



“IDENTIFYING THE STRONGEST PREDICTORS OF PSYCHOLOGICAL STRESS AMONG HEALTH SCIENCE STUDENTS: A MULTIVARIATE ANALYSIS”

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Abstract: Background: Psychological stress is a significant mental and physiological response that occurs when individuals perceive environmental or emotional demands as exceeding their coping abilities. Stress commonly manifests through behavioral, emotional, cognitive, and physical symptoms, including anxiety, irritability, difficulty concentrating, heart palpitations, and alterations in social behavior. According to the American Psychological Association, stress can be classified into acute stress, episodic acute stress, and chronic stress, based on the duration and persistence of stress exposure. Among these, chronic stress is often overlooked despite its profound impact on mental health and overall well-being. This is a cross-sectional study aims to predict psychological stress in relation to sleep quality, social support, mindfulness, and emotional intelligence among health science students aged 18–25 years. A total of 200 students from Pachamuthu College of Pharmacy were included in our study. Students unwilling to participate, unable to complete the questionnaire, or currently receiving medication for psychological disorders will be excluded. Data were collected using standardized assessment tools, including the Perceived Stress Scale (PSS), Mindful Attention Awareness Scale (MAAS), Sleep Quality Scale, Schutte Emotional Intelligence Scale (SEITC), and Multidimensional Scale of Perceived Social Support (MSPSS). Our study demonstrates that moderate psychological stress is highly prevalent among college students, with a considerable proportion experiencing high stress. Sleep-related impairment showed a weak positive association with stress, while emotional intelligence and social support were not significantly related. Mindfulness emerged as the strongest predictor of psychological stress, displaying a positive association, which may reflect increased awareness and reporting of stress among more mindful individuals.

Keywords: Psychological stress, Sleep Quality, Emotional Intelligence, Mindfulness, Social Support.

INTRODUCTION

Stress is a psychological response that occurs as a result of demands placed on one's capabilities. It may be brought about by factors related to work as well as internal negative emotions. In the context of the American Psychological Association[1], there are three major types of stress: acute, which is triggered by stressful events such as deadlines; episodic, which affects people who live their lives under constant mini crises; and chronic stress, characterized by an inability to handle certain pressures associated with life, like poverty[2]. Physical signs include palpitations and digestive problems, while behavioral manifestations entail social isolation and drug and alcohol abuse. In essence, stress and sleep have a two-way relationship in that stress hormones such as the "fight or flight response" cause insomnia[4], while insufficient sleep makes it difficult for one to handle stress. [4]Emotional intelligence and mindfulness techniques are useful strategies that one may adopt to overcome stress in order to remain productive[3]. These factors are measured by clinicians and scholars using different standardized instruments such as Perceived Stress Scale (PSS)[4], which evaluates stress in one's life; Schutte Self-Report Emotional Intelligence Test (SSEIT), which assesses individuals' emotions; and Mindful Attention Awareness Scale (MAAS). Furthermore, perceived social support from family and friends is considered a crucial predictor of psychological well-being during stressful times.[6]

Methodology

Study Design : Multivariate analysis
Study Participants : 200
Study Duration : 6months
Study Site : Pachamuthu college of Pharmacy

INCLUSION

- Age 18-25

RESULT

A Total of 200 college students were participated in our study from that 185 Participant data were analysed. 15 participants were excluded for the analysis due to incomplete data. In our study 131 participants were female and 54 were male. The mean age of the participants were 19 years. The average PSS score of the participants was found to be 23.26. Only a total of 4 participants scored below 13 which indicates low stress levels, 123 participants have moderate stress level, 49 participants scored from the range of 27-40 which showed high stress levels. Sample standard deviation (SD) = 5.15: On average, PSS scores deviate by ± 5.15 units from the mean. Population SD = 5.14: Very close to sample SD, suggesting the sample well represents the population.

Skewness = 0.16: Slight positive skew, but very close to zero $\rightarrow$ nearly symmetric distribution. And Kurtosis = -0.27 : Slightly platykurtic (flatter than normal), but still close to normal. No unusual or extreme values detected in the dataset.

