Prevalence and Association Between Sedentary Behavior and Suicidality Among College Students of Pre-Medical and Pre-Engineering Disciplines

Journal of Health and Rehabilitation Research (2791-156X)
Volume 4, Issue 3
Double Blind Peer Reviewed.
https://jhrlmc.com/
DOI: https://doi.org/10.61919/jhrr.v4i3.1485
www.lmi.education/
LINK MEDICAL INTERFACE

Zuhaib Sultan[1], Asif Ali[2], Fariq Ahmed[3], Muhammad Azam[4]

Correspondence
Asif Ali
asif.ali@gcu.edu.pk

Affiliations
1 BS (Hons) Physical Education & Sports Sciences, Department of Physical Education & Sports Sciences, Government College University Lahore, Punjab, Pakistan.
2 Associate Professor, Department of Physical Education & Sports Sciences, Government College University Lahore, Punjab, Pakistan.
3 M.Phil. Scholar, Department of Physical Education & Sports Sciences, Government College University Lahore, Punjab, Pakistan.
4 Assistant Professor, Department of Physical Education & Sports Sciences, Government College University Lahore, Punjab, Pakistan.

Keywords
Sedentary behavior, suicidal ideation, physical activity, pre-medical students, pre-engineering students, mental health, college students.

Disclaimers

Authors' Contributions	All authors contributed equally to the design, data collection, analysis, and writing of the manuscript.
Conflict of Interest	None declared
Data/supplements	Available on request.
Funding	None
Ethical Approval	Respective Ethical Review Board
Study Registration	N/A
Acknowledgments	N/A

ABSTRACT

Background: The mental health of college students, especially those in pre-medical and pre-engineering disciplines, is increasingly concerning due to academic pressures and sedentary behavior, which can lead to suicidal ideation (SI).

Objective: This study aimed to examine the prevalence and association between sedentary behavior and SI among pre-medical and pre-engineering college students.

Methods: A cross-sectional study was conducted with 200 students (100 pre-medical, 100 pre-engineering) from Government Degree College, Booni, Chitral, using self-reported measures. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ), and SI was evaluated with the Adult Suicide Ideation Questionnaire (ASIQ). Data analysis included descriptive statistics and independent t-tests using IBM SPSS Statistics version 25.

Results: Pre-medical students showed higher sedentary behavior (59% high activity) and SI rates (52% minimal risk, 34% low risk, 12% moderate risk, 2% high risk) compared to pre-engineering students, who had 74% high physical activity and 91% minimal risk SI. Significant differences were found in physical activity ($t(200) = -3.45$, $p < .05$) and SI ($t(200) = 5.83$, $p < .05$) between groups.

Conclusion: Promoting physical activity may protect against SI among college students, particularly those in high-pressure academic disciplines.

INTRODUCTION

The mental health of college students, particularly those in pre-medical and pre-engineering disciplines, has become a significant concern in recent years, largely due to the rising academic pressures and social challenges they face. This heightened stress can negatively impact students' physical activity levels, promoting sedentary behavior, which in turn can exacerbate mental health issues, including suicidal ideation (1, 2). Suicidal ideation (SI), which encompasses suicidal thoughts, preparation, and attempts, is a critical indicator of suicide risk and is influenced by various factors such as depression, anxiety, and life dissatisfaction (4, 5). Suicide has become a leading cause of death worldwide, often surpassing other diseases, with a reported average yearly prevalence of SI at 2.0% and 2.1% in developed and developing countries, respectively (6). In academic settings, particularly among young adults, stress from continuous competitive pressures has been linked to numerous psychological and behavioral problems, including depression and SI (3).

Academic stress is a prevalent issue among college students, fueled by the demands and expectations from teachers and parents to achieve high academic performance (7). This pressure can lead to significant emotional, psychological, and physical distress, manifesting in mental health challenges such as SI. Studies have consistently shown a strong association between academic pressure and the prevalence of suicidal thoughts among students (8-11). Specifically, periods of intense academic demands, such as examination seasons, often correlate with increased rates of suicide attempts, underscoring the severe impact of academic stress on students' mental well-being (11).

The correlation between sedentary behavior and SI is particularly relevant among pre-medical and pre-engineering students, who experience distinct academic environments. Pre-medical students typically endure more rigorous academic demands and longer study hours compared to their pre-engineering peers, which may contribute to higher rates of sedentary behavior and SI (12). This pattern aligns with findings from studies conducted on medical students, which suggest that the chronic stress from intense academic pressures often leads to lower physical activity levels and increased risk of SI (29). Conversely, pre-engineering students often benefit from a curriculum that allows for better time management and more opportunities to engage in physical activities, potentially providing a protective effect against SI (32).

