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Research Article

Role of Sleep Quality in Self-Directed Learning and Psychological Wellbeing among Medical Students

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ABSTRACT:

Aim: The aim of this study was to examine the relationship between sleep quality, self-directed learning, and psychological wellbeing among medical students. Using a correlational design and quantitative methods, the study sought to determine how sleep quality influences students' learning abilities and mental wellbeing. Standardized measures were used to assess each variable, with findings revealing significant positive associations, highlighting the critical role of sleep in supporting both educational performance and psychological health. **Methodology:** This study used a quantitative, correlational research design to examine the relationship between SQ, SDL, and PWB among medical students. Data were collected through standardized self-report questionnaires (PSQI, SDLRS, and PWB Scale) from a sample of 267 students. A convenience sampling method was used, and SPSS 25 was used to analyze the data using regression analysis, correlation, and descriptive statistics. The purpose of the study was to ascertain how SQ predicts PWB and SDL. **Results:** The data analysis shown key insights into the relationships between SQ, SDL, and PWB among medical students. Descriptive statistics confirmed the demographic composition of the sample, with no missing data and acceptable psychometric properties for all study measures. Cronbach's alpha values for the PSQI, SDLS, and PWB scales ranged from 0.67 to 0.80, indicating acceptable to good internal consistency. Correlational analysis showed significant positive relationships between sleep quality and both self-directed learning ($r = .585$, $p < .01$) and psychological wellbeing ($r = .519$, $p < .01$), as well as between self-directed learning and psychological wellbeing ($r = .610$, $p < .01$). Regression analyses further supported these associations. Sleep quality significantly predicted self-directed learning ($\beta = .585$, $R^2 = .34$, $p < .001$), accounting for 34% of the variance, and psychological wellbeing ($\beta = .519$, $R^2 = .27$, $p < .001$), accounting for 27% of the variance. These findings indicate that healthier sleep quality is associated with higher levels of self-directed learning and psychological wellbeing, highlighting its important role in academic and psychological outcomes among students. **Conclusion:** The study found significant positive associations between sleep quality, self-directed learning, and psychological wellbeing. Medical students with better sleep quality were more likely to engage in self-directed learning and reported higher psychological wellbeing. These results highlight sleep quality as a key factor supporting both academic self-regulation and mental health. Promoting healthy sleep habits can enhance student engagement and serve as a protective factor against psychological distress, reinforcing the need for institutional support and awareness initiatives targeting sleep hygiene.

Keywords:
Sleep Quality (SQ), Self-Directed Learning (SDL), Psychological Wellbeing (PWB), Self-Directed learning Readiness Scale (SDLRS), Pittsburgh Sleep Quality Index (PSQI), Psychological Wellbeing (PWB), Regression Analysis, Correlational Study

1 | INTRODUCTION

SQ, SDL, and PWB are complex phenomena with interrelated implications for human functioning. Research on both humans and animals underscores a crucial connection between sleep duration and quality, learning, and psychological wellbeing.[1] Disturbed sleep quality not only hampers attention and delays learning but also impacts psychological wellbeing, essential for acquiring new knowledge.[1] Amidst the constant influx of new information and expanding access to knowledge, self-directed learning emerges as a significant aspect of knowledge acquisition, where learners take charge of planning, implementing, and evaluating their efforts.[2] Effective self-directed learning is integral to psychological functioning, influencing behavior especially in the presence of conflicting emotions.[3] Sleep, a dynamic physiological state, plays a key role in maintaining wellbeing and health, impacting stress response, emotional control, and cognitive function.[4] Inadequate sleep is strongly linked to the risk of developing mental illness[5], yet individuals often sacrifice

