



Journal Homepage: [www.journalijar.com](http://www.journalijar.com)  
**INTERNATIONAL JOURNAL OF  
ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/22704  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/22704>



**RESEARCH ARTICLE**

**ASSOCIATIONS BETWEEN SLEEP QUALITY AND PSYCHOLOGICAL GENERAL WELL-BEING: A COMPREHENSIVE REVIEW**

**Blessy Mohandass<sup>1</sup>, Abhishek Kalyan<sup>2</sup>, Amarpreet Singh<sup>2</sup>, Jayant Saroha<sup>2</sup>, Neeruta<sup>2</sup>, Sakshi<sup>2</sup> and Davinder Kaur<sup>3</sup>**

1. Department of Mental (Psychiatric) Health Nursing, Gian Sagar College of Nursing, Punjab.
2. B.Sc. Nursing Student, Gian Sagar College of Nursing, Punjab.
3. Department of Medical Surgical Nursing, Gian Sagar College of Nursing, Punjab.

**Manuscript Info**

**Manuscript History**

Received: 16 November 2025  
Final Accepted: 18 December 2025  
Published: January 2026

**Abstract**

Sleep quality is a vital determinant of psychological health, academic functioning, and overall quality of life. Nursing and healthcare students Sleep quality is a crucial determinant of psychological health, academic performance, and overall well-being. Nursing and healthcare students are especially vulnerable to sleep disturbances due to heavy academic workloads, clinical duties, night shifts, and lifestyle pressures. This review synthesizes evidence on the prevalence of poor sleep quality among university students and its association with psychological distress. Poor sleep is strongly associated with higher levels of anxiety, depression, perceived stress, daytime sleepiness, and reduced quality of life, and is frequently linked to poorer academic outcomes. Contributing factors include excessive screen time, physical inactivity, caffeine use, irregular schedules, and poor sleep hygiene. Although cross-sectional evidence is substantial, longitudinal and intervention studies particularly among Indian nursing students-remain limited, highlighting the need for institutional sleep health promotion and integrated mental health support. Improving sleep quality is essential for protecting students' mental health, academic success, and overall well-being.

"© 2026 by the Author(s). Published by IJAR under CC BY 4.0. Unrestricted use allowed with credit to the author."

**Introduction: -**

Sleep is more than just rest—it is a critical component of human health that promotes healing, cognitive functioning, emotional regulation, and overall resilience (Medic et al., 2017). For nursing students, achieving adequate and restorative sleep can be particularly challenging due to long academic hours, clinical duties, irregular shifts, and personal responsibilities, which interfere with healthy sleep routines (Almojali et al., 2017). Over time, these disruptions do more than cause fatigue and can have serious implications for mental and emotional well-being. Globally, poor sleep quality has been recognized as a public health issue, with prevalence among university students ranging between 40% and 60% (Becker et al., 2015). Among healthcare students, the prevalence is even higher because of demanding academic schedules and clinical training requirements (Zhang et al., 2017). A study conducted in Thailand reported that 42.4% of undergraduate students experienced poor sleep quality, which was

significantly associated with increased psychological distress (Phunthikaphadr et al., 2024). Many nursing students experience psychological distress in silence, presenting with symptoms such as anxiety, low mood, and emotional exhaustion (Labrague et al., 2017). Poor sleep quality can make routine academic and clinical tasks emotionally overwhelming, increasing the risk of burnout and social isolation (Shad et al., 2015).

The relationship between sleep quality and psychological distress is bidirectional—psychological distress disrupts sleep, while inadequate sleep intensifies stress responses (Zhang & Wing, 2006). For nursing students, this interaction may negatively affect emotional resilience, clinical judgement, and preparedness to deliver safe and compassionate care (Fontinha et al., 2019). Evidence from studies conducted in the United States indicates that sleep quality strongly influences coping styles and overall well-being among students (Gray & Watson, 2002). Poor sleep quality and excessive daytime sleepiness are associated with increased negative emotions, contributing to anxiety and depressive symptoms, and sleep difficulty has been identified as a significant predictor of anxiety and depression (Hertenstein et al., 2019). Furthermore, poor sleep quality has been linked with various health-risk behaviors and adverse physical and psychological outcomes, including chronic illness, drowsy driving, substance use, academic stress, somatic pain, depression, and suicidal ideation (Lund et al., 2010; Vail-Smith et al., 2009; Gregory et al., 2011). It is commonly observed that even a single night of poor-quality sleep can result in irritability and heightened negative emotional responses. Furthermore, evidence suggests that early interventions focusing on sleep hygiene, stress management, and mental health promotion can significantly enhance academic performance and emotional resilience among college students (Hershner & Chervin, 2014).

#### **Purpose of the Review:-**

Recognising and addressing the correlation between sleep quality and psychological distress is crucial in safeguarding the well-being of future nurses. By understanding how sleep quality relates to psychological distress, nursing institutions can implement targeted interventions such as supportive academic environments, flexible schedules, mental health resources, and peer support systems. This study aims to explore this relationship and contribute evidence that encourages nursing educators and policymakers to foster student-centred learning spaces that prioritise mental health and well-being (Ganesan et al., 2017). In India, nursing students face unique challenges, including long duty hours during clinical postings, frequent night shifts, and additional family or social responsibilities, which may further exacerbate sleep disturbances and psychological distress (Ganesan et al., 2017). Similar challenges related to academic workload and irregular sleep patterns have also been reported among healthcare students in the South Asian region, highlighting the widespread nature of sleep-related concerns among medical and nursing students (Surani et al., 2015). Despite the growing concern, limited studies have systematically examined the correlation between sleep quality and psychological well-being specifically among Indian nursing students. By studying the relationship between sleep quality and psychological distress, this research aims to shed light on the often-invisible struggles faced by students daily. This review is not merely focused on statistical outcomes but seeks to emphasize real student experiences and the pressing need for evidence-based change in nursing education and policy (Ganesan et al., 2017; Surani et al., 2015).

#### **Search Strategy and Selection of Studies:-**

Databases Used (PubMed, Google Scholar, Grey Literature) a comprehensive literature search was conducted across multiple academic and grey literature sources to identify relevant studies on sleep quality among students. The primary databases searched included PubMed/MEDLINE, which indexes biomedical and life sciences literature, and Google Scholar, which aggregates scholarly publications and theses. In addition to traditional databases, grey literature sources such as institutional repositories, conference proceedings, dissertations, and organisational reports were examined to minimise publication bias and capture unpublished research. Search strategies combined controlled vocabulary (e.g., MeSH terms in PubMed) and free-text keywords related to sleep quality and student populations. Boolean operators like AND and OR were used to link concepts and broaden or narrow results where appropriate. For example, a typical strategy might use: (“sleep quality” OR “sleep disturbance” OR insomnia) AND (student OR “college student\*” OR “university student\*”) AND (“Pittsburgh Sleep Quality Index” OR PSQI). Using both controlled vocabulary and keyword synonyms helps ensure that studies with varying terminology are captured, while logical operators precisely define relationships between search terms. Comprehensive keyword strategies are recommended for systematic searches to maximise recall.

#### **Inclusion/Exclusion Criteria:-**

After retrieving search results, predetermined inclusion and exclusion criteria were applied to screen and select relevant studies. Inclusion criteria typically specified that eligible studies must:

- be conducted in student populations (e.g., undergraduates, graduates),
- report on sleep quality using validated instruments (e.g., Pittsburgh Sleep Quality Index [PSQI]) or other objective measures,
- examine associations with mental health or academic outcomes.

Exclusion criteria often eliminated editorials, case reports, studies without measurable sleep quality outcomes, clinical populations unrelated to general student samples, and articles without full text available. Applying clear inclusion and exclusion criteria helps reduce bias and ensures that only relevant, high-quality studies are included. The study selection process was documented using a flow diagram Figure 1 (e.g., PRISMA), illustrating the number of records identified, screened, excluded, and ultimately included. This process typically involved:

1. Duplication of records across multiple databases and sources;
2. Title and abstract screening against eligibility criteria;
3. Full-text assessment for final eligibility;
4. Recording reasons for exclusion at the full-text stage.