Environmental factors also play a role in influencing SI. Exposure to natural settings and outdoor activities has been shown to positively affect emotional well-being and reduce

stress, anxiety, and depressive symptoms (34). Given that this study was conducted in the Chitral region of Pakistan, a relatively cool and hilly area, environmental factors could also influence the mental health outcomes observed among the students. However, it is essential to consider that these relationships are multifaceted and can be influenced by a variety of individual, cultural, and contextual factors (35).

This study aimed to explore the prevalence and association between sedentary behavior and SI among college students in pre-medical and pre-engineering disciplines. By examining these associations, the study seeks to provide insights into the impact of academic pressures and lifestyle choices on the mental health of college students. Understanding these relationships may aid in identifying targeted interventions to promote physical activity and reduce the risk of SI among students, thereby enhancing their overall mental and psychological well-being.

MATERIAL AND METHODS

The study utilized a cross-sectional design to examine the prevalence and association between sedentary behavior and suicidal ideation (SI) among pre-medical and pre-engineering college students in upper Chitral, Pakistan. The population comprised students aged 18 to 24 years enrolled in pre-medical and pre-engineering disciplines at Government Degree College, Booni, located in the Chitral region, KPK, Pakistan. The initial population included 385 students, from which a sample size of 200 participants was calculated using the Yamane formula to ensure a representative distribution (19). The final sample included 100 pre-medical and 100 pre-engineering students who met the inclusion criteria, which specified current enrollment in their respective disciplines and consent to participate voluntarily.

Demographic information was collected using a questionnaire that included items on gender, age, study program, marital status, and academic year. Additionally, data related to lifestyle factors such as social media use at night, screen time per day, weight, BMI, and resting heart rate were obtained to assess potential correlates of sedentary behavior. Physical activity levels were measured using the International Physical Activity Questionnaire (IPAQ), a validated tool that categorizes activity into vigorous, moderate, and normal levels over the previous seven days. The IPAQ is widely used in research involving young adults and has demonstrated strong reliability, with a Cronbach alpha score of 0.86 (23). Suicidal ideation was assessed using the Adult Suicide Ideation Questionnaire (ASIQ), which is a self-reported measure designed to evaluate the frequency of suicidal thoughts in adults. The ASIQ has been extensively validated, showing high internal consistency (r alpha = 0.97) and test-retest reliability (rtt = 0.86) among college populations (25).

Data collection was conducted through face-to-face administration of the questionnaires at the study site. Each participant received individual instructions on completing the surveys, and questionnaires were reviewed for completeness upon submission. Participants were assured of confidentiality and the academic nature of the study. Ethical approval was obtained from the Department of Physical Education, Government College University, Lahore, and permissions were secured from the principal of Government Degree College, Booni. All participants provided informed consent, and the study adhered to the ethical principles outlined in the Declaration of Helsinki, including respect for participants' rights, voluntary participation, and confidentiality of data.

Data analysis was performed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize the demographic characteristics and the levels of physical activity and suicidal ideation among the participants. An independent t-test was applied to compare the physical activity and SI scores between pre-medical and pre-engineering students. Effect sizes were calculated to assess the magnitude of differences observed between groups, with Cohen's d used to interpret the effect size of the differences. This analysis approach facilitated a clear comparison of the prevalence of sedentary behavior and SI between the two academic disciplines, allowing for an examination of the potential protective role of physical activity against SI in this population. The results were interpreted in the context of existing literature to provide insights into the mental health and lifestyle behaviors of college students in high-stress academic settings.

RESULTS

The results of the study revealed significant differences in physical activity and suicidal ideation (SI) levels between pre-medical and pre-engineering students. For pre-medical students, 17% exhibited low physical activity, 24% moderate, and 59% high activity levels. In contrast, the SI assessment showed that 52% were at minimal risk, 34% at low risk, 12% at moderate risk, and 2% at high risk. Among pre-engineering students, only 1% demonstrated low physical activity, 25% moderate, and 74% high levels. Their SI assessment showed 91% at minimal risk, 4% at low risk, 5% at moderate risk, and none at high risk. To further examine the differences between these groups, an independent t-test was conducted. The results indicated significant mean differences in physical activity between pre-medical and pre-engineering students, with pre-engineering students showing higher activity levels ($M = 2.73$, $SD = 0.47$) compared to pre-medical students ($M = 2.42$, $SD = 0.77$), $t(200) = -3.45$, $p < .05$. The effect size was 0.48, suggesting a small impact. For SI, pre-medical students had significantly higher mean scores ($M = 18.72$, $SD = 16.16$) compared to pre-engineering students ($M = 7.32$, $SD = 10.00$), $t(200) = 5.83$, $p < .05$, with a medium effect size of 0.82, indicating a substantial difference in SI between the two group.

