

Association Between Quality and Duration of Sleep and Academic Performance of Undergraduate Nursing Students

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Abstract

Background: Low quality of sleep is now becoming an epidemic among nursing population due to their busy work schedule and also many other factors may contribute to poor sleep among nursing students. As nursing students are the future of our healthcare system, therefore, this problem needs to be addressed in order to overcome the negative effects caused by poor sleep both on cognitive as well as physical health.

Objective: To determine the mean duration of sleep among undergraduate nursing students, to assess the quality of sleep using PSQI and its relationship with academic performance in terms of GPA, to identify factors associated with poor quality of sleep among undergraduate nursing students.

Methodology: An analytical cross-sectional study that was carried out in Peshawar. Data was collected from three nursing colleges in Peshawar such as Rufaidah Nursing College, Rahman College of Nursing and Northwest College of Nursing. A total of 293 students participated in the study. The study was approved from the IRB of Peshawar medical college. A written consent form was signed from every participant in the study. Pittsburgh Sleep Quality Index was used to identify duration and quality of sleep and self-reported GPA scale was used to find out GPA of the participants. **Results:** A total 293 participants participated in the study. The sample comprised of 60.8% males (n=178) and 38.6% females (n=113), with the majority of aged 18-2 years (66.9%). Most of the participants lived in hostels (59.7%), consumed caffeinated beverages (85%), and used electronic devices before sleeping (91.1%). Regarding academic performance, 74.8% had a GPA of 3.0 or above, and 70.6 % believed that sleep quality affects academic performance. Nursing students reported an average sleep duration of approximately 6.5hrs at night (C3_Ts: M=6.49, SD=1.25), which falls below the recommended 7-9hrs for adults. The sleep duration PSQI score (M= 1.05, SD=0.74) corresponds to the 6-7hrs category on the standardized scale and concurrently the global PSQI score (M=11.24, SD=2.54) indicates overall poor sleep quality across the sample, with all the participants scoring above the score of 5 on PSQI scale. All the nursing students participated in the study had poor sleep quality. Female nursing students had significantly poor sleep quality as compared to males (PSQI=10.78), Living arrangement, caffeine intake and screen use show no significant association with sleep quality but there existed a weak but significant relationship between poor sleep quality and academic performance (r=0.193, p= 0.001).

Conclusion: In conclusion poor sleep quality has major effect on female students as compared to males and it has an association between poor GPA scores while other mediating factors such as lifestyle, caffeine consumption and environment show no significant relationship between sleep quality therefore nursing students needs to be aware of the harmful effects of poor sleep on the overall health of them and they are needed to be trained for sleep hygiene practices.

Background:

Sleep is a basic human requirement as it is necessary for the bodily functions to work correctly. We all humans need to drink and eat in order for our survival and sleep is also one of them. If we do not sleep well our bodily functions will disrupt which may have many devastating effects on human body because sleep is one of the most important factor which is needed for our growth and development. A research study showed that all living organisms needs to sleep in order to survive except sharks. (1). As a human being our body needs 8hrs of sleep at night to maintain our bodily functions because sleep is the basic requirement to maintain our psychological, mental, cognitive and overall physical health. It plays a major role in growth and development (2)(3). Sleep quality can be linked with sleep deprivation. Many studies conducted on college students revealed that they sleep more on weekend as compared to other days due to which they have many psychological and cognitive problems (4). Many studies showed that sleep can also have a major effect on our academic performance as well. Those students who did not take adequate amount of sleep at night they have many issues such as psychological and overall mental illnesses including sleep deprivation. Studies also showed that over 60% of college students have poor quality of sleep resulting in an increased amount of health problems such as physical and psychological (5). In most of the beginning years of colleges most of the students were greatly affected from poor sleep because they took bad quality and low duration of sleep which resulted in sleep deprivation. Recent studies showed that use of media devices such as mobile phones. Tablets, laptops and other electronic media devices can have greater influence on college students and most important consequence is sleep deprivation (6). Sleep deprivation is most commonly seen in medical students due to their excessive intake of caffeine and smoking due to high academic load and stress levels. Those factors which can cause sleep deprivation are obesity, long working hours and excessive use of electronic media devices. Studies also showed that sleep deprivation can cause diseases such as gastrointestinal diseases, cardiac problems, peripheral distortion, systemic inflammation and depression (7). According to a study, most of the sleep related problem occurred in medical students. A study in Canada and united states which was based on 40 revised studies showed a consistent high amount of psychological problems in medical students (8). According to national sleep foundation in USA, around 80% of who took good amount of sleep had high grades as compared to those students who suffered from daytime sleepiness and other sleep problems (9)(10). Most of the university students faced significant amount of mental problems such as anxiety, depression and stress(11)(12). Researches on mental problems and other psychiatric illnesses have greater linkages with poor sleep. From the past two decade this problem persisted and it is an area of greater interest that needs to be addressed (13). A study conducted in US showed that insomnia effects 33% of adults where in Europe the data is in between 4% to 22% which mostly effected the women population (14). Studies from middle east and north Africa revealed that 59.1% medical students suffer from poor sleep(15). According to research conducted in different regions the insomnia prevalence among college students ranges from 9.4% to 56.7% (5). Another study from Peshawar also revealed that among 270 nursing students 72.6% students had poor sleep (16). Many nursing students have poor quality of sleep due to prolonged courses and high demanding schedules (17).

Problem Statement:

Nursing students suffer from poor sleep due to academic workload, stress and heavy work schedules. Poor sleep quality has greater influence on academic performance as well as mental health. Proper sleep is required for the body to function properly because sleep has a restorative function which is required for the body to maintain proper health, moreover it can also influence our psychological, sociological and physiological functions. Many studies revealed the linkage of poor sleep with psychiatric illnesses including anxiety, depression and stress. Sleep deprivation is also linked with prolonged electronic media devices such as mobile, pcs and laptops. It can also affect our GI, cardiovascular and immune functions because sleep plays a vital role in regulation of mood and immune function. Despite the significance of the problem there is low empirical data present primarily on the linkage of sleep quality and duration with academic performance due to which it is difficult for the policy makers to make significant policies to address this issue. Therefore, this study will reveal the relationship of poor sleep quality with academic performance which will give valuable insights for the policy makers to make a stand on this increasing epidemic as it is a global concern which needs to be addressed.