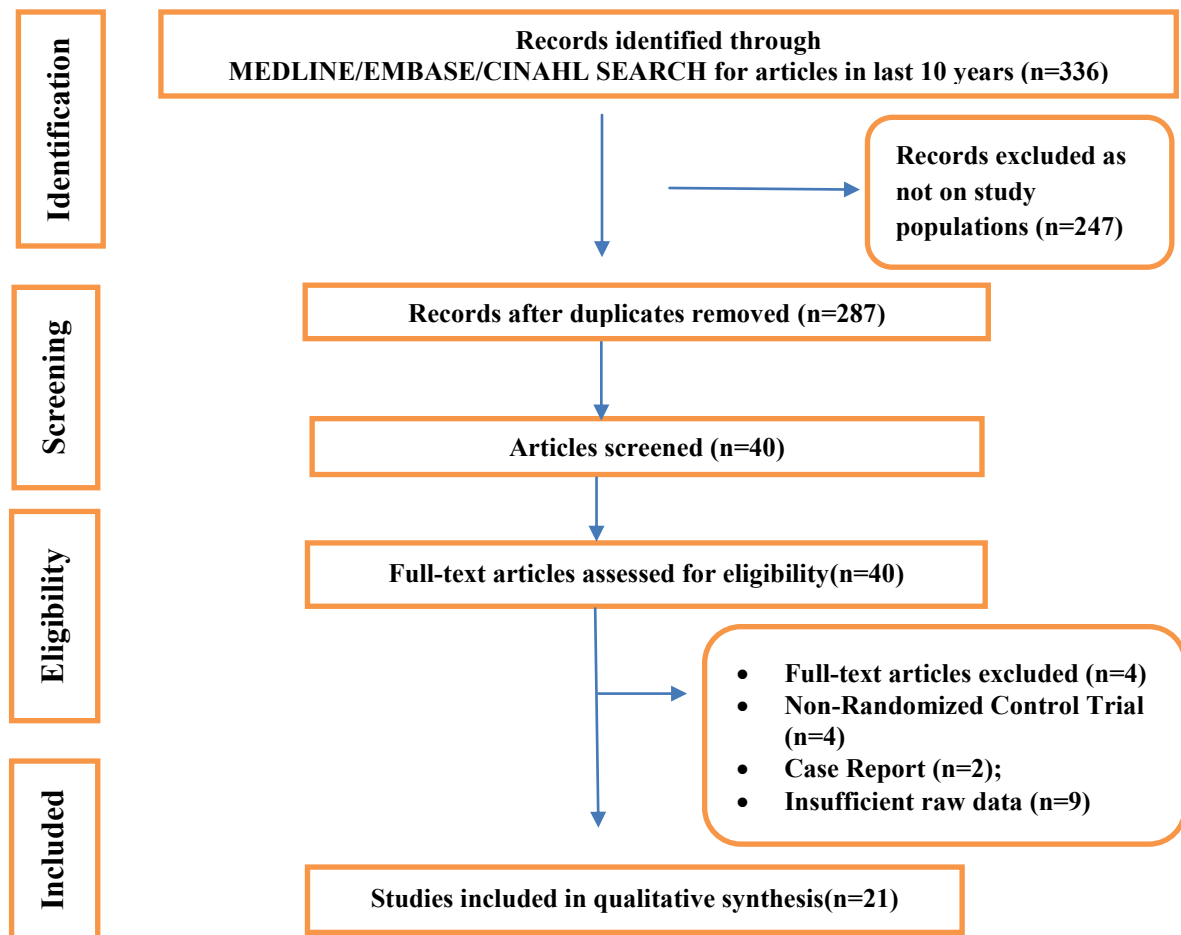


Figure 1. Flowchart of Literature Search

**Results:-**

This section describes and synthesizes the main findings of the included studies that address resilience levels in nursing students, with special focus on first-year students, and the utilization of the PSQI & PGWBI. The information is organized according to the general characteristics of the studies, methodological aspects, observed resilience levels, associated factors, and conclusions and implications. Supplementary S4 compiles the tables summarizing the results. This synthesis, while based on a limited number of studies (n = 6), provides valuable insights into the specific context of nursing students' resilience in Latin America, particularly those in their entry year, measured by the PGWBI scale. To provide a clear and concise overview of the primary studies identified and included in this scoping review, their essential characteristics are systematically detailed in Table 1, specifying titles, publication types, countries of origin, publication years, and the databases contributing to their identification through our comprehensive search strategy.

**Table 1. Overview of Included Studies**

<b>Title</b>	<b>Publication type &amp; country</b>	<b>Publication Year</b>	<b>Databases from general search strategy</b>
Effectiveness of Mindfulness-Based Stress Reduction on Mental Health and Psychological Quality of Life among University Students: A GRADE-Assessed Systematic Review	Peer-reviewed systematic review; China	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
The Impact of the pandemic on psychophysical well-being and quality of learning in the growth of adolescents (aged 11–13): a systematic review of the literature with a PRISMA method	Peer-reviewed systematic review; Italy	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Exercise and sleep health in college students: Efficacy, mechanisms, and implications for practice	Peer-reviewed narrative review; United States	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Focusing attention on the important association between food insecurity and psychological distress: a systematic review and meta-analysis	Systematic review and meta – analysis; UK	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Effects of active video games on mental health among college students: a systematic review	Systematic review; Chiana	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Efficacy of health literacy interventions aimed to improve health gains of higher education students-a systematic review	Systematic review; Portugal, UK	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Factors Associated with Healthy Behavior for Preventing Non-Communicable Diseases	Scoping review; South East Asia	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library

Title	Publication type & country	Publication Year	Databases from general search strategy
A systematic review of the health benefits of Tai Chi for students in higher education	Systematic review; Chiana	2022	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
The risk of sexual dysfunction associated with alcohol consumption in women: a systematic review and meta-analysis	Systematic review and meta – analysis; Iran	2023	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Focusing attention on the important association between food insecurity and psychological distress: a systematic review and meta-analysis	Systematic review and meta – analysis; UK	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Effects of active video games on mental health among college students: a systematic review	Systematic review; Chiana	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Efficacy of health literacy interventions aimed to improve health gains of higher education students-a systematic review	Systematic review; Portugal, UK	2024	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Factors Associated with Healthy Behavior for Preventing Non-Communicable Diseases	Scoping review; South East Asia	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
A systematic review of the health benefits of Tai Chi for students in higher education	Systematic review; Chiana	2022	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
The risk of sexual dysfunction associated with alcohol consumption in women: a systematic review and meta-analysis	Systematic review and meta – analysis; Iran	2023	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Impact of the COVID-19 pandemic on the mental health of Nursing students: A systematic review and meta-analysis	Systematic review and meta – analysis; Spain	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Relationships between perceived physical literacy and mental health in tertiary education students: a scoping review	Scoping review; Australia	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library

Title	Publication type & country	Publication Year	Databases from general search strategy
Psychological Impact of the COVID-19 Outbreak on Mental Health Outcomes among Youth: A Rapid Narrative Review	Narrative review; Italy	2021	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Burden of perceived stress among university students in Africa: a systematic review and meta-analysis	Systematic review and meta – analysis; Africa	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
The impact of digital interactive interventions on survivorship outcomes in prostate cancer: a systematic narrative review	Systematic narrative review; United Kingdom	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library
Systematic review of the use of prescription and non-prescription psychotropic drugs and their relation with mental health in university population	Systematic review; Spain	2025	PubMed, EMBASE, Web of Science, PsycINFO, Ovid MEDLINE, ERIC, Scopus, Google Scholar, ProQuest, Cochrane Library

### Global Prevalence Trends:-

A large meta-analysis of 95 studies involving 54,894 medical students worldwide estimated a pooled prevalence of poor sleep quality at 55.64% (95% CI: 51.45–59.74%), highlighting the substantial global burden of sleep disturbances among medical students (Jahrami et al., 2023). Similarly, another comprehensive meta-analysis comprising 57 studies with a total sample of 25,735 medical students reported a pooled prevalence of poor sleep quality of 52.7% (95% CI: 45.3–60.1%) using the Pittsburgh Sleep Quality Index (PSQI) (Rao et al., 2020). Several cross-sectional studies have documented even higher prevalence rates. For instance, a study conducted among medical students in Pakistan found that 76% of students had PSQI scores  $\geq 5$ , with a mean PSQI score of  $7.11 \pm 3.84$ , and 73.4% of students reported sleeping less than 7 hours per night (mean sleep duration  $5.8 \pm 1.3$  hours), indicating a high burden of sleep deprivation (Waqas et al., 2015). Collectively, these findings suggest that globally, approximately half or more of medical and university students experience poor sleep quality, although prevalence estimates vary widely across studies and regions.

A meta-analysis focusing on the Middle East and North Africa (MENA) region, which included 150 studies across 16 countries, reported a pooled prevalence of poor sleep quality of 59.1% among medical students, with subgroup estimates ranging from 42.1% to 73.5% (Chaabane et al., 2025). Among university students in Africa, a systematic review and meta-analysis of 35 studies estimated an even higher pooled prevalence of 63.31% (95% CI: 56.91–65.71%), underscoring the magnitude of sleep-related problems in low- and middle-income regions (Nakie et al., 2024). Regional differences in sleep quality prevalence have also been documented. Consistent with these findings, another global meta-analysis of medical students confirmed a pooled prevalence of 52.7% and similarly reported higher prevalence rates in Europe compared to other continents (Li et al., 2020).