The table summarizes the inferential analysis, showing that the Chi-Square test yielded a statistic of 1.04 with 1 degree of freedom and a p-value of 0.31, indicating no significant association between sedentary behavior and suicidal ideation (SI) among pre-medical and pre-engineering students. Logistic regression results further support this, with an intercept odds ratio of 0.12 (p = 7.57E-

Table 1 Variables

Variables	Frequency (f)	Percentage (%)
Physical Activity		
Low	17	17.0
Moderate	24	24.0
High	59	59.0
Adult Suicide Ideation		
Minimal Risk	52	52.0

Table 2 Pre-Engineering Participants Data

Variables	Frequency (f)	Percentage (%)
Physical Activity		
Low	1	1.0
Moderate	25	25.0
High	74	74.0
Adult Suicide Ideation		
Minimal Risk	91	91.0

Table 3 Association Between Sedentary Behaviour and Suicidal Ideation

Statistic	Value	Variable
Chi-Square	1.039	
Degrees of Freedom	1.0	
P-Value	0.307	
Intercept Odds Ratio	0.12	Intercept
Sedentary Odds Ratio	0.0	Sedentary

19), and a sedentary odds ratio of 0 ($p = 0.86$), suggesting that sedentary behavior does not significantly predict SI risk, as reflected by the high p-values, both well above the 0.05 significance level. These results suggest that pre-medical students, who face more intense academic pressures, are more likely to exhibit lower physical activity levels and higher rates of SI compared to their pre-engineering counterparts. This underscores the potential protective role of physical activity against SI among college students and highlights the need for targeted interventions to promote an active lifestyle, particularly among pre-medical students.

DISCUSSION

The findings of this study highlighted significant differences in sedentary behavior and suicidal ideation (SI) between pre-medical and pre-engineering college students, underscoring the critical role of physical activity in influencing mental health outcomes among students in demanding academic disciplines. The results indicated that pre-medical students exhibited higher levels of sedentary behavior and SI compared to pre-engineering students, suggesting that the intense academic pressures faced by pre-medical students may contribute to these adverse outcomes. These findings are consistent with previous research showing that increased physical activity is associated with lower SI levels among adolescents and young adults (26, 27). Physical activity has been shown to improve mood, reduce stress, and enhance overall well-being, which may protect against the development of suicidal thoughts (28).

The study's results align with existing literature indicating that medical students, who often face higher academic demands and longer study hours, are at a greater risk of developing chronic stress and SI compared to students in other disciplines (29). For instance, a study conducted among medical students in Poland found that lack of physical activity was linked to higher stress levels and suicidal thoughts, supporting the notion that sedentary behavior contributes to negative mental health outcomes in this population (29). In contrast, pre-engineering students demonstrated higher levels of physical activity and lower SI, which may be attributed to a less demanding curriculum that allows for better time management and greater engagement in physical activities (32). This finding is in line with previous studies that reported lower SI rates among students who participated in regular physical activities, emphasizing the potential mental health benefits of an active lifestyle (27, 31).

However, the study also revealed some complexities regarding the influence of environmental factors on SI. The research was conducted in the Chitral region, a natural and scenic area that may have contributed positively to the participants' mental health through outdoor exposure, which has been shown to reduce stress and improve emotional well-being (34). This suggests that environmental context, in addition to physical activity, plays a role in shaping mental health outcomes, highlighting the multifaceted nature of SI risk factors (35). Therefore, while the findings reinforce the importance of promoting physical activity, they also suggest that other contextual elements, such as environmental exposure, should be considered in interventions aimed at reducing SI among students.

The strengths of this study include its focus on a specific and high-risk population, providing insights into the distinct challenges faced by pre-medical and pre-engineering students. The use of validated measures for both physical

activity and SI ensured the reliability of the findings, while the cross-sectional design allowed for the examination of associations between these variables within the academic context. However, there were also limitations, including the reliance on self-reported measures, which may introduce response biases, and the cross-sectional nature of the study, which limits causal interpretations. The study was also geographically restricted to a specific region, which may affect the generalizability of the findings to other settings with different environmental or cultural characteristics.

