

## ASSOCIATION OF PHYSICAL ACTIVITY WITH PERCEIVED STRESS AND SLEEP QUALITY OF NURSING STUDENTS IN PESHAWAR: A CROSS-SECTIONAL STUDY

Muhammad Uzair<sup>1</sup>, Arif Hussain<sup>2</sup>, AbuBakar Asad<sup>3</sup>, Syed Muhammad Hammad<sup>\*4</sup>,  
Itbar Gul Swati<sup>5</sup>, Hilal Ahmad<sup>6</sup>, Dilawar Khan<sup>7</sup>, Izaz Khan<sup>8</sup>

<sup>1</sup>Nurse Intern, Lady Reading Hospital, Peshawar, Pakistan

<sup>2</sup>Nurse Intern, Saidu Group of Teaching Hospitals, Swat, Pakistan

<sup>3</sup>Nurse Intern, Avicenna Medical College & Hospital, Lahore, Pakistan

<sup>\*4</sup>Physical Therapist, District Headquarter Hospital, Nowshera, Pakistan

<sup>5</sup>Lecturer/Registered Nurse Officer, Khyber Pakhtunkhwa Institute of Medical Sciences/Khyber Teaching Hospital, Peshawar, Pakistan

<sup>6</sup>Nurse Intern, Lady Reading Hospital, Peshawar, Pakistan

<sup>7</sup>Nurse Intern, Avicenna Medical College & Hospital, Lahore, Pakistan

<sup>8</sup>Nurse Intern, Pakistan Institute of Medical Sciences (PIMS), Islamabad, Pakistan

<sup>1</sup>muhammaduzair66551@gmail.com, <sup>2</sup>arifhussain009867@gmail.com,

<sup>3</sup>abubakarasadkp21bsn3080@gmail.com, <sup>\*4</sup>syedhammad07@yahoo.com,

<sup>5</sup>itbarqambar@gmail.com, <sup>6</sup>ha8427171@gmail.com, <sup>7</sup>dkwazer759@gmail.com,

<sup>8</sup>qaziizazizaz@gmail.com

DOI: <https://doi.org/10.5281/zenodo.20132206>

### Keywords

Physical activity, perceived stress, sleep quality, nursing students, cross-sectional study

### Article History

Received: 14 March 2026

Accepted: 24 April 2026

Published: 12 May 2026

Copyright @Author

Corresponding Author: \*  
Syed Muhammad Hammad

### Abstract

**Background:** Nursing students frequently experience challenges related to physical activity, perceived stress, and sleep quality, which significantly influence their health and academic performance. Physical inactivity is recognized as a major global risk factor for morbidity and mortality.

**Objective:** To determine the association between physical activity, perceived stress, and sleep quality among nursing students in Peshawar.

**Methods:** A cross-sectional study was conducted among 384 undergraduate nursing students from public and private institutions in Peshawar between July and December 2025. Participants were selected through convenient sampling. Physical activity was assessed using the International Physical Activity Questionnaire-Short Form (IPAQ-SF), perceived stress using the Perceived Stress Scale (PSS), and sleep quality using the Sleep Quality Scale (SQS). Data was analysed using SPSS version 23 and presented as frequencies and percentages.

**Results:** Out of 384 undergraduate nursing students with the mean age ( $22.1 \pm 1.8$  Years) and academic performance ( $3.2 \pm 0.4$  GPA). Among them, 62.2% reported moderate physical activity, 81% had moderate perceived stress, and 67.2% experienced moderate sleep problems. A significant association was found between physical activity and sleep quality, whereas no significant association was observed between physical activity and perceived stress.

**Conclusion:** Most nursing students demonstrated moderate levels of physical activity, stress, and sleep disturbances. Increased physical activity was associated with better sleep quality but did not significantly reduce perceived

stress. Promoting active lifestyles may improve sleep health among nursing students.