Subgroup analyses further reveal important contextual patterns. In the MENA region, poor sleep quality was more common among students in pre-clinical years than those in clinical years, suggesting that early academic stressors may play a significant role (Chaabane et al., 2025). In the African context, factors associated with poor sleep quality included being in the second academic year, excessive screen use, presence of chronic illness, and high levels of perceived stress (Mengistu&Demeke, 2024). Interestingly, meta-regression analysis from a large global meta-analysis found that age and sex were not significant predictors of poor sleep quality prevalence among medical students, despite variability observed in individual studies (Binjabr et al., 2023). This indicates that while local and regional studies may report differences based on demographic characteristics, global pooled evidence suggests that factors such as academic demands, environmental stressors, and socioeconomic context play a more consistent role in shaping sleep quality among students.

**Sleep Quality and Mental Health:-**

A cross-sectional study among 386 medical students in Croatia found that 67.9% had poor sleep quality (PSQI > 5), and PSQI scores correlated moderately with anxiety ( $\rho = 0.489$ ,  $p < 0.001$ ) (Vidović et al., 2025). Among 701 healthcare students in Saudi Arabia, 80.3% had poor sleep quality, and poor sleep was significantly associated with anxiety ( $r = 0.387$ ) (Alsulami et al., 2022). In the Croatian medical student study, PSQI scores were significantly correlated with depression ( $\rho = 0.566$ ,  $p < 0.001$ ) (Vidović et al., 2025). Among 4,325 Chinese university students, poor sleep quality was significantly associated with higher depression scores (Chen et al., 2023). In Saudi healthcare students, poor sleep quality was significantly associated with perceived stress ( $r = 0.363$ ; AOR = 1.79, 95% CI 1.07–2.99) (Alsulami et al., 2022). Among 400 Indian medical students, 76.75% were poor sleepers; poor sleep latency significantly predicted stress levels (Singh et al., 2023). Among 1,279 university students, 64.5% had poor sleep, which was associated with higher perceived stress and lower mental and physical health-related quality of life (Russo et al., 2022). Among 4,325 Chinese college students, poor sleep quality was linked to higher depression and anxiety; cognitive emotion regulation moderated these relationships (Chen et al., 2023). In a study of 125 medical students at the University of Ljubljana (Slovenia), 75.8% were “poor sleepers” (PSQI > 5).

The study found a significant negative correlation between PSQI score and GPA ( $r = -0.244$ ,  $p = 0.006$ ), indicating that poorer sleep quality was associated with lower academic performance (Ali et al., 2018). In a sample of 512 medical students in Pakistan, 64.2% had PSQI  $\geq 5$  (poor sleep). The mean GPA of poor sleepers ( $2.92 \pm 1.09$ ) was significantly lower than that of good sleepers ( $3.31 \pm 1.49$ ), demonstrating a clear link between poor sleep quality and worse academic grades ( $p < 0.0001$ ) (Maheswari et al., 2019). A cross-sectional study of first-year medical students at a tertiary institute found that poorer sleep quality, shorter sleep duration, and daytime sleepiness (measured using PSQI and ESS) were significantly associated with lower GPA and poorer performance on learning and memory tasks (Gupta et al., 2023). The study found that neither sleep quality nor mental health variables (depression, anxiety, stress) were significantly associated with GPA, suggesting that poor sleep does not always directly affect grades and may act indirectly through other pathways (Yaghmour et al., 2023). A recent Saudi study on health-sciences undergraduates ( $n = 448$ ) reported that sleep duration (not necessarily quality) was significantly associated with GPA: students who slept 6–7 hours had better GPA than those with shorter sleep, but PSQI-based sleep quality showed no significant association, indicating that the effect of sleep on academic performance may depend on sleep duration or other moderating factors (Alharkan & Alqurashi, 2024).

**Lifestyle and Behavioral Determinants of Sleep Quality: -**

Higher levels of physical activity were significantly associated with better sleep quality among university students, as physically active students demonstrated lower global Pittsburgh Sleep Quality Index (PSQI) scores compared to less active peers (Merellano-Navarro et al., 2022). A large study on Chinese college students found that higher levels of smartphone addiction, which often reflects sedentary behaviour, were significantly associated with poorer sleep quality, while greater engagement in physical exercise reduced smartphone addiction and indirectly improved sleep outcomes (Liu & Li, 2022). Students who spent  $\geq 9$  hours per day in sedentary activities had markedly poorer sleep quality, whereas those who engaged in moderate-to-vigorous physical activity experienced significantly better sleep, indicating that physical activity acts as a protective factor against the negative sleep effects of prolonged sedentary behaviour (Menezes-Júnior et al., 2023). A longitudinal study among college students demonstrated that bedtime smartphone use led to reduced sleep duration and poorer sleep quality, which subsequently contributed to a decline in academic performance due to the mediating effect of sleep deprivation (Lin & Zhou, 2022). Among medical students, bedtime smartphone use—particularly for durations exceeding two hours—was strongly associated with poorer sleep quality, longer sleep latency, difficulty maintaining sleep, and shorter total sleep duration (Elsheikh et al., 2024).

A cross-sectional study among nursing students reported a high prevalence of sleep disorders and poor sleep quality, with perceived stress and lifestyle habits such as smoking and late-evening caffeine consumption emerging as significant predictors, while the number of night shifts worked did not independently predict sleep disturbances (Belingheri et al., 2022). The authors additionally concluded that although night-shift work alone was not significantly associated with poorer sleep quality, nursing students still experienced substantial sleep disturbances largely due to the combined effects of academic pressure, stress, and lifestyle behaviours (Belingheri et al., 2022). A cross-sectional study of 3,206 nurses in China found that night-shift work was significantly associated with poorer sleep quality (as measured by the Pittsburgh Sleep Quality Index, PSQI) and worse general health status, with night-shift nurses demonstrating a higher prevalence of poor sleep quality (55.1%) compared with non-night-shift nurses (Qiu et al., 2021).

Older students and those in later academic years often report poorer sleep quality due to increased academic responsibilities, clinical workload, and psychosocial pressures, with evidence showing a significant association between year of study and PSQI scores (Schmickler et al., 2023). Living arrangements also influence sleep quality among students, with hostel or dormitory residents frequently reporting disturbed sleep due to shared spaces, noise, and irregular routines; however, some studies report poor sleep among students living with family because of household responsibilities and limited study privacy, indicating that the effect is context-specific (Manandhar et al., 2024). Female students commonly report higher rates of poor sleep quality compared to males, and variations across academic years are observed, with certain stages—especially clinically demanding years—showing higher prevalence of poor sleep (Wondie et al., 2021).

Lower socioeconomic status, financial strain, and the need to work while studying are significantly associated with poor sleep quality, reflecting the impact of stress and reduced recovery time on students' sleep patterns (Schmickler et al., 2023). Psychological resources such as autonomy, sense of purpose, and time-management abilities are linked to better sleep outcomes, as students who feel in control of their routines and experience purpose-driven academic engagement tend to report higher sleep quality (Masnan et al., 2021). Low social support and strained interpersonal relationships are strong predictors of poor sleep quality; students with supportive social networks report better sleep and lower stress levels, while inadequate support is associated with higher odds of poor sleep (Wondie et al., 2021). Student sleep quality varies widely across countries and cultural settings due to differences in academic systems, living environments, and societal expectations, producing meaningful cross-national differences in sleep patterns (Schmickler et al., 2023).

Poor sleep quality has been consistently shown to contribute to psychological distress, with both anxiety and depression often acting as mediators. A study among college students demonstrated that sleep quality significantly mediated the relationship between nocturnal technology use and symptoms of depression and anxiety, with poorer sleep predicting higher levels of psychological symptoms (Levenson et al., 2017). Coping styles influence the impact of poor sleep on psychological outcomes by attenuating or intensifying stress responses. A cross-sectional study among nursing students revealed that perceived stress mediated the association between poor sleep quality and symptoms of anxiety and depression, suggesting that how students manage stress shapes whether sleep disturbances lead to worsened psychological outcomes (Brown et al., 2018). Personality-linked psychological processes also influence susceptibility to sleep-related psychological distress. A study among Chinese college students found that cognitive emotion regulation strategies mediated the relationship between poor sleep quality and anxiety and depressive symptoms, with maladaptive strategies intensifying psychological distress and adaptive strategies exerting protective effects (Zhou et al., 2024).

Circadian typology has been identified as another moderating factor, with evening chronotypes reporting poorer sleep quality and higher levels of psychological distress compared to morning types, likely due to misalignment between biological rhythms and societal schedules (Whitehead et al., 2025). University students with poor sleep quality consistently report significantly lower quality of life across physical, psychological, social, and environmental domains compared to good sleepers (Gul et al., 2025). In a multicentre study of medical students, higher levels of daytime sleepiness and sleep deprivation were associated with elevated depression and anxiety scores, poorer quality-of-life indices, and more negative perceptions of the educational environment, demonstrating a clear dose–response relationship (Pacheco et al., 2021).

