

ORIGINAL RESEARCH

# The impact of nursing students' sleep hygiene practices on patient safety

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## ABSTRACT

**Background:** Nursing students are prone to inadequate sleep but not fully aware of personal health risks, potential safety and quality of care issues. Poor sleep hygiene can impact cognition, alertness, cognitive speed, and accuracy of tasks completion, lower grades, fatigue and depression.

**Methods:** This descriptive study addressed quantitative data from a 4-point Likert scale and open-ended questions. Nursing students from the National Student Nurse Association enrolled in an associate or baccalaureate program and having had at least one clinical experience were invited to participate in the study.

**Results:** Results indicate the amount of sleep needed is not being achieved. Participants reported ingesting substances to stay awake and to induce sleep. Nineteen percent of students reported making an error during a clinical experience.

**Conclusions:** Students may be naive in thinking short- and long-term use of sleep-inducing aides and stimulants for wakefulness pose no risks to personal safety and safety of patients. By identifying and addressing systemic causes of nursing students lack of sleep using a comprehensive approach to educate, impose consequences, and promote sleep hygiene at the local and national levels, students will have fewer reasons and justifications for not achieving adequate sleep.

**Key Words:** Nursing students, Sleep, Safety, Quality care

## 1. INTRODUCTION

Sleep is a necessary component of daily life to function adequately and safely.<sup>[1,2]</sup> Generally speaking, most people need between 6-8 hours of sleep within a 24-hour period.<sup>[3,4]</sup> When adequate sleep is not obtained, sleep debt accumulation may occur, requiring further attempts to catch up on sleep.<sup>[5]</sup> Healthcare professions, such as nursing, that require shift work, long hours, and daytime sleeping, may contribute to sleep loss; and nursing students who are engaged with coursework, clinical experiences, and employment are no exception. The lack of sufficient sleep may place nursing students at risk for lower grades and comprehension of the

material, increased errors within a clinical setting, and personal health and injury.<sup>[6]</sup> Nursing students today are an important part of the overall healthcare team and should make optimum decisions regarding their health, including sleep hygiene, to promote personal and patient safety.

A previous study by Thomas et al.<sup>[6]</sup> found (54%) of the nursing student participants were engaged in employment (e.g., full-time and part-time), often working 12-hour shifts (51%) while enrolled as a full-time academic student. The combination of working and being a full-time student can lead to sleep deprivation, potentially resulting in lack of judgement

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for personal and patient safety.<sup>[6,7]</sup> The American Nurses Association Guide to the Code of Ethics for Nurses Provision 3.6: Patient Protection and Impaired Practice states that an impaired nurse may result from an illness, physical and/or mental exhaustion, forms of grief, burnout, distractions, and any usage of substances that may lead to an unsafe practice.<sup>[8]</sup> To further investigate the sleep habits of nursing students, a second study was conducted with participants from the National Student Nurse Association (NSNA) (2022).<sup>[9]</sup>

### Literature review

An exhaustive literature search about the sleep patterns of nursing students was completed with very few results returning. Key words for data base included: sleep keywords (combined with OR) of patterns, deprivation, trends, and amount of search terms for CINAHL, Medline, PubMed, and Nursing & Allied Health (combined with sleep key words) included nursing student, nursing, nursing clinical practice, safety, and healthcare. Research articles discovered in search were included in the literature review.

For years nurses (24%-45%) have reported inadequate sleep patterns placing them at higher risks for medication errors, distractions, poor communication, and occupational injuries.<sup>[10]</sup> Additionally, Niu et al. (2013) concluded night shift nurses had a 40% higher likelihood of errors than nurses working a day shift.<sup>[11]</sup> Studies have shown adverse effects on the body from lack of sleep including hypertension, obesity, a variety of mood disorders, cardiovascular diseases, immune disorders, substance abuse and dementia.<sup>[6,12-17]</sup> Worley explains that, regardless of the increasing amount of research, people are still not getting sufficient sleep due to a variety of sleep disorders, erratic and altered work schedules, increased employment demands, and lifestyle choices that lead to personal health and safety issues, as well as safety issues for others.<sup>[18]</sup>

Thomas et al. found nursing students may be prone to inadequate sleep while not being fully aware of the personal health risks and potential safety and quality of care issues which may result.<sup>[6]</sup> Nursing students reported staying awake up to 19 hours/day, getting insufficient sleep, and consuming sleep-/wake-inducing substances while also engaging in clinical experiences, employment, and didactic coursework. Particularly concerning was the finding that nursing students did not demonstrate awareness of unhealthy sleep hygiene impact to personal safety and professional practice. The cumulative sleep loss combined with chemical ingestion to control sleep and wakefulness may contribute to alertness, errors in judgment, poor communication, as well as medication, treatment and other errors in the clinical environment. Nursing students are responsible for safe, quality patient care

when in a clinical environment and may not be exempt from making errors yet may not recognize the negative effects of unhealthy sleep hygiene to self and others.