## INTRODUCTION

Nursing students (NS) most often encounter challenges linked to physical activity (PA), sleep quality (SQ) and perceived-stress levels (PSL) which will be important for their general health and academic achievement [1, 2]. As stated by WHO, lack of PA is point out as the 4<sup>th</sup> notable risk factor for worldwide mortality [3]. Previous studies reported a higher frequency of physical inactivity (PIA), ranges between 43-80% among adult populace most commonly in females [4]. A recent research suggest that the level of physical inactivity within Middle Eastern undergraduate students was 58.0% in males and 42.0% in females [5]. In South Asia and Pakistan, the physical inactivity among the university students ranging from 21.9% to 80.6% [6, 7]. Sleep deprivation is widespread among students globally, with studies indicating that upto 24% among university students in the United Kingdom and nearly 49% in Taiwan report sleeping less than seven hours [8, 9]. Different types of physical activity suggest that a differential effect on stress-related neurophysiological systems in regarding psychosocial stress and sleep quality [10].

The therapeutic actions of PA on physiological mental-health are emphasized via the recognition of exercise and physical exertion as first-line interventions for anxiety disorders [11]. Medical students oftenly encounter high levels of stress, which have harmful affect not only on their overall well-being but also their academic performance, clinical efficiency, and ability to cope with the demanding nature of medical training [12]. Yilmaz et al., revealed importance of positive association in b/w SQ and PA levels ( $P < .05$ ). In addition, a moderately favorable correlation b/w PSL and SQ was found ( $p < .05$ ). Results also revealed that NS have moderate PSL and PA, and they have exceptionally poor SQ [13]. Wright LJ et al., reported that greater levels of physical activity are correlated to reduced stress, leading to lower number of symptoms of anxiety and depression [14]. Saintila J et al., reported that engaging in physical activity contributes to healthier sleep quality, which in turn helps lower stress levels [15]. Conversely, Marin-Lagos et al.,

Discovered a significant inverse relationship between stress and sleep quality among medical students [16]. Sepdanius et al. identifies that physical activity was negatively linked with stress and positively linked with emotional intelligence, whereas poor sleep quality correlated with diminished emotional well-being [17].

Whereas, limited prior studies conducted on international level which provides valuable insights into the correlation between stress, sleep quality and physical activity, several gaps remain. The findings of Marin-Lagos et al. [16] recognise the importance of stress as well as sleep with in medical students but show an unidentified role of physical activity, while Olufemi et al. [18] suggest that short-term aerobic interventions may not be adequate to improve stress and sleep outcomes. Moreover, the work of Sepdanius et al. [17] identifies broader psychological benefits of physical activity, particularly in relation to emotional intelligence, yet the mechanisms through which activity influences stress and sleep remain inconclusive. These inconsistencies suggest a need for further research that not only examines the direct associations among these variables but also considers population differences, intervention duration, and lifestyle contexts. By addressing these gaps provided a clearer understanding of how stress, sleep, and physical activity interact, thereby informing more effective health promotion strategies for students and professionals alike.

## METHODS

A cross-sectional survey was conducted to determine the association of physical activity with perceived stress and sleep quality among nursing students in Peshawar between July and December 2025. The targeted population consists of 384 undergraduate nursing students from both the public and private institutions affiliated with Khyber Medical University, Peshawar. Participants were selected based on inclusion criteria that required them to be male or female nursing students aged 18 to 35, currently enrolled with the respective nursing institutes of Peshawar. Nursing students who were clinically diagnosed neurological,

psychiatric, or systemic diseases, current use of medications affecting sleep or activity, primary sleep disorders, or incomplete questionnaire/consent were excluded.

Data collection utilized a reliable and validated questionnaire adapted from previously established tools to gather demographic details, physical activity was assessed using the International Physical Activity Questionnaire-Short Form (IPAQ-SF) categorized as low (<600 MET-min/week), moderate (600–3000 MET-min/week), and high (>3000 MET-min/week), perceived stress using the Perceived Stress Scale (PSS-10) categorized as low (0–13), moderate (14–26), and high (27–40), and sleep quality using the Sleep Quality Scale (SQS-28) categorized as healthy (0–27), moderate (28–55), and poor sleep (56–84). Before data collection, all participants were provided with an information sheet explaining the purpose, methodology, and potential benefits of the research. The investigator addressed any queries raised by the participants to ensure full comprehension. Written informed consent was obtained from every subject prior to enrollment. Ethical approval for the study was obtained from the relevant institutional review board. The questionnaire was administered verbally by the investigator to maintain uniformity in responses and reduce the likelihood of misinterpretation. For data analysis, the Statistical Package for Social Sciences (SPSS) version 23 was employed. Continuous variables such as age and academic performance etc., were expressed as mean  $\pm$  SD; categorical variables such as; sex, place of residence, academic year and institution name etc., were expressed as frequencies and percentages. Associations between physical activity with perceived stress, sleep quality, and other variables (sex, institution, academic performance) were assessed using chi-square tests with cross-tabulations, and the results were organized in tabular form for clarity and ease of interpretation.