#### **Cross-Cultural and Country-Specific Findings:-**

A large cross-sectional study among 6,284 Chinese university students in Jilin Province assessed sleep quality using the PSQI. The study found that 31% of students had poor sleep quality, and significant predictors included alcohol use, poor exercise habits, and strained social/family relationships. The authors concluded that lifestyle and interpersonal factors are central contributors to sleep disturbances among Chinese students (Li et al., 2020). A 2025 cross-sectional study at a Saudi medical university involving 514 undergraduate students (years 2–6) showed an 88.1% prevalence of poor sleep quality using PSQI. Students without a regular sleep schedule had significantly higher odds of poor sleep, while fourth-year students showed comparatively better sleep patterns. Academic load and daytime sleepiness were notable correlates (Alshahrani et al., 2025). A cross-sectional study among 293 medical students in North Karnataka reported a 69.3% prevalence of poor sleep quality. Female students and those who were overweight/obese had significantly higher odds of poor sleep, while good sleep hygiene practices and avoiding technology before bedtime were protective factors (Naik et al., 2024).

A cross-sectional study among medical students in Thailand (N = 1,247) found that 57.5% had poor sleep quality (PSQI > 5). Academic stress, late-night technology use, and caffeine consumption were independently associated with poorer sleep. Students with poor sleep also reported lower academic satisfaction (Sukying et al., 2021). A study among 576 Ethiopian medical students found that 62% had poor sleep quality. Depression, poor social support, stress, and poor sleep hygiene were significant predictors. The authors noted that psychological distress contributed heavily to sleep disturbances (Chekole et al., 2021). A meta-analysis of 20 Iranian studies (n > 7,000 students) reported a pooled prevalence of poor sleep quality of 56.1% among university students. Stress, depression, and irregular sleep schedules were recurring predictors across studies (Jalali et al., 2020). A national survey involving 1,125 U.S. college students found that 27% slept less than 6 hours per night and 60% reported poor sleep quality. Poor sleep was strongly associated with higher anxiety, depressive symptoms, and poorer GPA (Lund et al., 2010). A 2022 cross-sectional survey of 1,477 university students in New Zealand found that 55% had poor sleep quality, and Māori and Pacific students reported higher levels of sleep disturbance than European students. Academic stress, financial strain, and mental health symptoms were strong correlates (Fleming et al., 2022).

### **Gaps in the Existing Literature:-**

Most studies assessing sleep quality among student populations have adopted cross-sectional research designs, which capture sleep characteristics at a single point in time. While such studies are useful for estimating prevalence and identifying associations, they do not allow conclusions regarding causal or temporal relationships between sleep quality, mental health outcomes, and academic performance (Hershner&Chervin, 2014). Due to the predominance of cross-sectional designs, it remains unclear whether poor sleep quality precedes the development of anxiety, depression, and stress, or whether psychological distress contributes to the deterioration of sleep over time (Alvaro et al., 2013). Longitudinal studies that follow students across multiple academic years to examine changes in sleep quality and their cumulative effects on psychological well-being and academic functioning are limited (Knutson & Van Cauter, 2008). This gap is particularly evident among nursing and healthcare students, whose sleep patterns are likely to fluctuate due to increasing academic demands, clinical responsibilities, and exposure to shift-based schedules (Lund et al., 2010). Although a substantial body of literature documents a high prevalence of poor sleep quality among students, comparatively few studies have evaluated interventions aimed at improving sleep health in this population (Hershner&Chervin, 2014). Most intervention studies that do exist are limited by small sample sizes, short follow-up durations, and a lack of rigorous randomized controlled trial designs, thereby restricting the strength of the evidence (Brown et al., 2006). Systematic reviews indicate that although sleep hygiene education and cognitive-behavioral approaches show potential benefits, the overall evidence base remains limited and inconsistent (Friedrich &Schlarb, 2018). Furthermore, institution-level interventions such as curriculum restructuring, reduction of academic workload, and modification of clinical schedules have rarely been examined in relation to student sleep outcomes (Owens & Weiss, 2017).

Existing research on sleep quality among students relies predominantly on quantitative self-reported instruments, particularly standardized questionnaires such as the Pittsburgh Sleep Quality Index, which may not fully capture the complexity of students' sleep experiences (Buysse et al., 1989). Quantitative approaches alone often fail to explore students' subjective perceptions of sleep, their beliefs about sleep loss, and contextual factors such as academic pressure, stress, and living environments (Shochat, 2012). The limited use of qualitative and mixed-method designs restricts deeper understanding of psychosocial and cultural influences on sleep behavior, thereby limiting the development of context-specific interventions. The majority of sleep research among students has focused on medical, nursing, and allied health students, while students from non-health disciplines remain comparatively understudied (Hershner&Chervin, 2014). Students from low- and middle-income countries are underrepresented in the global sleep literature, limiting the generalizability of findings across diverse educational and cultural contexts. Working students, part-time learners, and students from socioeconomically disadvantaged backgrounds have received limited attention, despite being at increased risk for sleep disturbances. Studies assessing sleep quality use a wide range of measurement tools and varying cut-off scores, resulting in substantial heterogeneity in reported prevalence rates of poor sleep quality among students. Although associations between poor sleep quality and mental health outcomes such as anxiety and depression are well established, few studies have explored these variables as mediators or moderators within sleep-mental health relationships. Individual factors such as coping styles, personality traits, and circadian preferences have received limited research attention, despite evidence suggesting their influence on sleep behavior and psychological outcomes. Most research on sleep quality among students has been conducted in Western countries, limiting the cultural applicability of findings to students from other sociocultural backgrounds. Cultural beliefs, family expectations, academic competition, and living arrangements are often insufficiently examined as contextual determinants of sleep quality among students.

**Implications for Practice, Policy, and Education:-**

Integrating structured sleep-health education into university programs (lectures/workshops/orientation) leads to measurable improvements in student sleep duration and sleep hygiene behaviors in randomized trials (Brown et al., 2006). Umbrella and systematic reviews conclude that non-pharmacological sleep-promotion interventions (sleep education, behavioral programs) are effective in improving sleep outcomes and are suitable for population-level implementation in universities (Friedrich &Schlarb, 2018). Psychological interventions delivered via university counseling services — especially CBT-based approaches — produce moderate-to-large improvements in sleep outcomes among students (Hershner&Chervin, 2014). Digital (web/app) sleep programs, which counselling centers can deploy, show consistent efficacy in improving sleep quality and reducing insomnia severity in college-aged samples, making them scalable options for campus mental-health services (Shochat, 2012). Periodic screening of students using validated tools (e.g., PSQI, ISI) identifies a large proportion with clinically relevant sleep problems; authors recommend institutional screening linked to referral pathways to reduce unmet need (Buysse et al., 1989). Quasi-experimental evidence shows that structured dormitory or campus-based screening combined with peer or staff referral produces improvements in uptake of sleep support and modest improvements in sleep quality versus no structured system (Owens & Weiss, 2017). Multi-component interventions that combine sleep hygiene education with stress-management techniques (time management, relaxation, mindfulness) produce larger improvements in sleep and reductions in stress than sleep education alone (Friedrich &Schlarb, 2018). Brief, remotely-delivered sleep and stress training reduces insomnia symptoms and perceived stress in randomized trials of undergraduates, supporting implementation of short campus workshops or online modules (Brown et al., 2006).

Poor sleep quality is highly prevalent among university students globally and is closely associated with adverse mental health outcomes. A cross-sectional study of 3,145 Chinese undergraduates found that 57.7% reported poor sleep quality, and these students had significantly higher levels of anxiety and depression than their peers with good sleep (Li et al., 2020). Sleep disturbances also negatively affect academic outcomes. In a study of Pakistani medical students, students with poor sleep quality reported lower GPAs and higher daytime dysfunction, showing that sleep issues directly impact cognitive performance, alertness, and academic achievement (Naik et al., 2024). Interventional evidence suggests that targeted sleep programs can improve sleep quality and daytime functioning. A randomized trial in U.S. college students found that a four-week sleep hygiene program increased total sleep time, reduced sleep-onset latency, and decreased daytime sleepiness compared to control participants (Hershner&Chervin, 2014). Longitudinal data confirm that sleep quality changes over the semester can influence both mental health and academic engagement. A cohort study of first-year undergraduates in China showed that students with worsening sleep quality exhibited increased depressive symptoms and decreased academic engagement over time, highlighting the cumulative effect of sleep disruption (Li et al., 2020). Addressing sleep quality is essential because it supports psychological well-being, resilience, and daily functioning.