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sleep for immediate gratification or perceived productivity gains.[6] Understanding the intricate relationship between SQ, SDL, and PW is essential for promoting holistic health and effective learning strategies. Researchers investigate how inadequate sleep affects learning and psychological wellbeing. When we don't get enough sleep, our focus, attention, and attentiveness wander, which makes it harder to comprehend information.[4] Overworked neurons can't appropriately organize information when they aren't given enough rest, and we can't access previously learned information when we don't get enough sleep. Additionally, it might affect our capacity for comprehension. We become incapable of making intelligent decisions because we are unable to adequately assess the situation, plan effectively, and choose the proper course of action.[7] Poor judgment occurs. If we are constantly worn out to the point of tiredness, we are less likely to perform properly. The body's organ systems are not synchronized, muscles are not well-rested, and neurons are not functioning at their peak. Lack of sleep might potentially cause accidents or injuries because to focus lapses.

2 | LITERATURE REVIEW

A therapeutic aspect of human physiology is sleep because that has long been recognized as being essential for both physical and mental well-being as well as a high quality of life. Sleep deficiency has negative effects on human biology including fatigue, daytime sleepiness, and impaired neurocognitive function.[8] Students' cognitive function, which includes their capacity for concentration and for estimating how long it will take them to complete assignments, is negatively impacted by sleep deprivation. Poor sleep is more common in some nations than others. Using the PSQI, it has been found to vary between 19% in a Chinese study to 55.8% in an Ethiopian study.[9] The fact that poor SQ impairs self-directed learning is well known. According to Durmer and Dinges [10], not getting enough sleep may have an adverse effect on our cognitive functions, including worsening short-term and working memory performance and lowering situational awareness. According to Ribeiro & Gounden[11], poor sleep quality may affect one's capacity for memory, creativity, and problem-solving. Therefore, it should not be surprising that students who do not get good quality of sleep perform poorly in school. After all, no person can learn if their physiological needs are not met. However, not only self-directed learning is harmed by poor sleep quality. Student's poor sleep quality impairs synaptic pruning, this may result in physiological issues like obesity, cardiovascular disease, and acne, according to Jensen and Nut (2015). Additionally, it could set off emotional issues including aggression, irritability, and low self-worth.

All medical students enrolling in the preclinical years of a Saudi medical college in 2020 were the subject of a different cross-sectional investigation. At the 0.05 level of significance, the correlations between definite variables were evaluated using the Pearson's Chi-squared test. 77% of respondents said their sleep was bad, and 63.5% said they were under some sort of psychological stress (mean K10 score: 23.72 8.55). The PSQI score was 8.13 ± 3.46 on average. Additionally, there was a significant correlation between poor SQ and high levels of mental stress and daytime naps (P 0.001 and P = 0.035, respectively). A regression model found that daytime naps and poor psychological health were associated with poor SQ.[12] Bouwmans et al.[13] propose that both positive and negative effects of sleep quality can be predicted. The PSQI score showed a negatively correlated relationship with positive affect and a positively correlated relationship with negative affect.[14] Healthier sleep quality is correlated with positive emotions. Reduced psychological well-being and diminished positive affect are the results of disturbed sleep. Consistent with online study, individual sleep quality is a predictor of the good effect of the next day.[15] Higher levels of negative affect are predicted by inadequate sleep and higher levels of positive affect by enough sleep.[16] Negative affect of sleep quality may induce self-directed learning failure. According to a systemic study carried out in 2006, medical students in Canada and the US have higher rates of suicidal thoughts, hopelessness, and psychological distress than the general population. In Nepalese, Malaysian, and Pakistan medical students, the prevalence of stress was recorded at 20.9%, 41.9%, and 90%, respectively. In King Saud and King Faisal Universities in Saudi Arabia, the occurrence of stress was found to be 63% and 53%, respectively.[17] Some of the potential negative effects of psychological stress include the decline in students' performance in the classroom and in therapeutic settings, cognitive deficits, sickness, a higher likelihood of acquiring anxiety and depression, and a lower level of life satisfaction.