## RESULTS

The study included 384 participants, with an average age of 22.1 years (SD $\pm$ 1.8), ranging from 18 to 34 years and mean academic performance (GPA) of 3.2 (SD $\pm$ 0.4). Among them, 83.3% were male (n=320) and 16.7% were female (n=64). The participants were selected from

various professional years, with 9.9% from first year (n=38), 44.3% from second year (n=170), 18.5% from third year (n=71) and 27.3% from final year i.e., fourth year (n=105) were selected respectively. Moreover, the participants from different institution with 8.6% (n=33) from INSKMU, 9.1% (n=35) from RCN, 9.9% (n=38) from NWCN, 9.4% (n=36) from RNC, 14.6% (n=56) from PINC, 23.2% (n=89) from KPCN, 16.1% (n=62) from NCS and 9.1% (n=35) from HIMS were almost equally selected respectively. (Table 1)

A significant majority of the participants, 62.2% (n=239) reported moderate physical activity while 15.9% (n=61) have high level of physical activity. In-terms of perceived stress, majority 81% (n=311) had moderate perceived stress while 9.4% (n=36) have high level of perceived stress. In-terms of sleep quality, majority 67.2% (n=258) experienced moderate sleep problems while 4.4% (n=17) have severe sleep problem, respectively. (Table 2)

Cross Tabulation between the level of physical activity via IPAQ-SF with the Sleep Quality via SQS-28 and perceived stress via PSS-10 revealed that, out of 384 participants, majority of the participants have moderate (n=169) to low (n=51) level of physical activity with moderate (n=169) to rare (n=20) sleep problem, respectively. Whereas, majority of the participants have moderate (n=191) to low (n=67) level of physical activity with moderate (n=191) to high (n=9) perceived stress, respectively. Chi-square tests revealed that a significant association was found between physical activity and sleep quality, whereas no significant association was observed between physical activity and perceived stress. (Table 3)

Cross Tabulation between the level of physical activity via IPAQ-SF and demographic variables revealed that, the level of physical activity was higher (Moderate 63.7% to High 18.7%) among male participants (n=320) as compared to female (Moderate 54.6% to low 43.7%) participants (n=64) whereas the level of physical activity were higher among those participants 68.8% (f=117) enrolled in second year (n=170) have moderate level of PA followed by participants enrolled in 61.9% (f=65) fourth year (n=105) and 57.7% (f=41) third year (n=71) have moderate level of physical activity, respectively. Moreover, Majority of the participants who belongs to

KPCN(f=55), NCS(f=43) & RCN(f=29) have moderate level of PA followed by PINC(f=22) have low level of PA, respectively. This refers to the level of PA were higher among students of KPCN & NCS as compared to other nursing

institutions in Peshawar. Chi-square tests revealed a statistically significant associations between level of physical activity with gender, academic year and different institutions ( $P < 0.05$ ). (Table 4)

**Table 1 Demographic information of the participants**

Demographic variables		Mean	SD
Age (Years)		22.1	1.8
Academic Performance (GPA)		3.2	0.4
		<i>f</i>	<i>%</i>
Gender	Male	320	83.3
	Female	64	16.7
Academic Year	First Year	38	9.9
	Second Year	170	44.3
	Third Year	71	18.5
	Fourth Year	105	27.3
Name of institutions	Institute of Nursing Sciences (INS) - KMU	33	8.6
	Rehman College of Nursing (RCN)	35	9.1
	North West College of Nursing (NWCN)	38	9.9
	Rufaidah Nursing College (RNC)	36	9.4
	Pak International Nursing College (PINC)	56	14.6
	Khyber Pakhtunkhwa College of Nursing (KPCN)	89	23.2
	NCS College of Nursing (NCS-CN)	62	16.1
	HIMS College of Nursing (HIMS-CN)	35	9.1
<b>Total</b>		<b>384</b>	<b>100</b>