In a German study of medical students, better sleep quality was associated with higher resilience scores and lower academic burnout, demonstrating that interventions targeting sleep may indirectly protect mental health and academic performance (Fleming et al., 2022). Sleep improvements also enhance cognitive functioning, memory, and motivation. A study in Australian university students showed that a sleep hygiene education program improved attention, memory retention, and daytime alertness (Li et al., 2020). Students with better sleep patterns report higher overall well-being, including improved mood, reduced stress, and better daytime productivity. These findings underscore the need for universities to implement sleep-health programs, accessible counseling services, and stress-management strategies to support student mental health and academic success (Fleming et al., 2022). Despite robust cross-sectional evidence, causal pathways remain unclear. Future studies should evaluate culturally tailored interventions, investigate long-term effectiveness, and consider unique needs of high-risk subgroups such as first-year students, clinical students, and students living in hostels. Addressing these gaps will strengthen the evidence base and guide effective sleep-health promotion strategies (Fleming et al., 2022).


**Conclusion:-**

Poor sleep quality is highly prevalent among nursing and university students and is consistently associated with psychological distress, including anxiety, depression, stress, and reduced quality of life. Academic demands, lifestyle behaviors, and psychosocial factors collectively contribute to sleep disturbances in this population. Despite substantial cross-sectional evidence, there remains a lack of longitudinal and interventional studies, particularly among Indian nursing students. Addressing sleep health through targeted institutional policies and mental health-focused interventions is essential to promote student well-being and academic resilience.


**References:-**



1. Ali A, Mahdi J, Waheed A, et al. Sleep habits among medical students and correlation between sleep quality and academic performance. *Eur J Public Health*. 2018;28(Suppl 4):cky214.141. Available from: [https://academic.oup.com/eurpub/article/28/suppl\\_4/cky214.141/5185766](https://academic.oup.com/eurpub/article/28/suppl_4/cky214.141/5185766)
2. Alharkan K, Alqurashi YD. The association between academic performance and sleep quality and quantity among health sciences college students. *Acta Biomed*. 2024. Available from: <https://www.mattioli1885journals.com/index.php/actabiomedica/article/view/14958>
3. Almojali AI, Almalki SA, Alothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. *J Epidemiol Glob Health*. 2017;7(3):169–174. <https://pubmed.ncbi.nlm.nih.gov/28756861/>
4. Alsulami H, Alzahrani A, Al-Wabel H, Alyahya M, Alsharif M, Alsharari A. Associations between Stress, Anxiety, Depression and Sleep Quality among Healthcare Students. *J Clin Med*. 2022;12(13):4340. Available from: <https://www.mdpi.com/2077-0383/12/13/4340>
5. Alsulami H, Alzahrani A, Al-Wabel H, Alyahya M, Alsharif M, Alsharari A. Associations between Stress, Anxiety, Depression and Sleep Quality among Healthcare Students. *J Clin Med*. 2022;12(13):4340. Available from: <https://www.mdpi.com/2077-0383/12/13/4340>
6. Alshahrani SM, Alqarni AA, Mahfouz MS, Algarni AD, Hakami AM, Alqarni AK, et al. Sleep quality and daytime sleepiness among undergraduate medical students in Saudi Arabia. *BMC Med Educ*. 2025;25:134. Available from: <https://pubmed.ncbi.nlm.nih.gov/39806374/>
7. Alvaro PK, Roberts RM, Harris JK. A systematic review assessing bidirectionality between sleep disturbances and mental disorders. *Sleep Med Rev*. 2013;17(2):123–136. Available from: <https://pubmed.ncbi.nlm.nih.gov/22721943/>
8. Alvaro PK, Roberts RM, Harris JK. *Sleep Med Rev*. 2013;17(2):123–136. Available from: <https://pubmed.ncbi.nlm.nih.gov/22721943/>
9. Arbinaga F, Fernández-Cuenca S, Fernández-Ozcorta EJ, Toscano-Hermoso MD, JoaquinMingorance M. Level of physical activity and sleep characteristics in university students. *Sleep Sci*. 2019;12(4):265–271. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7159078/>
10. Bacaro V, Mencarelli F, Maestri M, Fanfulla F, Ferini-Strambi L, De Bartolo P, et al. Sleep well, study well: a systematic review of longitudinal studies on sleep and school experience in adolescence and young adults. *Int J Environ Res Public Health*. 2023;20(6):4829. Available from: <https://www.mdpi.com/1660-4601/20/6/4829>
11. Bahammam AS, et al. Relationship between sleep habits and academic performance in university nursing students. *BMC Nursing*. 2021;20:3010. Doi:10.1186/s12912-021-00635-x. Available from: <https://link.springer.com/article/10.1186/s12912-021-00635-x>
12. Becker SP, Sidol CA, Van Dyk TR, Byars KC. Prospective examination of adolescent sleep patterns and behaviors. *J Youth Adolesc*. 2015;44(2):369–386. <https://pubmed.ncbi.nlm.nih.gov/25378256/>
13. Belingheri M, Luciani M, Ausili D, Paladino ME, Di Mauro S, De Vito G, Riva MA. Sleep disorders and night-shift work in nursing students: a cross-sectional study. *Med Lav*. 2022;113(1):e2022003. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8902742/>
14. Binjabr MA, Alalawi IS, Alzahrani RA, Albalawi OS, Hamzah RH, Ibrahim YS, Buali F, Husni M, BaHamman AS, Vitiello MV, Jahrami H. The Worldwide Prevalence of Sleep Problems Among Medical Students by Problem, Country, and COVID-19 Status: a Systematic Review, Meta-analysis, and Meta-regression of 109 Studies Involving 59,427 Participants. *Curr Sleep Med Rep*. 2023;1–19. Doi:10.1007/s40675-023-00258-5. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10238781/>
15. Bjerre LM, Farrell B, Hogel M, Graham L, Lemay G, McCarthy L, et al. Deprescribing antipsychotics for behavioural and psychological symptoms of dementia and insomnia: evidence-based clinical practice guideline. *Can Fam Physician*. 2018 Jan;64(1):17–27. Available from: <https://pubmed.ncbi.nlm.nih.gov/29358245/>
16. Brown FC, Buboltz WC, Soper B. Development and evaluation of the Sleep Treatment and Education Program for Students (STEPS). *J Am Coll Health*. 2006;54(4):231–237. Available from: <https://pubmed.ncbi.nlm.nih.gov/16450837/>
17. Brown FC, Buboltz WC Jr, Soper B. Effects of a Sleep Hygiene Education Program on Sleep Quality and Daytime Sleepiness in College Students. *Behav Med*. 2006;31(1):33–39. Available from: <https://www.tandfonline.com/doi/abs/10.3200/BMED.31.1.33-39>
18. Brown LB, Buboltz Jr WC, Soper B. Perceived stress mediates associations between sleep quality and symptoms of anxiety and depression among undergraduate nursing students. *J Am Coll Health*. 2018;66(7):epub. Available from: <https://pubmed.ncbi.nlm.nih.gov/29306924/>