It is proposed that all adults should get seven to nine hours of sleep each night. But according to new research, most young people don't get as much sleep as is advised.[18] Stress and poor sleep have a negatively correlated with one another. Studies have demonstrated that psychosocial stressors can occasionally cause sleep disturbances and insufficient sleep.[19] Short-term effects of sleep disturbance and deprivation include impaired judgement, anxiety, impatience, and inability to process information. Over time, it may result in cardiovascular and metabolic diseases and raise mortality rates.[20] Students are one of the high-risk populations identified in the literature for developing sleep disorders.[21] Young students enrolled in medical schools have a significant predisposition.[22] Study on medical students' sleep disturbances has been conducted, and the findings vary according on the demographics and educational backgrounds of the students. In-class

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daytime sleepiness was reported by 90% or more of Chinese medical students[23] and by 35.5% of Malaysian students, which was more common among clinical students.[24] 70% of Hong Kong medical students reported poor SQ and their average nocturnal sleep time was only 6.6 1.2 hours.[25] Poor SQ has been reported in 16% of Malaysian medical students,[24] 40.6% of Iranian medical students,[26] 62.6% of Indian students,[27] and 77% of Pakistani medical students.[28]

2.1 | Self-Determination Theory

People have three basic psychological demands, according to SDT: relatedness, competence, and autonomy. Individuals are more engaged, driven, and psychologically well when these requirements are satisfied.[32] Sleep quality may influence a student's ability to fulfill these needs: Poor sleep reduces mental clarity, emotional regulation, and motivation; High-quality sleep supports cognitive functioning, allowing students to engage more fully in self-directed learning (which requires autonomy and competence).

2.2 | Connection to SDL and Wellbeing

Sleep affects intrinsic motivation and energy levels, which are central to self-directed learning and emotional resilience.

2.3 | Cognitive Load Theory

This theory suggests that cognitive resources are limited. Poor sleep increases **cognitive load**, making it harder for students to process, retain, and apply information effectively.[33]

2.4 | Implications

- Poor sleep impairs attention, working memory, and problem-solving, reducing the effectiveness of SDL.
- Increased cognitive strain may contribute to stress, anxiety, and lower psychological wellbeing.

2.5 | Aim of Study

The aim of this study is to comprehensively investigate the intricate relationship between SQ, SDL, and PWB among medical students. This research endeavor seeks to investigate into the impact of sleep quality on self-directed learning behaviors within this demographic, exploring how variations in sleep patterns may influence students' abilities to engage in independent learning pursuits. Additionally, the study aims to elucidate the reciprocal relationship between self-directed learning and psychological wellbeing, examining how self-directed learning practices may contribute to emotional regulation and overall psychological health among undergraduate students.

2.6 | Hypotheses

This research study has the following hypotheses
H1: Sleep quality will be positively associated with self-directed learning among medical students.
H2: Sleep quality and psychological well-being will be positively associated.

3 | PROPOSED RESEARCH METHOLOGY

3.1 | Sample Selection

The selected sample is (N) medical students of age range 18 to25, from three different medical colleges. This age range is specified for this study because no previous studies have been made in this age range. This sample selection is based on Raosoft calculator presenting the margin error of 5% and confidence level of 95%.

3.2 | Type of study

This study is correlational study and the data will be collected through survey data method using quantitative approach and the analysis will be made through SPSS.

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3.3 | Instrument Development/ Selection

Pittsburgh Sleep Quality Index – A 24-item questionnaire called the Pittsburgh Sleep Quality Inventory (PSQI), created by Buysse et al. [29] assesses the quality and severity of recent sleep disruptions. Estimates of the severity of sleep-related issues as well as sleep length and latency are included. Seven component scores, each weighted equally on a 0–3 scale, are created from these 24 elements. The global PSQI score, which ranges from 0 to 21, is then calculated by adding the seven component scores; higher numbers indicate poorer sleep quality.