- Health science students.

EXCLUSION

- Who are not willing in participation
- Unable to complete the study question
- Student who are taking medication for any **psychological disorder**

Plan of the study:

- Development of the research question
- Comprehensive review of literature
- Preparation of study protocol
- Development of study materials
- Informed consent form
- The scale was used [SLEEP DISTURBANCE, SSETI, PSS10, MAAS, MSPSS].[5]

5.Data collection

- Administration the validation questionnaire

6.Data analysis

- Statistical analysis by SPSS software

7.Report writing and conclusion

- Interpretation of findings
- Drawing conclusion based on the data analysis

Statistical Analysis:

Descriptive statistics along with multiple correlation and regression have been used to identifying the relationship between stress and Emotional intelligence, Mindfulness, Sleep quality, Social Support, Psychological stress and to identify the strongest predictors among those factors.

were normal, and the neonate required NICU observation for six days due to the presence of a visible swelling over the back at birth. No respiratory distress, feeding difficulty, fever, seizures, or signs of sepsis were observed during NICU stay.

Fig. No: 1 Box Plot

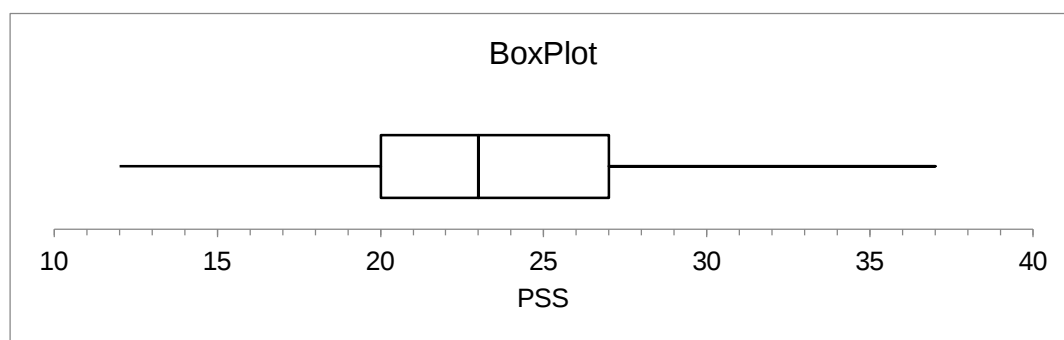
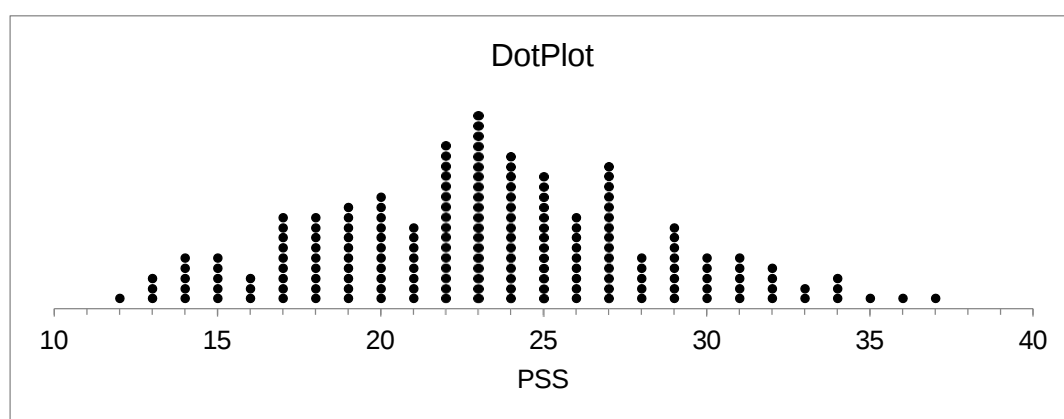


Fig. No:2 Dot Plot



The box plot demonstrates that most participants exhibit moderate levels of psychological stress, while a smaller proportion report markedly higher stress. Consistently, the dot plot shows that stress scores are concentrated within the moderate range, with frequencies gradually declining as scores increase. As a result, the use of parametric statistical tests, including t-tests, ANOVA, correlation, and linear regression, is appropriate for further analysis of predictors of psychological stress.”