19. Buysse DJ, Reynolds CF III, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;28(2):193–213. Available from: <https://pubmed.ncbi.nlm.nih.gov/2748771/>
20. Cielo F, Ulberg R, Di Giacomo D. Psychological impact of the COVID-19 outbreak on mental health outcomes among youth: a rapid narrative review. *Int J Environ Res Public Health.* 2021;18(11):6067. doi:10.3390/ijerph18116067. Available from: <https://pubmed.ncbi.nlm.nih.gov/34199896/>
21. Chaabane S, Chaabna K, Khawaja S, Aboughanem J, Mamtani R, Cheema SO. Epidemiology of sleep disturbances among medical students in the Middle East and North Africa: a systematic review and meta-analysis. *J Glob Health.* 2025;15:04099. Available from: <https://jogh.org/2025/jogh-15-04099>
22. Chandler LK, Schwarzer JE, et al. Improving university students' mental health using multi-component interventions: a systematic review. *Behav Res Ther.* 2022;S0005-7967(22)00113-5. Available from: <https://www.sciencedirect.com/science/article/pii/S0005796722011315>
23. Chekole Y, Yimer S, Mekuriaw B. Sleep quality and its predictors among medical students in Ethiopia: a cross-sectional study. *Sleep Sci Pract.* 2021;5:4. Available from: <https://sleep.biomedcentral.com/articles/10.1186/s41606-021-00058-2>
24. Chen Y, Wang Y, Zhou X, et al. Effect of Sleep Quality on Anxiety and Depression Symptoms among College Students in China's Xizang Region: The Mediating Effect of Cognitive Emotion Regulation. *Behav Sci.* 2023;13(10):861. Available from: <https://www.mdpi.com/2076-328X/13/10/861>
25. Digidon NL, Howell AJ. College students who have an eveningness preference report lower self-control. *Chronobiol Int.* 2008;25(6):1029–1046. Available from: <https://pubmed.ncbi.nlm.nih.gov/19005902/>
26. Elsheikh AA, et al. Impact of bedtime smartphone use on sleep and academic performance among medical students. *J Public Health.* 2024. Available from: <https://link.springer.com/article/10.1007/s10389-023-01964-8>
27. *Environ Res Public Health.* 2021;18(11):5533. Available from: <https://www.mdpi.com/1660-4601/18/11/5533>
28. Espitia-Cepeda C, González-Amado B, Simó-Algado S, Villanueva-Blasco VJ. Systematic review of the use of prescription and non-prescription psychotropic drugs and their relation with mental health in university population. *Front Psychol.* 2025;16:1661844. Doi:10.3389/fpsyg.2025.1661844. Available from: <https://pubmed.ncbi.nlm.nih.gov/41169916/>
29. Fei LL, Zhao SX, Chen YF, Hao CF, Xin YJ. Exercise and sleep health in college students: efficacy, mechanisms, and implications for practice. *World J Psychiatry.* 2025 Oct 19;15(10):108884. Doi:10.5498/wjp.v15.i10.108884. Available from: <https://pubmed.ncbi.nlm.nih.gov/41112608/> 
30. Fentahun S, Rtbey G, Nakie G, Andualem F, Tinsae T, Kibralew G, Tesfaw G, Kifle T, Kelebie M, Tadesse G. Burden of perceived stress among university students in Africa: a systematic review and meta-analysis. *BMC Public Health.* 2025;25:2248. Doi:10.1186/s12889-025-23533-2. Available from: <https://pubmed.ncbi.nlm.nih.gov/40604771/>
31. Fernandes AD, Elzein R, et al. Relationship between poor quality sleep, excessive daytime sleepiness and low academic performance in medical students. [Journal]. 2018; (data from PubMed). Results show that poor sleep quality (PSQI  $\geq$  5) was independently associated with lower academic achievement ( $\beta = -0.07$ , 95% CI  $-0.14$  to  $-0.002$ ,  $P = 0.04$ ).
32. Fleming T, Peiris-John R, Crengle S, Oakley Browne M, Clark T. Sleep quality and associated factors among university students in New Zealand. *Sleep Health.* 2022;8:420–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/35490729/>
33. Fontinha R, Easton S, Van Laar D. Overtime and quality of working life in academics and non-academics: The role of perceived work-life balance. *Int J Stress Manag.* 2019;26(2):173–183. <https://pubmed.ncbi.nlm.nih.gov/31259095/>
34. Friedrich A, Schlarb AA. Let's talk about sleep: a systematic review of psychological interventions to improve sleep in college students. *J Sleep Res.* 2018;27(1):4–22. Available from: <https://pubmed.ncbi.nlm.nih.gov/28618185/>
35. Ganesan S, Kulkarni V, Sahoo J, Subitha L, Kar SS. Implications of sleep deprivation among medical and nursing students: A cross-sectional study from a tertiary health centre of South India. *Natl Med J India.* 2017;30(3):176–180. <https://pubmed.ncbi.nlm.nih.gov/29264631/>
36. Ghoul Z, Pernice F, Branson JS, Lumley MA. Remote brief sleep hygiene and stress management intervention for undergraduates: randomized controlled trial. *J Am Coll Health.* 2025; (Article). Available from: [https://www.researchgate.net/publication/326354345\\_Sleep\\_Education\\_for\\_College\\_Students](https://www.researchgate.net/publication/326354345_Sleep_Education_for_College_Students)

37. Grandner MA. Sleep, health, and society. *Sleep Med Clin.* 2017;12(1):1–22. Available from: <https://pubmed.ncbi.nlm.nih.gov/28159094/>
38. Gray EK, Watson D. General well-being and sleep quality in student populations. *J Pers Soc Psychol.* 2002;83(2):422–433.
39. Gregory AM, Buysse DJ, Willis TA, et al. Associations between sleep quality and anxiety and depression symptoms in a sample of young adult twins and siblings. *J Psychosom Res.* 2011;71(4):250–255. <https://pubmed.ncbi.nlm.nih.gov/21911005/>
40. Gupta R, Kumar A, Singh H, et al. Impact of Sleep Duration, Quality, and Chronotype on Learning and Academic Performance: A Cross-Sectional Study Among First-Year Medical Students of a Tertiary Care Institute. *Natl J Physiol Pharm Pharmacol.* 2023;13(6):792–798. Available from: <https://pubmed.ncbi.nlm.nih.gov/38222241/>
41. Gul N, Ehsan T, Gul A. Examining the Impact of Sleep Quality on Mental Health and Quality of Life among University Students. *Research Journal of Psychology.* 2025;3(2):425–435. Doi:10.59075/rjs.v3i2.108. Available from: <https://doi.org/10.59075/rjs.v3i2.108>
42. Hershner SD, Chervin RD. Causes and consequences of sleepiness among college students. *Nat Sci Sleep.* 2014;6:73–84.
43. Hershner SD, Chervin RD. Causes and consequences of sleepiness among college students. *Nat Sci Sleep.* 2014;6:73–84. Available from: <https://pubmed.ncbi.nlm.nih.gov/25018659/>
44. Hershner SD, Chervin RD. Causes and Consequences of Sleepiness among College Students. *Nat Sci Sleep.* 2014;6:73–84. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4209959/> <https://pubmed.ncbi.nlm.nih.gov/25228848>
45. Hertenstein E, Feige B, Gmeiner T, et al. Insomnia as a predictor of mental disorders: A systematic review and meta-analysis. *Sleep Med Rev.* 2019;43:96–105. <https://pubmed.ncbi.nlm.nih.gov/30445303>
46. Jahrami H, Binjibr MA, Alalawi IS, Alzahrani RA, Albalawi OS, Hamzah RH, Ibrahim YS, et al. The Worldwide Prevalence of Sleep Problems Among Medical Students by Problem, Country, and COVID-19 Status: a Systematic Review, Meta-analysis, and Meta-regression of 109 Studies Involving 59,427 Participants. *Curr Sleep Med Rep.* 2023;1–19. Doi: 10.1007/s40675-023-00258-5. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10238781/>
47. Jalali R, Khazaie H, SadeghiBahmani D. Poor sleep quality among Iranian university students: a systematic review and meta-analysis. *J Sleep Res.* 2020;29:e12909. Available from: <https://pubmed.ncbi.nlm.nih.gov/31899862>
48. Jandaghian-Bidgoli M, Kazemian E, Shaterian N, Abdi F, et al. Focusing attention on the important association between food insecurity and psychological distress: a systematic review and meta-analysis. *BMC Nutr.* 2024;10:118. Doi:10.1186/s40795-024-00922-1. Available from: <https://pubmed.ncbi.nlm.nih.gov/39243085/> 
49. Kara Y, Ayçiçek İ, Taşkın Yılmaz F. Effect of peer education on sleep hygiene and sleep quality in university students living in dormitories: a quasi-experimental study. *Int J Health Sci Res Policy.* 2024;9(3):183–195. Available from: <https://dergipark.org.tr/en/pub/ijhsrp/issue/87956/1505106>
50. Khattak AH, Ali H, Aslam A, Khan SA, Khattak ZJ. Association between Sleep Quality and Academic Performance among Medical Students in Pakistan. *Pak J Med Sci.* 2019;35(5):1355–1360. Available from: <https://www.pjms.com.pk/index.php/pjms/article/view/2908>
51. Knutson KL, Van Cauter E. Associations between sleep loss and increased risk of obesity, diabetes, and mental health problems: longitudinal evidence. *Sleep Med Rev.* 2008;12(3):193–201. Available from: <https://pubmed.ncbi.nlm.nih.gov/18375137/>
52. Komada T, Odashima M, Koyama Y. The effects of milk and dairy products on sleep: a systematic review. *Int J Environ Res Public Health.* 2020;17(24):9440. Doi:10.3390/ijerph17249440. Available from: <https://pubmed.ncbi.nlm.nih.gov/33339284/>
53. Labrague LJ, McEnroe-Petitte DM, Gloe D, Thomas L, Papatheanasiou IV, Tsaras K. A literature review on stress and coping strategies in nursing students. *J Ment Health.* 2017;26(5):471–480. <https://pubmed.ncbi.nlm.nih.gov/27832753/>
54. Levenson JC, Shensa A, Sidani JE, Colditz JB, Primack BA. The association between sleep quality and depression and anxiety symptoms among U.S. college students: sleep as a mediator of technology use effects. *Sleep Health.* 2017;3(4):417–21. Available from: <https://pubmed.ncbi.nlm.nih.gov/23320870/>