Rationale:

Sleep deprivation among nursing students is a major concern which needs to be addressed because there is low local evidence specially in Peshawar, Pakistan on this topic .Our study will be used to address this issue and fill the gap because high academic stress can effect sleep/wake cycles which can lead to certain problems including poor concentration, poor critical thinking skills and mood problems because sleep also regulates mood there understanding this relationship is crucial and our study will be used to correlate it with academic performance. Our study will also be used to analyze poor sleepers and good sleepers of PSQI score greater than 5 and less than 5 respectively. This study gives clear local evidence to fill this gap.

Literature Review

This chapter will provide a complete evaluation of the local studies and international studies which will provide an evidence of sleep quality and quantity of university students with the primary emphasis on nursing students who are currently enrolled in BSN programs and health care students. In this research we will identify the relationship of sleep quality and quantity with academic performance in terms of GPA and will also identify the related factors with poor sleep such as lifestyle factors, work load and stress, academic stress as well as caffeine intake. The findings will provide an insight for the policy makers to make specific judgments regarding the severity of the problem which is increasing day by day due to negligence by students.

Search Strategy:

The literature review was searched with PubMed, Google scholar, Science direct, research gate, CINAHL and PAKMEDiNET were searched using Boolean combinations of keywords related to sleep quality, academic performance and nursing education. The search was limited to peer-reviewed articles published from 2015-2024. After removing duplicates and screening titles and abstracts against inclusion criteria, 88 full text articles were assessed for eligibility, resulting in 23 studies included in final review. The complete selection process is illustrated in the PRISMA chart which illustrates the identification, screening, eligibility assessment, and inclusion phase of this systematic review.

Academic Performance and Poor Sleep:

A study conducted in Germany by Schmikler et al in 2023 which was cross-sectional study on university students identified multiple determinants of poor sleep such as stress, irregular schedules, and high screen usage which was linked with poor academic performance. A sample of 1684 was taken which showed the poor sleepers percentage of 48.7% in which the female students showed high chances of low academic performances as compared to male students and also other studies conducted on medical and health sciences reported high incidence of poor sleepers and significant negative correlations in between PSQI and academic performance. These studies repeatedly identified exam periods, clinical rotations, and heavy course loads as a key contributor to sleep deprivation (18).

Furthermore, another study in 2023 published in *Frontiers in Public Health*, Angelillo et al. evaluated sleep quality among university students. The study design was cross l which identified the relation of poor sleep with academic scores and was considered very common , effect sizes and strength of associations vary between contexts which also suggests important roles of culture, institution and lifestyle factors(19).

Moreover another study from Pakistani medical and health student surveys highlighted the PSQI scores of students were greater than 5 and theses were linked with stress, depressive symptoms and poor academic scores. A 2024 PAFMJ study revealed that medical students experience deviations in their sleep patterns more and it was directly linked with poor score in academics(20). Another study from Islamabad and Rawalpindi showed that most of the students had academic stress which directly caused poor sleep(21).

Poor Sleep Quality and Duration:

Many studies revealed the relation of shorter duration of sleep with(<7hrs) with academic performances and poor attention(19) (22). Poor sleep is common problem among university and college students and is often associated with poor grades (18). A study conducted in US showed that insomnia effects 33% of adults where in Europe the data is in between 4% to 22% which mostly effected the women population (14).

Another study conducted in Parana, Brazil identified the linkage of poor sleep with stress in which total of 213 nursing students participated in the study which showed the overall percentages of burnout syndromes, excessive daytime sleepiness and poor sleep quality of 4.7%, 34.7% and 58.7% respectively(23).

According to a study from Ethiopia poor sleep can also cause major health problems including cardiovascular problems. A study conducted in this country which was based of 586 study participants showed sleep deprivation of 68.4% which was linked with caffeinated drinks consumption and lifestyle factors(24) .

A study conducted in China showed the overall prevalence of poor sleep which was 75.6% same as the US but higher than Malaysia (58.1%), Pakistan (57%), Lebanon (52.7%) and Saudi Arabia (49%).

Another conducted in Saudi Arabia showed the prevalence of poor sleepers and their associations with stress and academic performance in which the data was collected from medical students in which most of the students acquired total sleep of 5.8hrs of sleep at night in which 8% students reported to sleep during the day and not during the night time, students with poor sleep quality were about 30%, excessive daytime sleepiness in 40% of students and insomnia symptoms in 33% of students(8).

Associated factors with Poor Sleep:

Longer time to fall asleep and greater sleep disturbances are linked with daytime disturbances and disturbed mental health which has direct impact on academics and overall mental functioning (25). Researches from Saudi Arabia and other gulf countries from 2022-2024 documented high scores of PSQI among medical and health students; many studies link late night smartphones use, early clinical shifts, and increased caffeine intake to worse sleep and poorer self-reported academic performance (26).

Studies from Indonesia and other south-east Asian studies from 2020-2024 showed similar patterns like poor sleep prevalence often exceeded from 40-60% among health-faculty students, and poor sleepers report more daytime dysfunction and lower grades (27).

Studies from Nepal and Bangladesh also concluded that the PSQI score were higher than 5 and the percentages of poor sleepers were in between 40-65% and it was greatly associated with daytime dysfunction, mood symptoms, and academic work stress which caused poor scores(28).

Regional studies also highlights the role of cultures, family responsibilities, social distancing, heavy workload and part time shifts lifestyles factors as major contributors sleep deprivation. This importance needs to be highlighted as poor sleep can also affect our physiological functions as well(10)(29) (30).