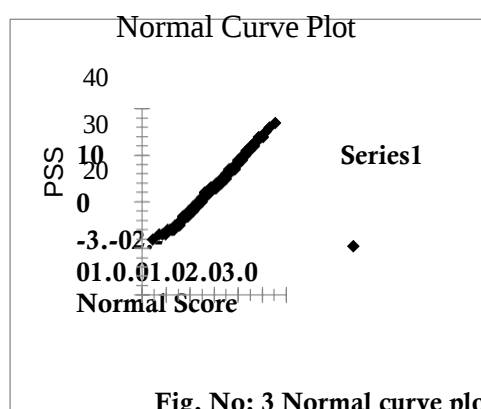


Fig. No: 3 Normal curve plot

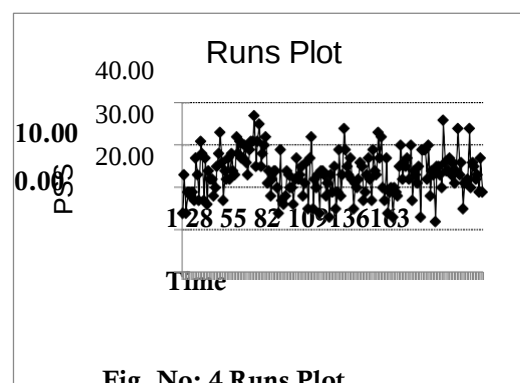


Fig. No: 4 Runs Plot

Karl Pearson’s correlation test is used to analysis the relationship between the psychological stress and predicting factors. Analysis between psychological stress and sleep quality showed a weak positive correlation between Variable A and Variable B ($r = 0.18$) with p value 0.012, i.e., increase in sleep related impairment shows increase in the psychological stress among students indicating a statistically significant minimal linear association between the two variables.

Test between psychological stress and emotional intelligence shows Very slight negative correlation ($r = -0.003$) indicates increase in emotional intelligence shows decrease in the psychological stress with p value 0.96 showed that correlation is not significant indicating that emotional intelligence may not serve as a potential predictor of stress.

Analysis between psychological stress and mindfulness revealed a significant weak to moderate positive correlation between Variable A and Variable B ($r = 0.298$, $p < 0.001$), indicating that increases in Variable A are associated with increases in Variable B."

Test between stress and social support shows no significant correlation between two Variables ($r = -0.003$, $p = 0.96$), indicating the absence of a linear association between stress and social support.

All possible regression analysis identified mindfulness as the best single predictor of psychological stress. The model including mindfulness alone was statistically significant ($p = 3.76 \times 10^{-5}$) and explained 8.4% of the variance in PSS (Adjusted $R^2 = 0.084$). Sleep quality was not a significant predictor either alone ($p = 0.149$) or when combined with mindfulness ($p = 0.785$), and its inclusion did not improve model performance.

DISCUSSION

The present study assessed the distribution of psychological stress among college students and explored its relationship with selected predictive factors,[7] including sleep quality, emotional intelligence, mindfulness, and social support.[8] The findings revealed that the majority of participants experienced moderate levels of stress, with a substantial proportion reporting high stress, highlighting psychological stress as a common concern within this population.[9] The mean PSS score (23.26 ± 5.15) is comparable to values reported in previous studies among undergraduate students, suggesting that academic demands[10], lifestyle changes, and psychosocial pressures may contribute significantly to stress levels in this age group.[11]

The distribution of stress scores demonstrated near-normality, with minimal skewness and kurtosis, and no extreme outliers, indicating good data quality and supporting the use of parametric statistical methods.[12] Visual plots further confirmed that moderate stress predominated, while a smaller but noteworthy group exhibited elevated stress, emphasizing the need for targeted interventions for high-risk students.[13]