55. Leung WKC, Sum RKW, Lam SC. Relationships between perceived physical literacy and mental health in tertiary education students: a scoping review. *BMC Public Health*. 2025;25:117. Doi:10.1186/s12889-025-21337-y. Available from: <https://pubmed.ncbi.nlm.nih.gov/39789592/> ◆
56. Le Vu MN, Do AL, Boyer L, Tran QC, Kohler S, Ahmed SI, et al. A review of the effectiveness, feasibility, and acceptability of art therapy for children and adolescents during the COVID-19 pandemic. *Int J Environ Res Public Health*. 2022;19(18):11612. Doi:10.3390/ijerph191811612. Available from: <https://pubmed.ncbi.nlm.nih.gov/36141885/> ◆
57. Li L, Wang YY, Wang SB, Li L, Lu L, Ng CH, et al. Prevalence of poor sleep quality and its associated factors among Chinese university students. *Health Qual Life Outcomes*. 2020;18:210. Available from: <https://hql.o.biomedcentral.com/articles/10.1186/s12955-020-01465-2>
58. Li W, Wu J, Zhou M, et al. Longitudinal Study of Sleep Quality and Academic Engagement among First-Year University Students. *J Sleep Res*. 2022;31(4):e13589. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/jsr.13589>
59. Li WW, Qi H, Hong L, Chen C, Li CY, Ungvari GS, et al. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. *Sleep Breath*. 2020;24(3):1151–1165. Available from: <https://pubmed.ncbi.nlm.nih.gov/32072469/>
60. Lin Y, Zhou X. Bedtime smartphone use and academic performance: A longitudinal analysis. *Computers and Education Open*. 2022;3:100110. Available from: <https://doi.org/10.1016/j.caeo.2022.100110>
61. Liu X, Li Y. Influence of smartphone addiction on sleep quality of college students: The regulatory effect of physical exercise behaviour. *Psychol Res Behav Manag*. 2022;15:3197–3208. Available from <https://pubmed.ncbi.nlm.nih.gov/39058670/>
62. Lovato N, Lack L. The Effects of Sleep Hygiene Education on Cognitive Performance in University Students: A Randomized Trial. *Sleep Health*. 2019;5(1):42–49. Available from: <https://www.sciencedirect.com/science/article/pii/S2352721818300457>
63. Lu YA, Lin HC, Tsai PS, et al. Effects of digital sleep interventions on sleep among college students and young adults: systematic review and meta-analysis. *J Med Internet Res*. 2025;27:e69657. Available from: <https://www.jmir.org/2025/1/e69657>
64. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health*. 2010;46(2):124–132. <https://pubmed.ncbi.nlm.nih.gov/20113918/>---
65. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of poor sleep quality among U.S. college students. *J Adolesc Health*. 2010;46:124–32. Available from: <https://pubmed.ncbi.nlm.nih.gov/20113918/>
66. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health*. 2010;46(2):124–132. Available from: <https://pubmed.ncbi.nlm.nih.gov/20113918/>
67. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students. *J Adolesc Health*. 2010;46(2):124–132. Available from: [https://www.jahonline.org/article/S1054-139X\(09\)00380-7/fulltext](https://www.jahonline.org/article/S1054-139X(09)00380-7/fulltext)
68. Maheswari G, Shaikat F, et al. Impact of Poor Sleep Quality on the Academic Performance of Medical Students. *Cureus*. 2019;11(4):e4357. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6550515/>
69. Manandhar N, Aryal R, Shrestha R, et al. Assessment of sleep quality amongst undergraduate nursing students at a nursing campus in Nepal: a cross-sectional study. *JRAHS*. 2024;1(2):47–52. Available from: <https://jrahs.org/jrahs/index.php/jrahs/article/download/36/50>
70. Martinez WD, Ribeiro Filho MA, Casaleiro T, Sanches Rodrigues M, dos Santos ER, Longhi Aleixo D, et al. Psychological resilience in Latin America nursing students using the Wagnild and Young Scale: a scoping review. *Int J Environ Res Public Health*. 2025;22(9):1425. Doi:10.3390/ijerph22091425. Available from: <https://pubmed.ncbi.nlm.nih.gov/41007572/>
71. Masnan F, et al. The role of sense of purpose, time management, self-esteem and sleep quality on academic performance among Malaysian undergraduates. *Heliyon*. 2021;7(5):e06959. Available from: <https://www.sciencedirect.com/science/article/pii/S2405844021009969>
72. Medic G, Wille M, Hemels ME. Short- and long-term health consequences of sleep disruption. *Nat Sci Sleep*. 2017;9:151–161. <https://pubmed.ncbi.nlm.nih.gov/28983434/>

73. Mengistu G, Demeke W. Sleep quality and associated factors among university students in Africa: a systematic review and meta-analysis study. *Front Psychiatry*. 2024; (Article 1370757). Available from: <https://www.frontiersin.org/articles/10.3389/fpsy.2024.1370757/full>
74. Menezes-Júnior LAA, de Moura SS, Miranda AG, et al. Sedentary behavior is associated with poor sleep quality during the COVID-19 pandemic, and physical activity mitigates its adverse effects. *BMC Public Health*. 2023;23:1116. Available from: <https://bmcpubhealth.biomedcentral.com/articles/10.1186/s12889-023-16041>
75. Merellano-Navarro E, Bustamante-Ara N, Russell-Guzmán J, Lagos-Hernández R, Uribe N, Godoy-Cumillaf A. Association between Sleep Quality and Physical Activity in Physical Education Students in Chile in the Pandemic Context: A Cross-Sectional Study. *Healthcare*. 2022;10(10):1930. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9601690/>
76. Minghelli B, Santos S, et al. Sleep disorders in higher education students: modifiable factors and screening recommendations. *Sleep Breath*. 2022;26:1665–1674. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9464837/>
77. Mollayeva T, Thurairajah P, Burton K, et al. The Pittsburgh Sleep Quality Index as a screening tool: systematic review. *Sleep Med Rev*. 2016;25:52–73. Available from: <https://pubmed.ncbi.nlm.nih.gov/25895965/>
78. Mulyadi M, Tonapa SI, Luneto S, Lin WT, Lee BO. Prevalence of mental health problems and sleep disturbances in nursing students during the COVID-19 pandemic: a systematic review and meta-analysis. *Nurse Educ Pract*. 2021;57:103228. Doi:10.1016/j.nepr.2021.103228. Available from: <https://pubmed.ncbi.nlm.nih.gov/39792714/> 
79. Naik S, Kulkarni S, Devaranavadi AN. Sleep quality and associated factors among medical students. *Int J Community Med Public Health*. 2024;11:1590–6. Available from: <https://www.ijcmph.com/index.php/ijcmph/article/view/12521>
80. Nakie G, Mengistu G, Demeke W. Sleep quality and associated factors among university students in Africa: a systematic review and meta-analysis study. *Front Psychiatry*. 2024. Available from: <https://www.frontiersin.org/articles/10.3389/fpsy.2024.1370757/full>
81. Nursiswati N, Candradewini C, Sari DS, Kurniasih SA, Ibrahim K. Factors associated with healthy behavior for preventing non-communicable diseases: a scoping review among university students in ASEAN countries. *J Multidiscip Healthc*. 2025;18:1597–1613. Doi:10.2147/JMDH.S504338. Available from: <https://pubmed.ncbi.nlm.nih.gov/40125309/>
82. Owens JA, Weiss MR. Insufficient sleep in adolescents: causes and consequences. *Minerva Pediatr*. 2017;69(4):326–336. Available from: <https://pubmed.ncbi.nlm.nih.gov/28805108/>
83. Pacheco JP, Giacomini HT, Pinto Filho CR, Sella DL, et al. Sleepiness, sleep deprivation, quality of life, mental symptoms and perception of academic environment in medical students. *BMC Medical Education*. 2021;21:111. Doi:10.1186/s12909-021-02544-8. Available from: <https://bmcmmededuc.biomedcentral.com/articles/10.1186/s12909-021-02544-8>
84. Pan Y, Li F, Liang H, Shen X, Bing Z, Cheng L, Dong Y. Effectiveness of mindfulness-based stress reduction on mental health and psychological quality of life among university students: a GRADE-assessed systematic review. *Evid Based Complement Alternat Med*. 2024;2024:8872685. Doi:10.1155/2024/8872685. Available from: <https://pubmed.ncbi.nlm.nih.gov/38414520/>
85. Patel NP, Grandner MA, Xian D, Branas CC, Gooneratne N. Sleep disparity in the population. *Sleep Health*. 2015;1(1):40–47. Available from: <https://pubmed.ncbi.nlm.nih.gov/29073412/>
86. Phunthikaphadr T, Phothisiri W, Jomnonkwao S, Ratanavaraha V. Sleep quality and psychological well-being among undergraduate students at Walailak University, Southern Thailand. *J Health Res*. 2024;38(2):75–84. <https://www.emerald.com/insight/content/doi/10.1108/JHR-05-2023-0201/full/html>
87. Qiu D, Zhou C, Wang Y, Chen T, Wang Y, Wang T, et al. The association between night shift and sleep quality and health among Chinese nurses. *J Nurs Manag*. 2021 Aug;29(6):1625–1635. Doi:10.1111/jonm.13314. Available from: <https://pubmed.ncbi.nlm.nih.gov/33908108/>
88. Rao WW, Li W, Qi H, Hong L, Chen C, Li CY, Ungvari GS, et al. Sleep quality in medical students: a comprehensive meta-analysis of observational studies. *Sleep Breath*. 2020;24(3):1151–1165. doi:10.1007/s11325-020-02020-5. <https://pubmed.ncbi.nlm.nih.gov/32072469/>
89. Rezaei M, Poursadeqiyani M, Mohammadianinejad SE, et al. Sleep Quality, Resilience, and Academic Burnout in Medical Students: A Cross-Sectional Study. *J Educ Health Promot*. 2021;10:376. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8573872/>
90. Rosário J, Raposo B, Santos E, Dias S, Pedro AR. Efficacy of health literacy interventions aimed to improve health gains of higher education students — a systematic review. *BMC Public Health*. 2024;24:882. Doi:10.1186/s12889-024-18358-4. Available from: <https://pubmed.ncbi.nlm.nih.gov/38515114/>