Local cross-sectional study from Lahore at CMH was conducted in which 41 willing students were included in the study which revealed that 89% students reported that they needed more sleep(21). There are many factors that can influence sleep and academic performance some of the mediators are discussed below:

Stress and Mental Health: Stress is directly linked to many problems such as poor sleep, psychological problems, and depressive episodes and most importantly can cause severe symptoms related to psychosis. It can directly influence academic performance (31)(32).

Clinical Workload: Nursing as well as other medical personnel are at risk for sleep deprivation due to their excessive working hours and consistent shift changes as compared to people enrolled in other programs(33).

Screen Time and Substance Use: Excessive use of electronic media device is also linked with poor sleep(34).

Summary of Literature Gaps: Most of the studies primarily focuses on medical student or other health care professionals but very few studies or literature is present on BScN students particularly on the linkage of Gpa and poor sleep specifically in Peshawar there are literally no studies available to fill the gaps and identify the factors associated with poor GPA of nursing students primarily enrolled in a nursing institution. There are some Pakistani studies are available on this topic but no one has identified it in Peshawar or other region of Pakistan except for Islamabad, Lahore, in Peshawar only one college but they also didn't found the relation of sleep with GPA therefore a comprehensive study is needed for this purpose to evaluate the problem and fill the gap also there are no studies which collectively identified the relationship of academic performance with other moderators as living condition, clinical duties and lifestyle factors. There is also minimal interventional studies which tell us the fact that improvement in sleep can influence academic performance or not. This gap needs to be filled by assessing the associations between the factors specifically in Peshawar. However, many studies significantly from all over the world shows significant relation and effect of poor sleep on many factors in university students. Despite this data primarily on students from Peshawar is limited and also very few studies have use the PSQI

tool in their study. The present research is designed to evaluate these factors and identify the areas that needs to be improved.

Methodology

Research Design

This study uses an analytical cross sectional design to evaluate the prevalence as well as identify the associations of GPA and other factors with sleep.

Study Setting

Data was collected from:

1. Northwest College of Nursing
2. Rufaidah Nursing College
3. Rehman College of Nursing

Population

The population was BSN students who were currently enrolled in an institution.

Sample Size and Sampling Technique

Convenience sampling technique was used for the selection of the participants.

The sample size is 292 having a confidence interval of 95% and margin of error of 5% with a total population of 1200.

The sample size was calculated using the web version of Raosoft sample size calculator. The population was based on three private college in Peshawar each having total students of 400 with a total population of 1200.

Inclusion and Exclusion Criteria

Inclusion Criteria:

1. BSN students currently enrolled in any semester at private nursing colleges in Peshawar.
2. Students who have completed at least one semester and have academic performance records available.
3. Students willing to participate and provide informed consent.

Exclusion criteria:

1. Students diagnosed with sleep disorders or psychiatric illnesses (e.g., insomnia, anxiety disorders) prior to enrolment in the nursing program.
2. Students on medication that affects sleep patterns (e.g., sedatives, stimulants).
3. Students currently on academic leave or suspension

Data Collection Tool

The full version of the PSQI consists of 19 self-rated items assessing sleep duration, latency, disturbances, and daytime dysfunction. The global score ranges from 0–21, with scores >5 indicating poor sleep quality.

Data Collection Procedure

Data was collected using a questionnaire consisting of two parts. **Part A:** Demographic variables and self-reported CGPA. It was assured for accuracy. Confounding variables such as part time jobs, caffeinated drinks and mobiles excessive use.

Part B: Full version of PSQ was used.

A permission letter was signed by the head of each hospital from where data was collected. Informed consent was obtained from each participant in written form before data collection. The participants were autonomous in whether to be a participant and have the right to withdraw their participation at any time.

Data Analysis

The data collected was analyzed using SPSS version 22.0.

Descriptive statistics Mean, SD, frequencies and percentages were used for demographic variables.

T-test for comparing mean GPA across groups with different sleep durations.

ANOVA for comparing GPA across sleep quality categories.

Chi square for associations between categorical variables.

Pearson correlation was applied to examine relationships between sleep duration, quality, and academic performance. t-test for mean academic performance and duration of sleep, ANOVA and chi square can all be used for testing the significance of various associations between key variables.

Ethical Considerations

1. Written informed consent was obtained from all participants, including participant's name and signature (College name will not be required) is not optional and is required.
2. Data was anonymized and securely stored.
3. Participants were allowed to withdraw at any time
4. Approval was obtained from an Institutional Review Board (IRB)
5. Confidentiality and data protection was strictly ensured.

Results / Findings

The study was analytical cross sectional study in which data was collected from three nursing colleges in Peshawar such as Northwest College of nursing, Rahman College of Nursing, and Rufaidah Nursing College. The study duration was from September 2025 to December 2025.

Demographic Profile of Subjects:

A total of 293 undergraduate nursing students participated in the study. The demographic and lifestyle characteristics of participants are summarized from fig 1.1 to fig 1.9. The sample comprised of 60.8% males (n=178) and 38.6% females (n=113), with the majority of aged 18-2 years (66.9%). Most of the participants lived in hostels (59.7%), consumed caffeinated beverages (85%), and used electronic devices before sleeping (91.1%). Regarding academic performance, 74.8% had a GPA of 3.0 or above, and 70.6 % believed that sleep quality affects academic performance.