Correlation analysis showed a weak but statistically significant positive association between psychological stress and sleep-related impairment[14], indicating that poorer sleep quality is associated with higher stress levels.[15] This finding is consistent with existing literature suggesting a bidirectional relationship between sleep disturbances and stress, where inadequate sleep may exacerbate stress, and heightened stress may, in turn, impair sleep quality.[16,17] Although statistically significant, the small effect size suggests that sleep quality alone may not be a strong determinant of stress but remains a relevant contributing factor.[18]

Psychological stress demonstrated no significant relationship with emotional intelligence, suggesting that, within this sample, emotional intelligence may not play a major protective role against stress. This contrasts with some previous studies that report an

inverse association, and the discrepancy may be attributed to differences in measurement tools, sample characteristics, or cultural context.[19] Similarly, social support was not significantly correlated with stress, indicating that perceived support may not directly influence stress levels in this cohort or that its effect may be mediated through other psychosocial variables.[20]

Interestingly, a weak-to-moderate positive correlation between mindfulness and psychological stress was observed, which differs from the commonly reported inverse relationship. One possible explanation is that individuals with higher mindfulness possess greater awareness of their internal emotional states and therefore report stress more accurately.[21] Another plausible explanation is reverse causation, whereby students experiencing higher stress may actively engage in mindfulness-related practices as a coping strategy. Additionally, as mindfulness practice can initially increase awareness of distressing thoughts and emotions, higher mindfulness scores may reflect heightened recognition of stress rather than increased stress itself.[22,23]

Regression analysis identified mindfulness as the best single predictor of psychological stress, explaining 8.4% of the variance in PSS scores. While this proportion is modest, it indicates that mindfulness contributes meaningfully to stress variability, though a large proportion of stress remains unexplained, suggesting the influence of additional academic, environmental, and personal factors. Sleep quality did not emerge as a significant predictor in regression models, indicating that its effect on stress may be indirect or overshadowed by other variables.[24,25,26]

Overall, these findings underscore the multifactorial nature of psychological stress and highlight the importance of considering both behavioral and psychological constructs when designing stress management programs for students.

CONCLUSION

The present study demonstrates that moderate psychological stress is highly prevalent among college students, with a considerable proportion experiencing high stress. Sleep-related impairment showed a weak positive association with stress, while emotional intelligence and social support were not significantly related. Mindfulness emerged as the strongest predictor of psychological stress, displaying a positive association, which may reflect increased awareness and reporting of stress among more mindful individuals.

These findings suggest that stress management strategies in college settings should adopt a comprehensive, multidimensional approach, incorporating sleep hygiene education, psychological support services, and appropriately structured mindfulness-based interventions. Future longitudinal and interventional studies are recommended to clarify causal relationships and to further explore the complex interplay between mindfulness, sleep, and psychological stress.

