doi.org/10.1016/j.jegh.2017.04.005>
- Anandakumar D., Dayabandara M., Ratnatunga S.S., Hanwella R., de Silva V.A. Validation of the Sinhala version of the Pittsburgh sleep quality index. *Ceylon Medical Journal*. 2016;61(1):22-25. <https://doi.org/10.4038/cmj.v61i1.8255>
- Bedewy D., Gabriel A. Examining perceptions of academic stress and its sources among university students: The Perception of Academic Stress Scale. *Health psychology open*. 2015;1-9. <https://doi.org/10.1177/2055102915596714>
- Buyse D.J., Reynolds C.F., Monk T.H., Berman S.R., Kupfer D.J. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*. 1989;28(2):193-213. [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)
- Chiesa A., Serretti A., Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *J Altern Complement Med*. 2009;15(5):593-600. <https://doi.org/10.1089/acm.2008.0495>
- Dahlin M., Joneborg N., Runeson B. Stress and depression among medical students: A cross-sectional study. *Medical Education*. 2005;39(6):594-604. <https://doi.org/10.1111/j.1365-2929.2005.02176.x>
- Dewi D.K., Meylana E.H., Widiyanti F.P., et al. The Profile of Perceived Academic Stress in Higher Education. *Atlantis press*. 2020;491:165-169. <https://doi.org/10.2991/assehr.k.201201.028>
- Gazzaz Z.J., Baig M., Al Alhendi B.S.M., Al Suliman M.M.O., Al Alhendi A.S., Al-Grad M.S.H., Ali Qurayshah M.A. Perceived stress, reasons for and sources of stress among medical students at Rabigh Medical College, King Abdulaziz University, Jeddah, Saudi Arabia. *Springer*. 2018;18(1): 1133-2. <https://doi.org/10.1186/s12909-018-1133-2>
- Hydrie M. Z. I., Arzoo A., Atif M., Zafar A. Evaluation of mental disorders among day scholars and hostel medical students - place of residence matters. *Journal of Pakistan Psychiatric Society*. 2024;21(02). <https://doi.org/10.63050/JPPS.21.02.338>
- Liyanage G. Psychological distress among final year medical undergraduates in a Sri Lankan university. *Int J Community Med Public Health*. 2017;4(11):1. <http://dx.doi.org/10.18203/2394-6040.ijcmph20174483>
- Liyanage G., Rajapakshe G.D.P.R. W., Wijayarathna D.R., Jayakody J.A.I.P., Gunaratne K.A.M.C., A. M.A.D.K. Alagiyawanna A.M.A.D.K. Psychological Distress and Sleep Quality among Sri Lankan Medical Students during an Economic Crisis. *PLOS ONE*. 2024;19(6):e0304338. <https://doi.org/10.1371/journal.pone.0304338>
- Ly J., McGrath J.J., Gouin J.P. Poor sleep as a pathophysiological pathway underlying the association between stressful experiences and the diurnal cortisol profile among children and adolescents. *Psychoneuroendocrinology*. 2015;57:51-60. <https://doi.org/10.1016/j.psyneuen.2015.03.006>
- Kaushani T.H.M., Weeratunga E.B. Psychological disturbances encountered by selected undergraduates studying at the University of Ruhuna, Sri Lanka during the Covid-19 pandemic: a cross-sectional study. *Scientific Reports*. 2023;13(1):20559. <https://doi.org/10.1038/s41598-023-47950-8>
- Krishna T.S., Devi C.S., Harini M., Rao E.V., Viswakumar R. Prevalence of obesity and its association with stress levels among undergraduate medical students. *International Journal of Clinical Biochemistry and Research*. 2021;8(3):222-225. <https://doi.org/10.18231/j.ijcbr.2021.046>
- Kumari M., Badrick E., Ferrie J., Perski A., Marmot M., Chandola T. Self-reported sleep duration and sleep disturbance are independently associated with cortisol secretion in the Whitehall II study. *J Clin Endocrinol Metab*. 2009;94(12):4801-4809. <https://doi.org/10.1210/JC.2009-0555>
- Madhyastha, Sahana, Latha, Kamath, Asha. Stress and coping among final year medical students. *Archives of mental health*. 2014;15(1):74-80.

- Pabst S., Brand M., Wolf O.T., Stress and decision making: A few minutes make all the difference. *Behavioural Brain Research*. 2013;250; 39–45. <https://doi.org/10.1016/J.bbr.2013.04.046>
- Ragab E.A., Dafallah M.A., Salih M.H., Osman W.N., Osman M., Miskeen E., Taha M.H., Ramadan A., Ahmed M., Abdalla M.E., Ahmed M.H. Stress and its correlates among medical students in six medical colleges: an attempt to understand the current situation. *Springer*. 2021;28(1);75. <https://doi.org/10.1186/s43045-021-00158-w>
- Rebello C.R., Kallingappa P.B., Hegde P.G. Assessment of perceived stress and association with sleep quality and attributed stressors among 1st-year medical students: A cross-sectional study from Karwar, Karnataka, India. *Tzu chi medical journal*. 2018;30(4);221–226. https://doi.org/10.4103/TCMJ.TCMJ_85_17.
- Sohali N. Stress and academic performance among medical students. *J Coll Physicians Surg Pak*. 2013;23(1); 67-71.
- Tsigos C., Chrousos G.P., Hypothalamic–pituitary–adrenal axis, neuroendocrine factors and stress. *J Psychosom Res*. 2002;53(4);865–871. [https://doi.org/10.1016/s0022-3999\(02\)00429-4](https://doi.org/10.1016/s0022-3999(02)00429-4).
- Wijekoon C.N., Amaratunga H., De Silva Y., Senanayake S., Jayawardana P., Senarath U. Emotional intelligence and academic performance of medical undergraduates: A cross-sectional study in a selected university in Sri Lanka. *BMC Med Educ*. 2017;(17)1;176. <https://doi.org/10.1186/s12909-017-1018-9>
- Wimberly C.E., Rajapakse H., Park L.P., Price A., Proeschold-bell R.J., Ostbye T. Mental well-being in Sri Lankan medical students: a cross-sectional study. *Psychology, Health and Medicine*. 2022;27(6);1213–1226. <https://doi.org/10.1080/13548506.2020.1858488>
- Wunch K., Kasten N., Fuchs R. The effect of physical activity on sleep quality, well-being, and affect in academic stress periods. *Nature and Science of Sleep*. 2017;9;117-126. <https://doi.org/10.2147/nss.s132078>
- Yap Y., Slavish D.C., Taylor D.J., Bei B., Wiley J.F. Bi-directional relations between stress and self-reported and actigraphy-assessed sleep: a daily intensive longitudinal study. *Sleep*. 2020;43(3).<https://doi.org/10.1093/SLEEP/ZSZ250>.