Based on these findings, it is recommended that academic institutions consider implementing targeted interventions to promote physical activity and reduce sedentary behavior, particularly among students in high-pressure academic disciplines such as pre-medical programs. These interventions could include structured exercise programs, stress management workshops, and modifications to academic schedules to allow for more leisure and physical activity time. Additionally, there is a need for further research to explore the causal relationships between physical activity, sedentary behavior, and SI, as well as to examine the potential moderating effects of environmental factors. By addressing these aspects, future studies could provide more comprehensive strategies for enhancing the mental health and well-being of college students, thereby reducing the risk of SI in this vulnerable population.

CONCLUSION

In conclusion, this study demonstrated a clear association between sedentary behavior and increased suicidal ideation (SI) among pre-medical and pre-engineering students, with pre-medical students showing higher levels of sedentary behavior and SI. The findings underscore the importance of promoting physical activity as a protective factor against mental health challenges in high-pressure academic environments. The human healthcare implications of these results suggest that integrating physical activity into the routines of students, particularly those in demanding disciplines, could significantly improve mental well-being and reduce the risk of SI. Educational institutions and healthcare providers should collaborate to develop targeted interventions that encourage active lifestyles, stress management, and mental health support, contributing to a more balanced and healthier academic experience for students.

REFERENCES

1. Becker JC, Hartwich L, Haslam SA. Neoliberalism Can Reduce Well-Being by Promoting a Sense of Social Disconnection, Competition, and Loneliness. Br J Soc Psychol. 2021;60(3):947-65.
2. Hards E, Loades ME, Higson-Sweeney N, Shafran R, Serafimova T, Brigden A, et al. Loneliness and Mental Health in Children and Adolescents with Pre-Existing Mental Health Problems: A Rapid Systematic Review. Br J Clin Psychol. 2022;61(2):313-34.
3. Isakova M. Socio-Psychological Aspects of A Person's Attitude to His Mental Health. Asian J Multidim Res. 2021;10(4):29-36.
4. Harmer B, Lee S, Duong T, Saadabadi A. Suicidal Ideation. Treasure Island (FL): StatPearls Publishing; 2020.
5. Martínez-Alés G, Jiang T, Keyes KM, Gradus JL. The Recent Rise of Suicide Mortality in the United States. Annu Rev Public Health. 2022;43(1):99-116.
6. Borges G, Nock MK, Abad JMH, Hwang I, Sampson NA, Alonso J, et al. Twelve-Month Prevalence of and Risk Factors for Suicide Attempts in the World Health Organization World Mental Health Surveys. J Clin Psychiatry. 2010;71(12):21777.
7. Deng Y, Cherian J, Khan NUN, Kumari K, Sial MS, Comite U, et al. Family and Academic Stress and Their Impact on Students' Depression Level and Academic Performance. Front Psychiatry. 2022;13:869337.
8. Ivey-Stephenson AZ. Suicidal Ideation and Behaviors Among High School Students—Youth Risk Behavior Survey, United States, 2019. MMWR Suppl. 2020;69.
9. Smith K, Crawford S. Suicidal Behavior Among "Normal" High School Students. Suicide Life Threat Behav. 1986;16(3):313-25.
10. McAuliffe C, Corcoran P, Keeley HS, Perry IJ. Risk of Suicide Ideation Associated with Problem-Solving Ability and Attitudes Toward Suicidal Behavior in University Students. Crisis. 2003;24(4):160.
11. Fernández-García O, Gil-Llario MD, Castro-Calvo J, Morell-Mengual V, Ballester-Arnal R, Estruch-García V. Academic Perfectionism, Psychological Well-Being, and Suicidal Ideation in College Students. Int J Environ Res Public Health. 2022;20(1):85.
12. Worsley JD, Pennington A, Corcoran R. Supporting Mental Health and Wellbeing of University and College Students: A Systematic Review of Review-Level Evidence of Interventions. PLoS One. 2022;17(7).
13. Pedrelli P, Nyer M, Yeung A, Zulauf C, Wilens T. College Students: Mental Health Problems and Treatment Considerations. Acad Psychiatry. 2015;39:503-11.
14. Udhayakumar P, Illango P. Psychological Wellbeing Among College Students. J Soc Work Educ Pract. 2018;3(2):79-89.
15. Luo Z, Hou Y, Chen G, Wang F, Tu R, Dong X, et al. Long-Term Effects of Ambient Air Pollutants on Suicidal Ideation in China: The Henan Rural Cohort Study. Environ Res. 2020;188:109755.
16. Chen J-C, Samet JM. Air Pollution and Suicide Risk: Another Adverse Effect of Air Pollution? Eur J Epidemiol. 2017;32:943-6.
17. Ahmad TI, Bhatti MA, Urooj K, Javed H. Urban Population Growth, Per Capita Energy Use, and CO2 Emissions: Evidence From The World's Fifth-Most Populous Country. iRASD J Energy Environ. 2022;3(2):97-110.
18. Colbeck I, Nasir ZA, Ali Z. Characteristics of Indoor/Outdoor Particulate Pollution in Urban and Rural Residential Environment of Pakistan. Indoor Air. 2010;20(1):40-51.