BIBLIOGRAPHY

1. Crowley C, Kapitula LR, Munk D. Mindfulness, happiness, and anxiety in a sample of college students before and after taking a meditation course. *Journal of American College Health*. 2022 Mar 8;70(2):493-500.
2. Dewe PJ, O'Driscoll MP, Cooper CL. Theories of psychological stress at work. *Handbook of occupational health and wellness*. 2012 Nov 19:23-38.
3. Shields GS, Sazma MA, McCullough AM, Yonelinas AP. The effects of acute stress on episodic memory: A meta-analysis and integrative review. *Psychological bulletin*. 2017 Jun;143(6):636.
4. Hammen C, Kim EY, Eberhart NK, Brennan PA. Chronic and acute stress and the prediction of major depression in women. *Depression and anxiety*. 2009 Aug;26(8):718-23.
5. Saha D, Dutta P, Chakraborty A. The Neuro-Immune Axis in Cardiomyopathy: Molecular Mechanisms, Clinical Phenotypes, and Therapeutic Frontiers. *Immuno*. 2025 Oct 3;5(4):45.
6. Laeequddin M, Waheed KA, Sahay V. Measuring mindfulness in business school students: a comparative analysis of mindful attention awareness scale and langer's scale. *Behavioral Sciences*. 2023 Jan 30;13(2):116.
7. McKerrow I, Carney PA, Caretta-Weyer H, Furnari M, Miller Juve A. Trends in medical students' stress, physical, and emotional health throughout training. *Medical education online*. 2020 Jan 1;25(1):1709278.
8. De Vibe M, Solhaug I, Tyssen R, Friborg O, Rosenvinge JH, Sørli T, Bjørndal A. Mindfulness training for stress management: a randomised controlled study of medical and psychology students. *BMC medical education*. 2013 Dec;13(1):107.
9. Beklemis N, Harmanci Seren AK, Gilbreath B. Psychometrics of job Stress-Related presenteeism scale among Turkish nurses. *Evaluation & the Health Professions*. 2023 Sep;46(3):270-6.
10. Fang H, Tu S, Sheng J, Shao A. Depression in sleep disturbance: a review on a bidirectional relationship, mechanisms and treatment. *Journal of cellular and molecular medicine*. 2019 Apr;23(4):2324-32.
11. Schneiderman N, Ironson G, Siegel SD. Stress and health: psychological, behavioral, and biological determinants. *Annu. Rev. Clin. Psychol.*. 2005 Apr 27;1:607-28.
12. Evidence of the validity of the Multidimensional Scale of Perceived Social Support (MSPSS) in university students.
13. Dimensions of social support in the MSPSS: Factorial structure, reliability, and theoretical implications
14. Ng CG, Siddiq AA, Aida SA, Zainal NZ, Koh OH. Validation of the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) among a group of medical students in Faculty of Medicine, University Malaya. *Asian Journal of Psychiatry*. 2010 Mar 1;3(1):3-6.
15. Brugnoli AV, Gonçalves TR, Silva RC, Pattussi MP. Evidence of the validity of the Multidimensional Scale of Perceived Social Support (MSPSS) in university students. *Ciência & Saúde Coletiva*. 2022 Oct 17;27:4223-32.
16. Adesola AA, Akoki DM, Aderemi TV, Abraham MI. Psychometric properties of the multidimensional scale of perceived social support among university of Ibadan medical students. *BMC psychology*. 2025 May 7;13(1):481.
17. Dambi JM, Corten L, Chiwaridzo M, Jack H, Mlambo T, Jelsma J. A systematic review of the psychometric properties of the cross-cultural translations and adaptations of the Multidimensional Perceived Social Support Scale (MSPSS). *Health and quality of life outcomes*. 2018 May 2;16(1):80.
18. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *Journal of personality assessment*. 1988 Mar 1;52(1):30-41.
19. Brugnoli AV, Gonçalves TR, Silva RC, Pattussi MP. Evidence of the validity of the Multidimensional Scale of Perceived Social Support (MSPSS) in university students. *Ciência & Saúde Coletiva*. 2022 Oct 17;27:4223-32.
20. Varni JW, Limbers CA. The PedsQL™ Multidimensional Fatigue Scale in young adults:

- feasibility, reliability and validity in a University student population. *Quality of Life Research*. 2008 Feb;17(1):105-14.
21. Schnettler B, Orellana L, Sepúlveda J, Miranda H, Grunert K, Lobos G, Hueche C. Psychometric properties of the Multidimensional Students' Life Satisfaction Scale in a sample of Chilean university students. *Suma Psicológica*. 2017 Jul 1;24(2):97-106.
 22. Sann R, Lai PC, Liaw SY, Chen CT. Multidimensional scale development and validation: University service quality (UNIQUAL). *Journal of Hospitality and Tourism Insights*. 2023 Dec 1;6(5):2565-94.
 23. Mah CD, Kezirian EJ, Marcello BM, Dement WC. Poor sleep quality and insufficient sleep of a collegiate student-athlete population. *Sleep health*. 2018 Jun 1;4(3):251-7.
 24. Maheshwari G, Shaukat F. Impact of poor sleep quality on the academic performance of medical students. *Cureus*. 2019 Apr 1;11(4).
 25. Yilmaz D, Tanrikulu F, Dikmen Y. Research on sleep quality and the factors affecting the sleep quality of the nursing students. *Current health sciences journal*. 2017 Sep 27;43(1):20.
 26. Cates ME, Clark A, Woolley TW, Saunders A. Sleep quality among pharmacy students.