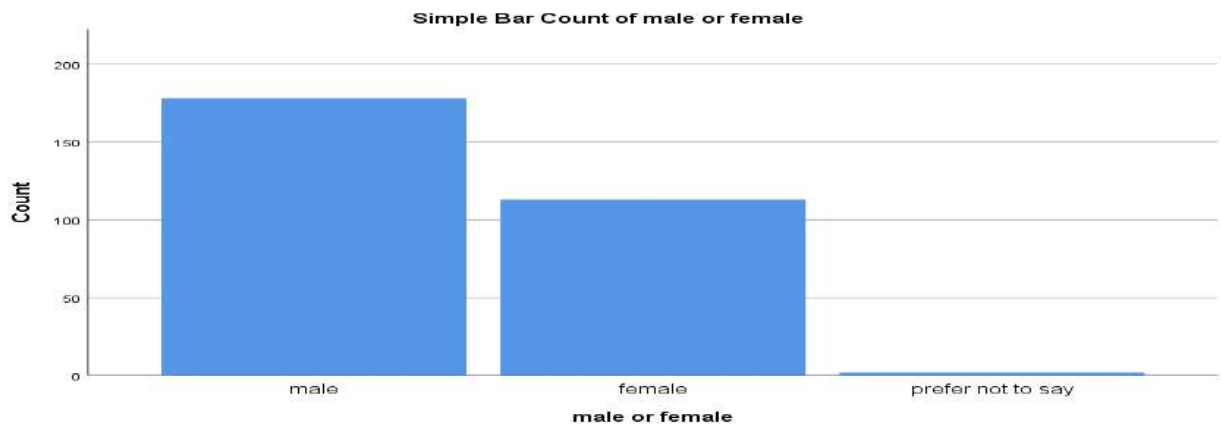
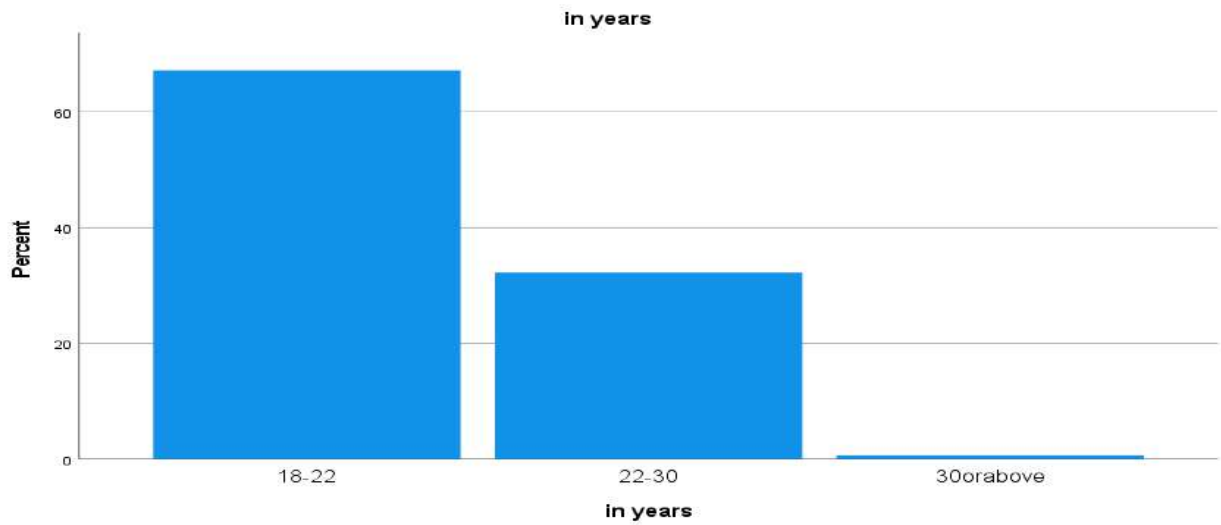
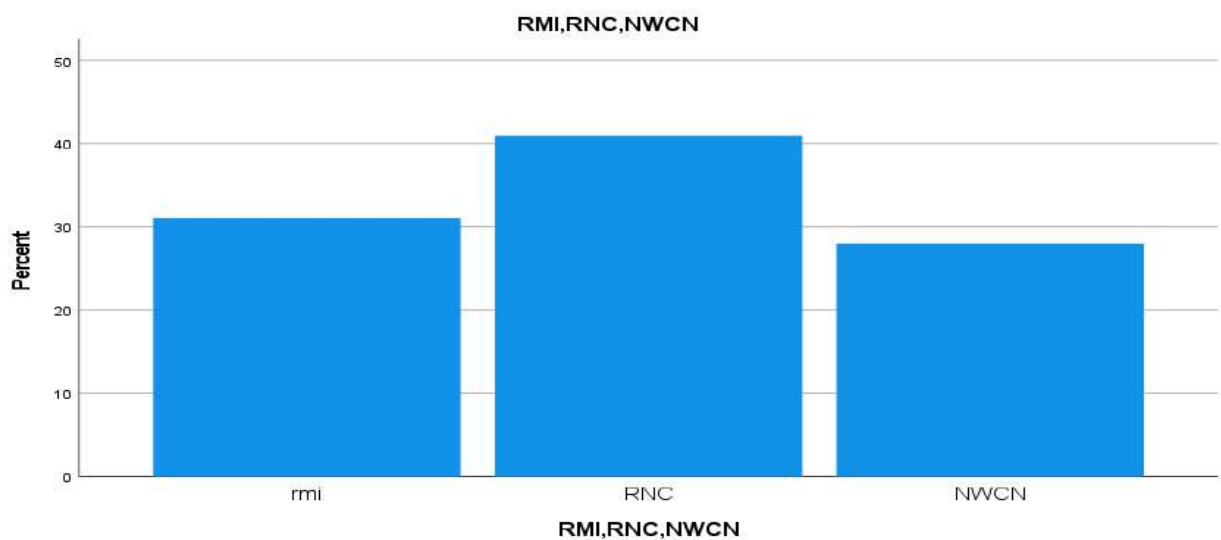
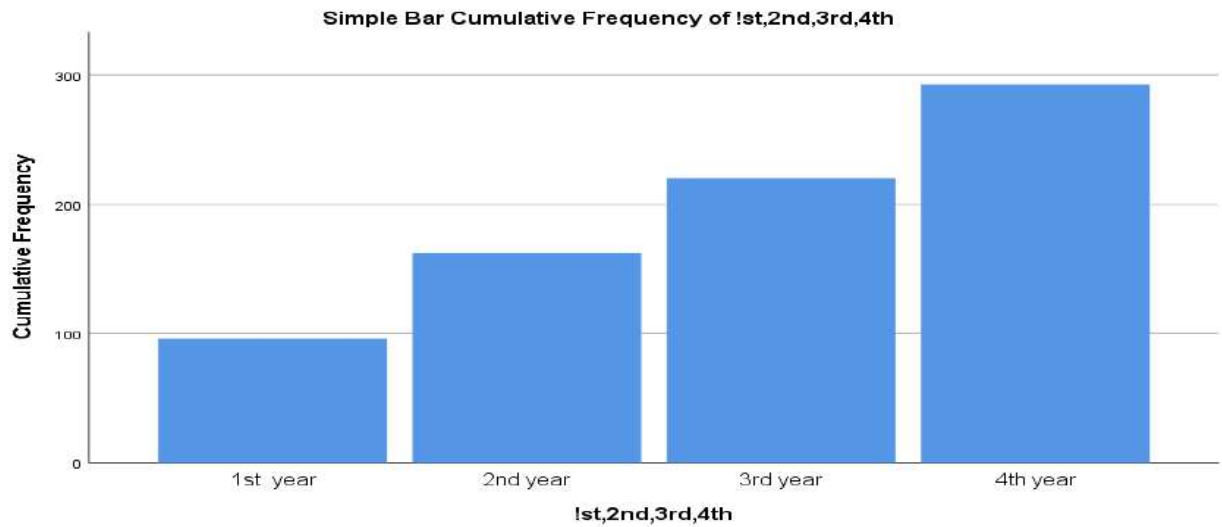
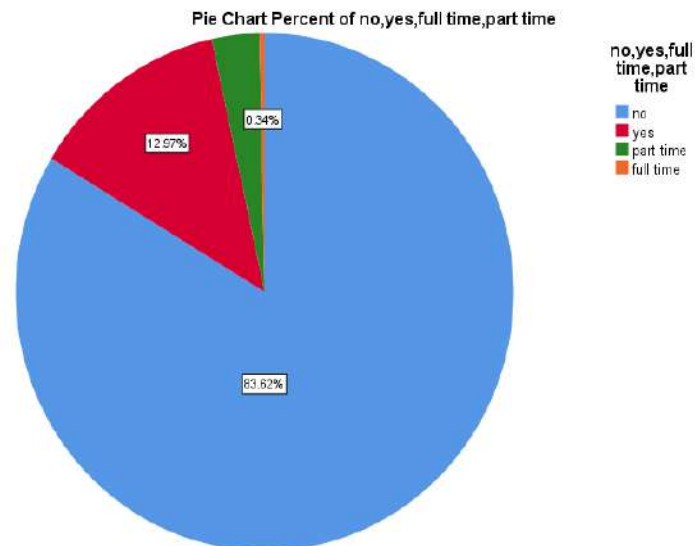
FIG: 1.1**FIG 1.2 : Age in years****FIG 1.3: Colleges**