19. Yamane Y. Mathematical Formulae for Sample Size Determination. J Math. 1967;1:1-29.
20. Biernat E, Stupnicki R, Lebiedziński B, Janczewska L. Assessment of Physical Activity by Applying IPAQ Questionnaire. Phys Educ Sport. 2008;52(2):83-9.
21. Fagaras S-P, Radu L-E, Vanvu G. The Level of Physical Activity of University Students. Procedia Soc Behav Sci. 2015;197:1454-7.
22. Mulahasanović IĆ, Mujanović AN, Mujanović E, Atiković A. Level of Physical Activity of the Students at the University of Tuzla According to IPAQ. Cent Eur J Sport Sci Med. 2018;21:23-30.
23. Gönülates S, Öztürk MA. Investigation of Relationship Between Physical Activity Levels and Quality of Life of University Students. Int Educ Stud. 2019;12(4):110-7.
24. Reynolds WM. Adult Suicidal Ideation Questionnaire. Psychol Assess. 1991.
25. Reynolds WM. Psychometric Characteristics of the Adult Suicidal Ideation Questionnaire in College Students. J Pers Assess. 1991;56(2):289-307.
26. Taliaferro LA, Rienzo BA, Miller MD, Pigg Jr RM, Dodd VJ. High School Youth and Suicide Risk: Exploring Protection Afforded Through Physical Activity and Sport Participation. J Sch Health. 2008;78(10):545-53.
27. Pfledderer CD, Burns RD, Brusseau TA. School Environment, Physical Activity, and Sleep as Predictors of Suicidal Ideation in Adolescents: Evidence From A National Survey. J Adolesc. 2019;74:83-90.
28. Grasdalsmoen M, Eriksen HR, Lønning KJ, Sivertsen B. Physical Exercise, Mental Health Problems, and Suicide Attempts in University Students. BMC Psychiatry. 2020;20:1-11.
29. Rosiek A, Rosiek-Kryszewska A, Leksowski Ł, Leksowski K. Chronic Stress and Suicidal Thinking Among Medical Students. Int J Environ Res Public Health. 2016;13(2):212.
30. Yang F, Meng H, Chen H, Xu X-h, Liu Z, Luo A, et al. Influencing Factors of Mental Health of Medical Students in China. J Huazhong Univ Sci Technolog Med Sci. 2014;34:443-9.
31. Raditya M, Sutarina N. Relationship Between Burnout and Physical Activity Level Among Pre-Clinical Medical Students. J Pak Med Assoc. 2021;71(2):S-62-S-.
32. Bork SJ, Mondisa JL. Engineering Graduate Students' Mental Health: A Scoping Literature Review. J Eng Educ. 2022;111(3):665-702.
33. Sakib N, Islam M, Al Habib MS, Bhuiyan AI, Alam MM, Tasneem N, et al. Depression and Suicidality Among Bangladeshi Students: Subject Selection Reasons and Learning Environment as Potential Risk Factors. Perspect Psychiatr Care. 2021;57(3):1150-62.
34. Lee S-H, Jung H-O, Park K-R, You J-O, Ha T-H, Kim H-S. Factors Influencing Suicidal Ideation of College Students. J Korean Acad Soc Nurs Educ. 2015;21(2):190-201.
35. Yoo J-S, Son J-W, Nam M-S. Factors Influencing Suicide Ideation Among Adolescents. J Korean Acad Community Health Nurs. 2008;19(3):419-30.