Self-Directed learning Readiness Scale – Fisher created this scale in 2001.[30] 40 items makes up the SDLRS, which are divided into three sections: self-management, learning drive, and self-control. There are 12 items for the drive to learn, 13 items for self-management, and 15 items for self-control. 40 items in the questionnaire were scored on a five-point Likert scale, ranging from strongly disagrees to strongly agree.

Psychological Wellbeing – There are 18 items on the scale describing emotional states. It is a 7-point likert type scale. High scores indicate psychological distress at high levels, whereas low scores indicate psychological distress at low levels.[31]

3.4 | Proposed Data Analysis Techniques

Data analysis will be done through SPSS data sheet after carefully filled questionnaires.
t-test will be used.

4 | DATA ANALYSIS AND RESULTS

The data analysis revealed key insights into the relationships between SQ, SDL, and PWB among medical students. Descriptive statistics confirmed the demographic composition of the sample, with no missing data and acceptable psychometric properties for all study measures. Cronbach's alpha values for the PSQI, SDLS, and PWB scales ranged from 0.67 to 0.80, indicating acceptable to good internal consistency. Correlational analysis showed significant positive relationships between SQ and both SDL ($r = .585$, $p < .01$) and psychological wellbeing ($r = .519$, $p < .01$), as well as between self-directed learning and psychological wellbeing ($r = .610$, $p < .01$). Regression analyses further supported these associations. Sleep quality significantly predicted self-directed learning ($\beta = .585$, $R^2 = .34$, $p < .001$), accounting for 34% of the variance, and psychological wellbeing ($\beta = .519$, $R^2 = .27$, $p < .001$), accounting for 27% of the variance. These findings indicate that healthier SQ is associated with higher levels of SDL and PWB, highlighting its important role in academic and psychological outcomes among students.

4.1 | Data Preparation and Descriptive

All questionnaires were fully completed, with no missing data. Three outliers were removed for accuracy. The final sample comprised 158 females (59.2%) and 109 males (40.8%), with the majority aged 20–23 years (47.6%). Most were unmarried (76%), from middle socioeconomic status (50.2%), and enrolled in the 2nd or 3rd academic year.

Table 1. Missing Values

Study Measure	N	Valid	Missing
PSQI	267	267	0
SDLS	267	267	0
PWB	267	267	0

Note. N = Number of participants; Valid = Number of valid responses; Missing = Number of missing responses.

This table shows that there were no missing responses for the PSQI, SDLS, and PWB scales among the 267 participants. This indicates that the data was complete and ready for further analysis without the need for imputation or removal of cases due to missing data.

Table 2 summarizes the demographic profile of the participants. The sample consisted of more females (59.2%) than males (40.8%). Most participants were aged between 20–23 years. The majority were unmarried (76%) and from a middle socioeconomic background (50.2%). Academic representation was nearly equal between second- and third-year students.

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Table 2. *Frequencies and Percentages of the Demographic characteristics of sample (n=267)*

Variables	Characteristics of Participants	(f)	(%)	Cum%
Gender	Male	109	40.8	40.8
	Female	158	59.2	100
Age	17-19	35	13.1	13.1
	20-23	127	47.6	60.7
	23-26	105	39.3	100.0
Marital Status	Married	64	24.0	24.0
	Unmarried	203	76.0	100.0
Socio Economic Status	Upper	112	41.9	41.9
	Middle	134	50.2	92.1
	Lower	21	7.9	100
Academic Year	2nd year	132	49.4	49.4
	3rd year	135	50.6	100.0

Note. (f) = Frequency; (%) = Percentage; Cum% = Cumulative Percentage.

Table 3. Psychometric Properties of study variables (n=267)

Variables	M	SD	Cronbach's α
PSQI	2.36	0.37	.71
SDLS	2.63	0.42	.80
PWB	2.70	0.44	.67

Note. PSQI = Pittsburgh Sleep Quality Index; SDLS = Self-Directed Learning Scale; PWB = Psychological Wellbeing

This table presents the mean scores, standard deviations, and reliability coefficients (Cronbach's alpha) for the study variables. All scales showed acceptable to good internal consistency, with alpha values above .67. The highest reliability was observed for the SDLS scale (.80), indicating consistent responses across items.