**Table 2 Level of Physical Activity (IPAQ-SF), Perceived stress (PSS-10) & Sleep Quality (SQS-28) of the participants**

Variables		<i>f</i>	<i>%</i>
Level of Physical Activity	Low activity <600 MET min/week	84	21.9
	Moderate activity 600-3000 MET-min/week	239	62.2
	High activity >3000 MET-min/week	61	15.9
Level of Perceived Stress	Low Stress (0-13)	37	9.6
	Moderate stress (14-26)	311	81
	High Stress (27-40)	36	9.4
Sleep Quality	Rare Sleep Problem (0-27)	109	28.4
	Moderate Sleep Problem(28-55)	258	67.2
	Severe Sleep Problem(56-84)	17	4.4
<b>Total</b>		<b>384</b>	<b>100</b>

**Table 3 Cross Tabulation between level of physical activity (IPAQ-SF) with Sleep Quality (SQS-28) & Perceived Stress (PSS-10)**

Variables		Level of Physical Activity (IPAQ-SF)			Total	P value
		Low activity <600 MET- min/week	Moderate activity 600- 3000 MET- min/week	High activity >3000 MET- min/week		
Sleep Quality Scale (SQS-28)	Rare Sleep Problem (0-27)	20	67	22	109	.00
	Moderate Sleep Problem (28-55)	51	169	38	258	
	Severe Sleep Problem (56-84)	13	3	1	17	
	<b>Total</b>	84	239	61	384	
Perceived Stress Scale (PSS-10)	Low Stress (0-13)	8	25	4	37	.7
	Moderate stress (14-26)	67	191	53	311	
	High Stress (27-40)	9	23	4	36	
	<b>Total</b>	84	239	61	384	

**Table 4 Cross Tabulation between level of physical activity(IPAQ-SF) and demographic variables**

Variables		Level of Physical Activity (IPAQ-SF)			Total	P Value
		Low activity <600 MET- min/week	Moderate activity 600-3000 MET- min/week	High activity >3000 MET- min/week		
Gender	Male	56	204	60	320	0.00
	Female	28	35	1	64	
	<b>Total</b>	84	239	61	384	
Academic Years	First Year	14	16	8	38	0.00
	Second Year	36	117	17	170	
	Third Year	9	41	21	71	
	Fourth Year	25	65	15	105	
	<b>Total</b>	84	239	61	384	
	INS-KMU	11	16	6	33	

Name of Institution	RCN	4	29	2	35	0.00
	NWCN	7	27	4	38	
	RNC	10	26	0	36	
	PINC	22	24	10	56	
	KPCN	13	55	21	89	
	NCS	8	43	11	62	
	HIMS	9	19	7	35	
	<b>Total</b>	<b>84</b>	<b>239</b>	<b>61</b>	<b>384</b>	

## DISCUSSION

The aim of our research is to determine the association of PA with PS and SQ among NS in Peshawar. The result of our research identify that out of 384 (n=384) NS with the mean age of 22.1 ± 1.8 yrs and mean academic GPA of 3.2 ± .4 majority of the students have moderate level of PA and moderate sleep problem followed by low level of PA and severe sleep problem. Moreover, this study also observed that majority of the NS (62.2%) moderate level of PA with (81%) moderate level of PS and (67.2%) moderate sleep problem. Moreover, there is significant association between PA and SQ (p<0.05) whereas, no significant association among the PA and perceived stress (p>0.05). A similar study done in Jeddah nursing College (CON-J) by Eman Bajamal et al suggested that there is Saudi university students have alarmingly high levels of poor sleep quality and low levels of physical activity, with a gender gap that is especially noticeable among females given that 85.1% of participants were female [19]. Continuing, our present study also suggested that there is moderate sleep problem among the physically inactive students as majority of the physically inactive students are female followed by boys. Likewise, a study 75.6% of students in a 2019 study by Santose M et al. from a public institution in southern Brazil reported having poor sleep quality. Interestingly, the study found that students who engaged in free-time physical activity (FTPA) one to seven times a week had far better sleep outcomes than those who did not [20]. Relating to this study, we observed that most of the students who falls in the 2<sup>nd</sup> category of IPAQ have better sleep quality in contrast to those who falls in 1<sup>st</sup> category of IPAQ. Xiaohong Liu et al stated Both high-intensity and low-intensity exercise may enhance the quality of sleep; 31.5% of respondents reported very good sleep quality, whereas 30.1% reported poor sleep