FIG 1.4: Study years**FIG 1.5: Current job condition****FIG 1.6**

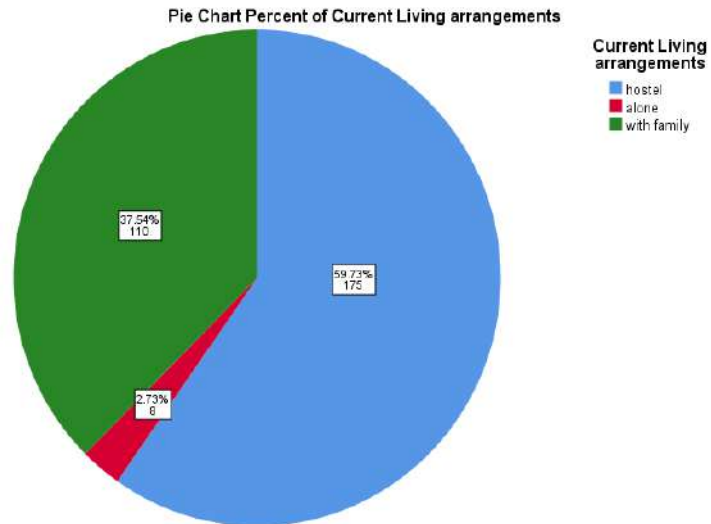


FIG 1.7: Caffeine Intake

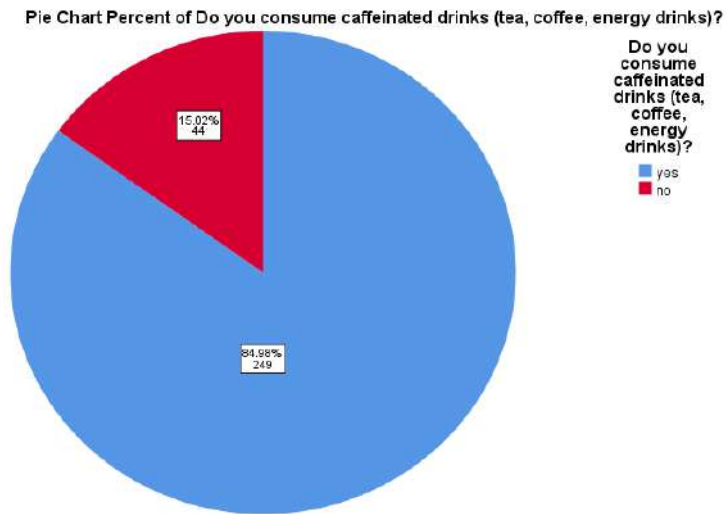


FIG 1.8

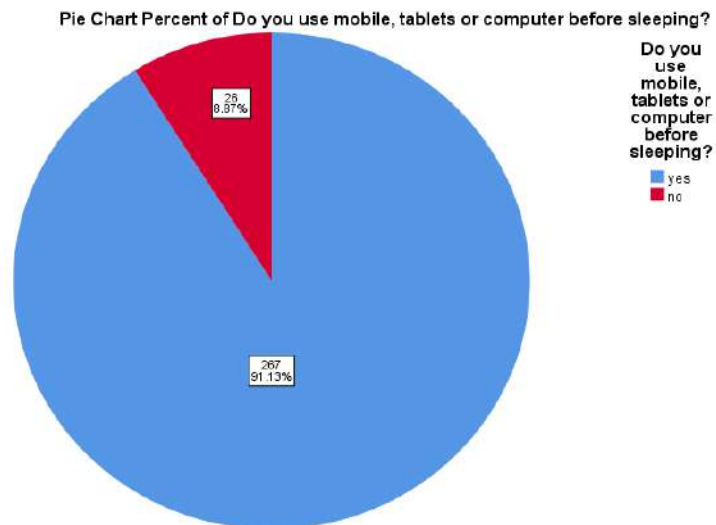


FIG 1.9

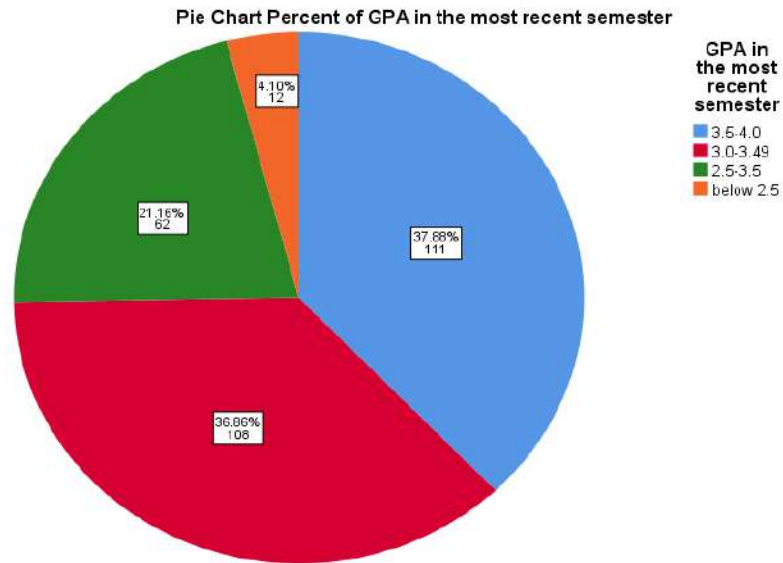
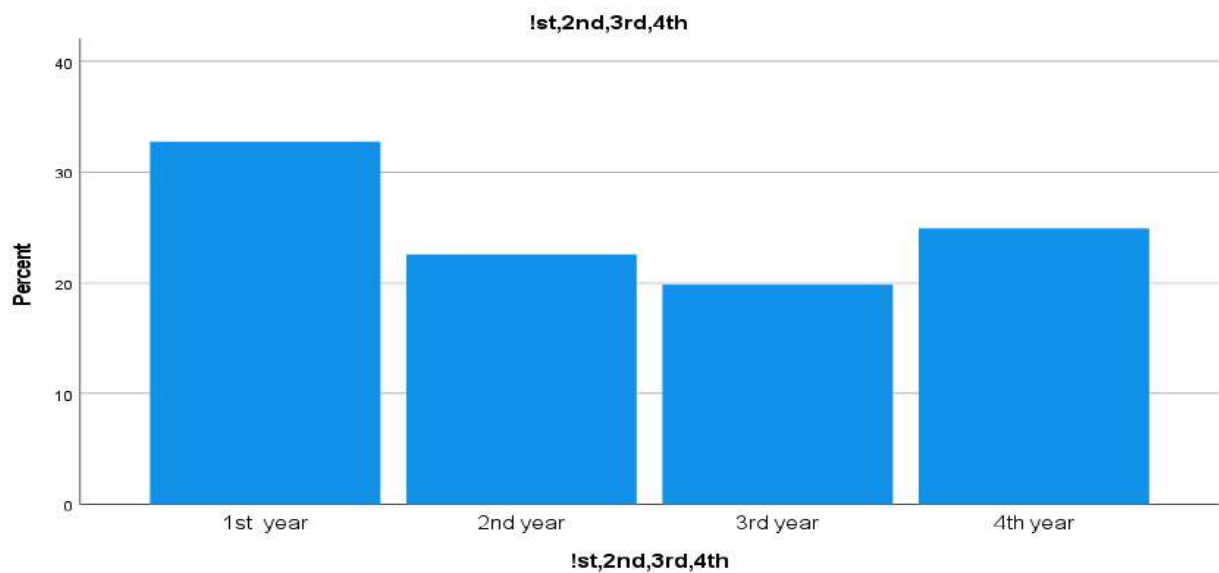
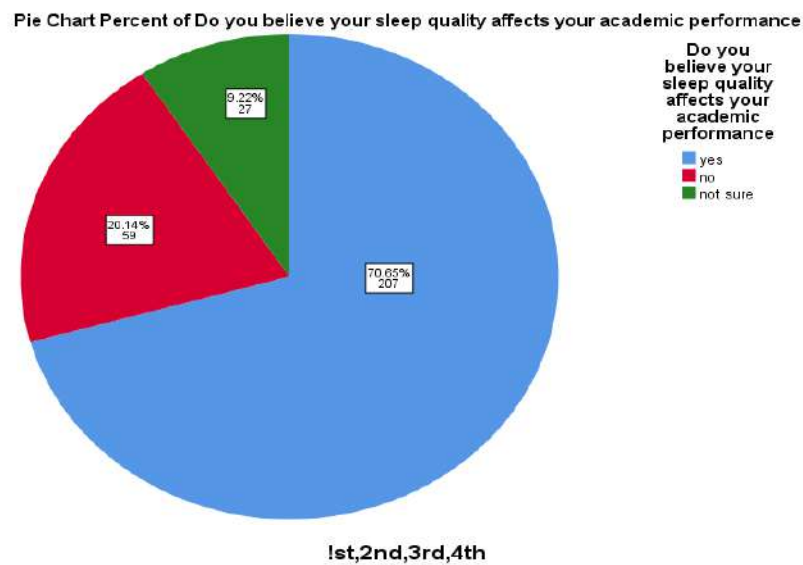


FIG 1.10



Sleep Duration:**Table 2.1: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Sleep duration	293	.00	3.00	1.0478	.74331
Global PSQI Score	293	6.00	19.00	11.2423	2.54399
C3_TS	293	2.00	9.00	6.4949	1.25409
N	293				

Key findings: The majority of nursing students obtain poor sleep and their sleep duration is below the recommended range.