Table 4. Pearson Correlation for sleep quality, self-directed learning and psychological wellbeing (n=267)

Variables	PSQI	PWB	SDLS
PSQI	1		
PWB	.519**	1	
SDLS	.585**	.610**	1

Note. PSQI = Pittsburgh Sleep Quality Index; PWB = Psychological Wellbeing; SDLS = Self-Directed Learning Scale. ** Correlation is significant at the 0.01 level (2-tailed).

Table 4 shows positive and significant correlations among all three variables. PSQI (sleep quality) was moderately correlated with both PWB (.519) and SDLS (.585), while PWB and SDLS were strongly correlated (.610). All correlations were significant at the 0.01 level, suggesting strong linear associations between the variables.

Table 5. Simple Linear regression analysis of for Predicting SDLS from PSQI

Variable	B	*SE*	B	p	95%CI	
					LL	UL
(Constant)	42.66	5.42		.000	31.99	53.33
PSQI	1.06	.091	.59	.000	.89	1.24

Note. β=standardized coefficient, B=unstandardized coefficient, p=sig, LL=Lower Limit, UL=Upper Limit

This regression analysis indicates that sleep quality (PSQI) significantly predicts self-directed learning (SDLS). A one-unit increase in PSQI was associated with a 1.06-unit increase in SDLS. The model explained 34% of the variance in SDLS, showing a strong predictive relationship.

The results in Table 6 show that PSQI also significantly predicts psychological wellbeing (PWB). A one-unit increase in PSQI corresponded to a 0.44-unit increase in PWB. The model accounted for 27% of the variance in PWB, highlighting sleep quality as a moderate predictor of psychological wellbeing.

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Table 6. Simple Linear regression analysis of for Predicting PWB from PSQI

Variable	B	*SE*	B	P	95%CI	
					LL	UL
(Constant)	22.49	2.68		.000	17.22	27.77
PSQ	.44	.05	.519	.000	.355	.531

Note. R^2=explained variance, β=standardized coefficient, B=unstandardized coefficient, p=sig, LL=Lower Limit, UL=Upper Limit

5 | DISCUSSION

This study explored the role of SQ in SDL and PWB among 267 medical students. Sleep quality was treated as the independent variable, while SDL and PWB were the dependent variables. Descriptive statistics provided insights into the sample demographics, while correlational analysis revealed significant positive associations between sleep quality (measured by PSQI), SDL, and PWB. These outcomes indicate that healthier sleep quality is linked with enhanced self-directed learning behaviours and improved psychological wellbeing. Regression analyses further confirmed that PSQI significantly predicted both SDL and PWB. Sleep quality explained 34% of the variance in SDL and 27% in PWB scores. These results emphasize the critical influence of good sleep hygiene on both academic engagement and mental health outcomes. Medical students with higher sleep quality demonstrated more proactive learning behaviors and reported better psychological health. These findings underscore the importance of integrating sleep health into academic support strategies and mental wellness programs for medical students.

6 | CONCLUSION

The study found significant positive associations between SQ, SDL and PWB. Medical students with better sleep quality were more likely to engage in self-directed learning and reported higher psychological wellbeing. These results highlight sleep quality as a key factor supporting both academic self-regulation and mental health. Promoting healthy sleep habits can enhance student engagement and serve as a protective factor against psychological distress, reinforcing the need for institutional support and awareness initiatives targeting sleep hygiene.

7 | LIMITATIONS

As a correlational study, causal relationships cannot be established. The study focused solely on medical students, limiting generalizability to other populations. Potential confounding factors such as academic stress, social support, or lifestyle variables were not controlled for. Future research should use longitudinal or experimental designs and incorporate a broader range of student populations and control variables to strengthen the findings and enhance external validity.

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