quality [21]. The results of this research are same to that of our research which makes the physical activity an important factor for improving the sleep quality. According to a recent survey, the prevalence of physical inactivity among male and female King Khalid University students was 58.0% and 42.0%, respectively. In the current study, women were less likely than men to participate in intense physical exercise. In all, 58.0% of the pupils did not engage in physical activity. Just 13.4% of the students engaged in strenuous physical activity, 14.8% in moderate-intensity physical activity, and 29.9% in walking activities that satisfied the World Health Organization's standards for physical activities that improve health [5]. Additionally, A study conducted on college Students discovered that physical activity had a direct and substantial impact on sleep quality. Even after controlling for mediating factors, physical activity continued to significantly and favorably predict sleep quality; hence, there was a strong and favorable correlation between physical activity and sleep quality [22]. Sen Lin et al.'s study at Xi'an Jiaotong University's School of Humanities and Social Sciences in China found a favorable correlation between physical exercise and both sleep quality and subjective wellbeing [23]. Continuing with the different research's on the benefits of PA, our results also suggested there is significant positive association between PA and SQ of the NS in Peshawar. The key findings of our present study is consistent with According to a study by Serge Brand P,hD, et al., adolescents who exercised less were more likely to have poor sleep and psychological functioning than adolescents who reported better sleep patterns and psychological functioning [24].

On the other hand, a research carried out in Kuala Lumpur, Malaysia, found that just 30% of participants engaged in physical activity that improved their health, while 54% of participants

slept poorly and almost half were marginally active (43.3%). However, there was no significant correlation ( $p>0.05$ ) between the degree of physical exercise and the quality of sleep [25]. Meanwhile, our study concluded, positive significant association ( $p<0.05$ ) among the PA and SQ, even after including variables like academic year we still concluded that those students who have physical activity had enhanced SQ in relation to the physically inactive students.

### CONCLUSION

This study demonstrated that among nursing students in Peshawar, physical activity is significantly associated with better sleep quality, while no significant association was observed with perceived stress. Most students exhibited moderate levels of physical activity, moderate perceived stress, and moderate sleep problems. Male students and those in higher academic years were more likely to engage in moderate to high physical activity. These findings emphasize the importance of promoting regular physical activity among nursing students as a strategy to improve sleep quality and overall well-being. Interventions targeting increased physical activity may help mitigate sleep disturbances and enhance the academic and clinical performance of nursing students.

### LIMITATIONS

We would really like to highlight numerous shortcomings in this study. This survey became performed at a single geographic area Peshawar involving only nursing students and institutions. Only 384 undergraduate nursing students were decided to survey which is consider as a small sample size with lack of postgraduate nursing students as well as there was also funding issue for the completion of this project.

**SOURCE OF SUPPORT:** Nil

**CONFLICT OF INTEREST:** None

### REFERENCES

Cornine, A., *Reducing nursing student anxiety in the clinical setting: An integrative review*. Nursing education perspectives, 2020. **41**(4): p. 229-234.