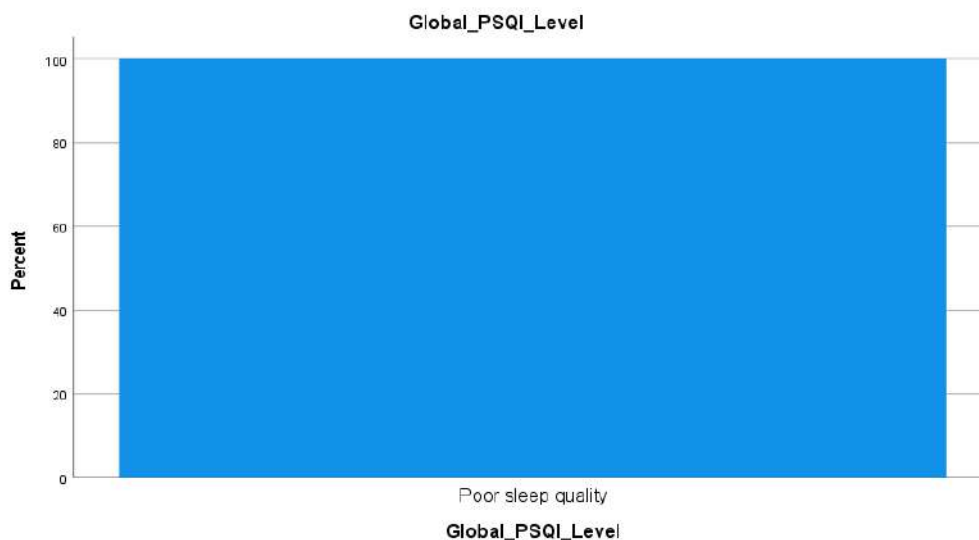
Nursing students reported an average sleep duration of approximately 6.5hrs at night (C3_Ts: M=6.49, SD=1.25), which falls below the recommended 7-9hrs for adults. The sleep duration PSQI score (M= 1.05, SD=0.74) corresponds to the 6-7hrs category on the standardized scale and concurrently the global PSQI score (M=11.24, SD=2.54) indicates overall poor sleep quality across the sample, with all the participants scoring above the score of 5 on PSQI scale.

Table 2.2: PSQI Results ,descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
C1_TS	293	.00	3.00	1.0102	.89704
C2_TS	293	.00	3.00	1.1126	.79658
C3_TS	293	2.00	9.00	6.4949	1.25409
C4_SET	293	.00	3.00	.0751	.44701
C5_TS	293	.00	3.00	1.2799	.61669
C6_TS	293	.00	3.00	.6314	.70757
C7_TS	293	.00	3.00	.6382	.76223

Table 2.3:Sleep Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Poor quality	sleep	293	100.0	100.0	100.0
Good quality	sleep	0	0	0	0



Key Findings: All the nursing students participated in the study had poor sleep quality.

Table 2.5: Correlation between sleep quality and GPA
Descriptive Statistics

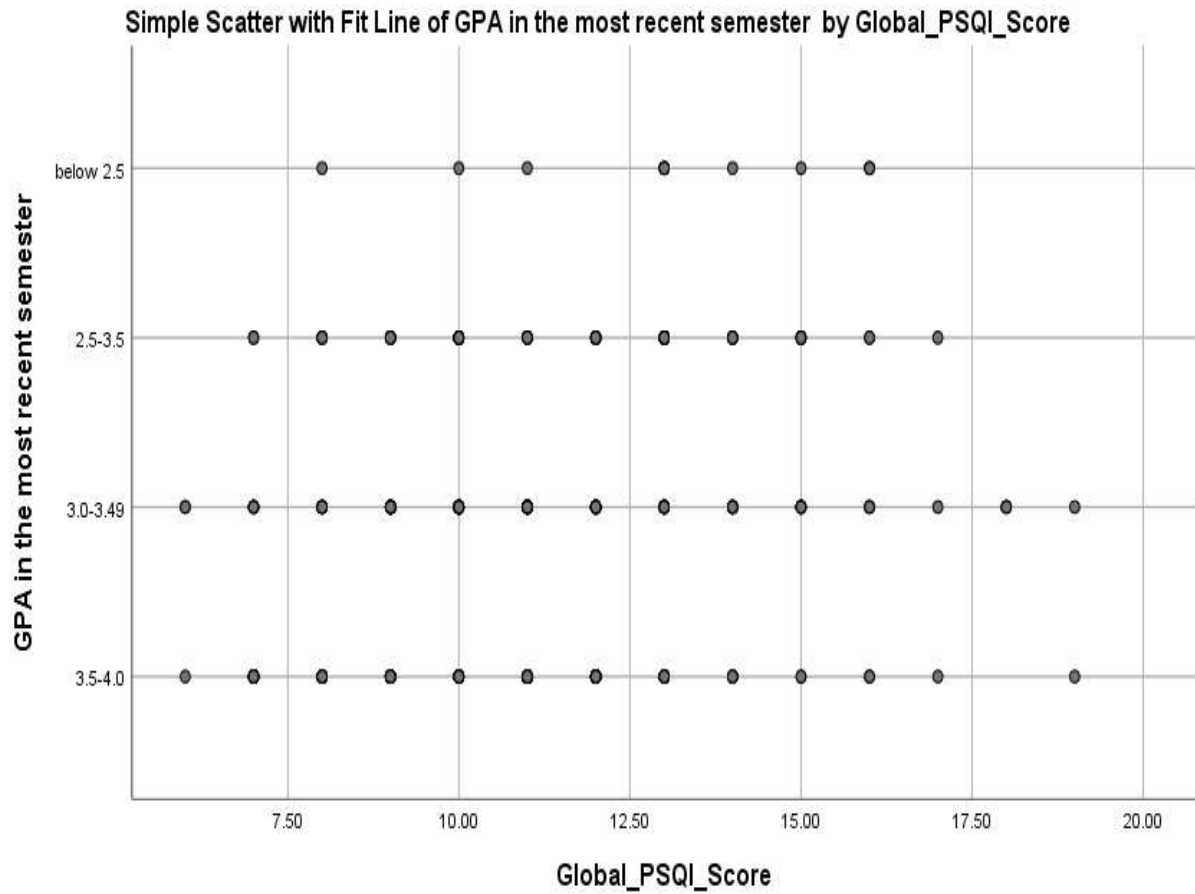
	N	Minimum	Maximum	Mean	Std. Deviation
GPA in the most recent semester	293	1	4	1.91	.866