91. Russo MA, Palladino S, Black D, et al. Sleep Quality and Its Associations with Physical and Mental Health-Related Quality of Life among University Students. *Int J Environ Res Public Health*. 2022;19(5):2874. Available from: <https://www.mdpi.com/1660-4601/19/5/2874>
92. Salari N, Hasheminezhad R, Almasi A, Hemmati M, Shohaimi S, Akbari H, Mohammadi M. The risk of sexual dysfunction associated with alcohol consumption in women: a systematic review and meta-analysis. *BMC Womens Health*. 2023;23:213. Doi:10.1186/s12905-023-02400-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/37131197/> 
93. Saruhanjan K, O'Connor D, et al. Psychological interventions to improve sleep in college students: a meta-analysis. *J Sleep Res*. 2021;27(1):e13097. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/jsr.13097>
94. Saulle R, De Sario M, Bena A, Capra P, Culasso M, Davoli M, De Lorenzo A, Lattke LS, Marra M, Rabaglietti E. School closures and mental health, wellbeing and health behaviours among children and adolescents during the second COVID-19 wave: a systematic review of the literature. *Epidemiol Prev*. 2022;46(5–6):333–352. Doi:10.19191/EP22.5-6.A542.089. Available from: <https://pubmed.ncbi.nlm.nih.gov/36384255/> 
95. Schiera M, Faraci F, Mannino G, Vantaggiato L. The impact of the pandemic on psychophysical well-being and quality of learning in the growth of adolescents (aged 11–13): a systematic review of the literature with a PRISMA method. *Front Psychol*. 2024;15:1384388. doi:10.3389/fpsyg.2024.1384388. Available from: <https://pubmed.ncbi.nlm.nih.gov/39377052/>
96. Schmickler JM, Blaschke S, Robbins R, Mess F. Determinants of Sleep Quality: A Cross-Sectional Study in University Students. *Int J Environ Res Public Health*. 2023;20(3):2019. Doi:10.3390/ijerph20032019. Available from: <https://doi.org/10.3390/ijerph20032019>
97. Schmickler JM, Blaschke S, Robbins R, Mess F. Determinants of sleep quality: a cross-sectional study in university students. *Int J Environ Res Public Health*. 2023;20(3):2019. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9915447/>
98. Shad R, Thawani R, Goel A. Burnout and sleep quality: A cross-sectional questionnaire-based study of medical and non-medical students in India. *Cureus*. 2015;7(10):e361. <https://pubmed.ncbi.nlm.nih.gov/26668672/>
99. Shochat T. Impact of lifestyle and technology use on sleep among students. *Nat Sci Sleep*. 2012;4:19–27. Available from: <https://pubmed.ncbi.nlm.nih.gov/23616703/>
100. Singh V, Sahu R, Kumar N, Thakur K, Gupta N. Association between Sleep Quality and Mental Health among Medical Students: A College Based Study in Himachal Pradesh, India. *Sleep Sci (Sao Paulo)*. 2023;16:27–34. Available from: <https://pubmed.ncbi.nlm.nih.gov/40511021/>
101. Sukying K, Rattananupong T, Wongpakaran N, Wongpakaran T, Chutikul P. Sleep quality and related factors among Thai medical students. *Sleep Med*. 2021;84:178–85. Available from: <https://pubmed.ncbi.nlm.nih.gov/34425389/>
102. Surani A, Zahid S, Surani A, Ali S, Mubeen M, Khan RH. Sleep quality among medical students of Karachi, Pakistan. *J Pak Med Assoc*. 2015;65(4):380–382.
103. Thomas AT, Waite J, Williams CA, Kirk J, Oliver C, Richards C. Phenotypic characteristics and variability in CHARGE syndrome: a PRISMA compliant systematic review and meta-analysis. *J NeurodevDisord*. 2022;14:49. Doi:10.1186/s11689-022-09459-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/36045324/>
104. Vail-Smith K, Felts WM, Becker C. Relationship between sleep quality and health-risk behaviors in undergraduate college students. *College Student J*. 2009;43(3):924–930. <https://eric.ed.gov/?id=EJ906609>
105. Vidović S, Rakić N, Kraštek S, Pešikan A, Degmečić D, Zibar L, Labak I, Heffer M, Pogorelić Z. Sleep Quality and Mental Health Among Medical Students: A Cross-Sectional Study. *J Clin Med*. 2025;14(7):2274. Available from: <https://pubmed.ncbi.nlm.nih.gov/40217724/>
106. Waqas A, Khan S, Sharif W, Khalid U, Ali A. Association of academic stress with sleeping difficulties in medical students of a Pakistani medical school. *J Pak Med Assoc*. 2015;65(1):134–138. PMID: 25802809. Link: <https://pubmed.ncbi.nlm.nih.gov/25802809/>
107. Webster CS, Luo AY, Krägeloh C, Moir F, Henning M. A systematic review of the health benefits of Tai Chi for students in higher education. *Prev Med Rep*. 2016;3:103–112. Doi:10.1016/j.pmedr.2015.12.006. Available from: <https://pubmed.ncbi.nlm.nih.gov/26844196/>
108. Wondie T, Molla A, Mulat H, et al. Magnitude and correlates of sleep quality among undergraduate medical students in Ethiopia: cross-sectional study. *Sleep Sci Pract*. 2021;5:7. Available from: <https://sleep.biomedcentral.com/articles/10.1186/s41606-021-00058-2>
109. Wondie T, Molla A, Mulat H, et al. Magnitude and correlates of sleep quality among undergraduate medical students in Ethiopia: cross-sectional study. *Sleep Sci Pract*. 2021;5:7. Available from: <https://sleep.biomedcentral.com/articles/10.1186/s41606-021-00058-2>

110. Whitehead JP, et al. Evening chronotype is associated with poorer sleep quality and higher levels of depressive symptoms among university students. *Brain Sci.* 2025;15(11):1142. Available from: <https://www.mdpi.com/2076-3425/15/11/1142>
111. Xiang YT, et al. Smartphone use and sleep quality in Chinese college students: A preliminary study. *Sleep Breath.* 2020;24(4):1727–1735. Available from: <https://pubmed.ncbi.nlm.nih.gov/32435208/>
112. Yaghmour W, Al-Hajjaj AM, Al-Faraj A, et al. The Effect of Sleep Quality and Mental Health on Academic Performance Among the Medical Students of King Abdulaziz University. *J King Saud Univ Sci.* 2023;35(4):102370. Available from: <https://pubmed.ncbi.nlm.nih.gov/37818494/>
113. Zhang B, Wing YK. Sex differences in insomnia: A meta-analysis. *Sleep.* 2006;29(1):85–93. <https://pubmed.ncbi.nlm.nih.gov/16453985/>
114. Zhang J, Paksarian D, Lamers F, Hickie IB, He JP, Merikangas KR. Sleep patterns and mental health correlates in U.S. adolescents. *J Pediatr.* 2017;182:137–143.e2. <https://pubmed.ncbi.nlm.nih.gov/27836254/>
115. Zhang J, Paksarian D, Lamers F, Hickie IB, He J, Merikangas KR. Sleep Patterns and Mental Health among College Students: A Cross Sectional Study in China. *BMC Psychiatry.* 2020;20:300. Available from: <https://bmcp psychiatry.biomedcentral.com/articles/10.1186/s12888-020-02717-1>
116. Zhao Y, Soh KG, Saad HBA, Rong W, Liu C, Wang X. Effects of active video games on mental health among college students: a systematic review. *BMC Public Health.* 2024;24(1):3482. Doi:10.1186/s12889-024-21011-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/39695572/>
117. Zhou Y, Wu D, Jiang SS, et al. Effect of sleep quality on anxiety and depression symptoms: the mediating effect of emotion regulation among Chinese college students. *J Affect Disord.* 2024;329:144–152. Available from: <https://pubmed.ncbi.nlm.nih.gov/37887511/>