- Yildirim-Hamurcu, S. and F. Terzioğlu, *Nursing students' perceived stress: Interaction with emotional intelligence and self-leadership*. Perspectives in psychiatric care, 2022. **58**(4): p. 1381-1387.
- Bull, F.C., et al., *World Health Organization 2020 guidelines on physical activity and sedentary behaviour*. British journal of sports medicine, 2020. **54**(24): p. 1451-1462.
- Al-Hazzaa, H.M., *Physical inactivity in Saudi Arabia revisited: A systematic review of inactivity prevalence and perceived barriers to active living*. International journal of health sciences, 2018. **12**(6): p. 50.
- Awadalla, N., et al., *Assessment of physical inactivity and perceived barriers to physical activity among health college students, south-western Saudi Arabia*. East Mediterr Health J, 2014. **20**(10): p. 596-604.
- Memon, A.R., et al., *The effectiveness of an incentivized physical activity programme (active student) among female medical students in Pakistan: a randomized controlled trial*. J Pak Med Assoc, 2018. **68**(10): p. 1438-45.
- Pengpid, S., et al., *Physical inactivity and associated factors among university students in 23 low-, middle-and high-income countries*. International journal of public health, 2015. **60**(5): p. 539-549.
- Tsai, L.-L. and S.-P. Li, *Sleep patterns in college students: Gender and grade differences*. Journal of psychosomatic research, 2004. **56**(2): p. 231-237.
- Azad, M.C., et al., *Sleep disturbances among medical students: a global perspective*. Journal of clinical sleep medicine, 2015. **11**(1): p. 69-74.
- Rimmele, U., et al., *The level of physical activity affects adrenal and cardiovascular reactivity to psychosocial stress*. Psychoneuroendocrinology, 2009. **34**(2): p. 190-198.
- Saeed, S.A., D.J. Antonacci, and R.M. Bloch, *Exercise, yoga, and meditation for depressive and anxiety disorders*. American family physician, 2010. **81**(8): p. 981-986.
- Saeed, A.A., et al., *Perceived stress and associated factors among medical students*. Journal of Family and Community Medicine, 2016. **23**(3): p. 166-171.

- Yilmaz, D.A., et al., *Examination of the relationship between physical activity, perceived stress and sleep quality of Nursing students: a cross-sectional and correlational study*. Herkes için Spor ve Rekreasyon Dergisi, 2024. 6(1): p. 1-8.
- Wright, L.J., J.J. Veldhuijzen van Zanten, and S.E. Williams, *Examining the associations between physical activity, self-esteem, perceived stress, and internalizing symptoms among older adolescents*. Journal of adolescence, 2023. 95(6): p. 1274-1287.
- Saintila, J., et al., *Association between sleep duration and burnout in healthcare professionals: a cross-sectional survey*. Frontiers in Public Health, 2024. 11: p. 1268164.
- Marín-Lagos, K., et al., *Relationship between stress levels, sleep quality, and physical activity in medical university students*. ARS MEDICA Revista de Ciencias Médicas, 2024. 49(4): p. 14-21.
- Sepdanius, E., et al., *Relationship between physical activity, stress and sleep quality and emotional intelligence*. International Journal of Human Movement and Sports Sciences, 2023. 11(1): p. 224-232.
- Olufemi, B.S., et al., *Effect of Aerobic Exercises on Body Composition, Perceived Stress Level and Sleep Quality*.
- Bajamal, E., et al. *The Association Between Physical Activity and Quality of Sleep Among Nursing Students in Saudi Arabia*. in Healthcare. 2025. MDPI.
- Santos, M., et al., *Relationship between free-time physical activity and sleep quality in Brazilian university students*. Scientific Reports, 2023. 13(1): p. 6652.
- Liu, X., et al., *Poor sleep quality and its related risk factors among university students*. Annals of palliative medicine, 2021. 10(4): p. 4479485-4474485.
- Yin, J., et al., *To explore the relationship between physical activity and sleep quality of college students based on the mediating effect of stress and subjective well-being*. BMC psychology, 2025. 13(1): p. 1-10.
- Lin, S., et al., *Physical exercise and undergraduate students' subjective well-being: mediating roles of basic psychological need satisfaction and sleep quality*. Behavioral Sciences, 2022. 12(9): p. 316.
- Brand, S., et al., *High exercise levels are related to favorable sleep patterns and psychological functioning in adolescents: a comparison of athletes and controls*. Journal of adolescent health, 2010. 46(2): p. 133-141.
- Saat, N., et al., *Sleep quality among university students: associations between demographic factors and physical activity level*. International Journal of Pharmaceutical Research and Allied Sciences, 2020. 9(3-2020): p. 57-65.