Table 2.6

		GPA in the most recent semester	Global PSQI Score
GPA in the most recent semester	Pearson Correlation	1	.193**
	Sig. (2-tailed)		.001
	N	293	293
Global PSQI Score	Pearson Correlation	.193**	1
	Sig. (2-tailed)	.001	
	N	293	293

Key Finding: Correlation is significant at the 0.01 level (2-tailed).

All 293 students had poor sleep quality (PSQI>5). A weak but significant correlation exists ($r=0.193$, $p= 0.001$) between GPA and PSQI, indicating poor sleep is associated with lower academic performance.



Factors associated with poor sleep quality

Table 2.5:

Group Statistics

	male or female	N	Mean	Std. Deviation	Std. Error Mean
Global_PSQI_Score	male	178	10.7753	2.43910	.18282
	female	113	11.9912	2.53721	.23868

Table 2.7:

Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower Upper
Global_PSQI_Score	Equal variances assumed	.442	.507	.235	291	.814	.09794	.41670	-.72220 .91807
	Equal variances not assumed			.244	61.236	.808	.09794	.40064	-.70354 .89941

Female nursing students had significantly poor sleep quality as compared to males (PSQI=10.78), with a mean difference of 1.22 points ($t = -4.08$, $p < 0.001$). The 95% CI (-1.80 to -0.63) confirms this significant difference does not include zero.

Non- Significant Factors:

Table 2.8:

Factor	Test	Statistic	P-value
Living arrangement	Anova	F(2,290) =1.062	0.347
Caffeine consumption	t-test	t(291) =0.235	0.814
Screen use	t-test	t(291) =0.185	0.853

Living arrangement, caffeine intake and screen use show no significant association with sleep quality.

Discussion

Summary and Key Findings:

This study investigated poor sleep quality and duration which can be effected by certain lifestyle factors and can have a major influence on the academic performance of nursing students. Our results revealed that nursing students slept 6.5hrs at night with 79.5% obtaining less than the recommended 7 hours of sleep at night and most importantly all the students involved in the study demonstrated universal poor sleep quality (100%) scoring above the PSQI clinical cutoff. A weak but significant correlation was found between poor sleep quality and academic performance. Only gender was associated with poor sleep quality, with female students reporting significantly worse sleep than their male counterparts. Contrary to expectations, lifestyle factors including caffeine consumption and screen use before bedtime showed no significant association with sleep quality. The sample comprised of 60.8% males ($n=178$) and 38.6% females ($n=113$), with the majority of aged 18-2 years (66.9%). Most of the participants lived in hostels (59.7%), consumed caffeinated beverages (85%), and used electronic devices before sleeping (91.1%). Regarding academic performance, 74.8% had a GPA of 3.0 or above, and 70.6 % believed that sleep quality affects academic performance. The study also showed that 100% of students participated in the study

were poor sleepers and showed association with lower grades. The finding of this research is highlighted that female students are more prone to lower grades and poor sleep as compared to males which is also highlighted in a similar study conducted in Germany which was cross-sectional study on university students identified multiple determinants of poor sleep such as stress, irregular schedules, and high screen usage which was linked with poor academic performance. A sample of 1684 was taken which showed the poor sleepers percentage of 48.7% in which the female students showed high chances of low academic performances as compared to male students (18).

Other studies from Nepal and Bangladesh also concluded that the PSQI score were higher than 5 and the percentages of poor sleepers were in between 40-65% and it was greatly associated with daytime dysfunction, mood symptoms, and academic work stress which caused poor scores (28).

The findings of our study showed no significant associations between living arrangements, caffeine consumption and lifestyle factors. Contradictory to our research findings a study conducted in Saudi Arabia and other gulf countries from 2022-2024 documented high scores of PSQI among medical and health students; many studies link late night smartphones use, early clinical shifts, and increased caffeine intake to worse sleep and poorer self-reported academic performance (8).

Conclusion and Recommendations

Strengths:

1. Our study highlighted the importance of addressing the major issue which is poor sleep as it affects the academic performance of individuals as well as it has many effects on cognitive functions as well.
2. This study highlighted that most of the nursing students had poor sleep quality which was not addressed specifically in Peshawar and its associations were also not addressed with GPA as it will give valuable information for policy makers and clinicians to help them to make important judgments regarding the significance of the problem.
3. The study used PSQI which is globally recognized tool.
4. The study also gave local data on sleep quality and GPA.

Weaknesses

1. The study used convenience sampling method which can introduce selection bias of the participants and limited generalizability of findings.
2. The study used analytical cross sectional design which cannot find causation that whether poor sleep lead to lower GPA or Lower GPA lead to poor sleep.

Conclusion:

In conclusion Poor sleep quality has major effect on female students as compared to males as well as it has an association between poor GPA scores while other mediating factors such as lifestyle, caffeine consumption and environment show no significant relationship between sleep quality.

Recommendations:

1. Encourage sleep hygiene education.
2. Review academic and clinical schedules.
3. Promote friendly campus environment.
4. Establish student support system.

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