According to Basner and Dinges sleep has many important functions, such as being essential for clear cognition, alertness, cognitive speed, and accuracy of task completion.<sup>[19]</sup> The accuracy of specific tasks is extremely important for the nurse. Cognitive performance and the ability to maintain attention begin to erode when awake for 16 hours or more, placing people at risk for potential errors in the workplace (e.g.) medication, treatment, communication, and transcription. People with a lack of sleep may also experience delayed reaction times and more periods of inattention than people with adequate sleep experience.<sup>[20]</sup> This information is especially important for nursing students who are still learning while preparing and administering medications, making quick decisions, and possibly addressing life threatening situations. Menon et al., found nursing students with poor sleep allocated fewer hours to study, tended to have lower grades, and exhibited more signs of depression.<sup>[21]</sup> Some nursing students are also engaged in a dangerous habit of consuming stimulants to stay awake and then consuming sleep aids when they are ready to fall asleep.<sup>[6,22]</sup>

Ferreira and De Martino used the Epworth Sleepiness Scale and the Sleep Journal to study 30 nursing students in Brazil in order to understand their fatigue levels and overall sleep patterns while studying during daytime hours and working during the night-time hours.<sup>[22,23]</sup> Nursing students were found to have high incidents of physical fatigue and daytime sleepiness, and women were more prone to these issues than men.<sup>[22]</sup> Ferreira and De Martino also found that nursing students who worked 12-hour night shifts and then studied during the day were more inclined to have higher levels of fatigue, potentially placing them at higher risk for lower performance at school and work.<sup>[22]</sup> There is evidence to believe that shortened sleep duration within a 24-hour period may be an important factor for circadian misalignment, causing increased sleepiness and increased susceptibility to mental health disorders such as depressive mood and bipolar disorders.<sup>[11,24]</sup> Hankinson noted that patient care is most often considered to be more important than the health and well-being of the nurse.<sup>[25]</sup> James, Butterfield, Tuell's study concluded sleep deprivation may likely impair the nursing student's overall confidence to practice safely when in a clinical environment.<sup>[26]</sup> Thomas et al., study concluded nursing students may lack the knowledge or intuition of the impact sleep deprivation can have on patient safety and quality of care, as well as personal health and safety.<sup>[6]</sup> Further, health-care workers often work alternating day and night shifts, which creates an additional negative impact to sleep/wake

patterns.<sup>[27]</sup> James et al. suggest education should be an important strategy to help nurses be more aware of the dangers of sleepiness in order to be intentional about developing healthy sleep hygiene.<sup>[27]</sup> However, there are appropriate questions as to how best to educate nursing students about the potential dangers of poor sleep hygiene personally and to the broader group of patients entrusted in their care as a student and subsequently as a professional registered nurse. This paper will present results from a national nursing student study regarding personal sleep habits and the potential negative impact on personal health, and patient safety and care.

## 2. METHODOLOGY

### 2.1 Purpose of the study

The purpose of the second phase sleep study was to gain specific information resulting from the initial (Thomas et al.'s) sleep study results; specifically, the purpose of this study was to determine how lack of sleep may negatively impact patient care and safety during a clinical nursing experience.<sup>[6]</sup> Since students are engaged in important tasks during a nursing clinical experience more information is needed regarding nursing student's sleep habits, perceived sleep needs, sleeping aids used to fall asleep, and stimulants used to remain awake (sleep hygiene) and the impact these perceptions and actions may have on personal and patient safety. The initial study was conducted with nursing students from one nursing program at a midwestern university. Results from the initial study indicated there were concerns about nursing students sleep hygiene and therefore, the researchers sought to conduct a subsequent study inviting students across the United States who were members of the National Student Nurses Association (NSNA). The specific problem statement was sleep deprivation among nursing students poses unsafe professional practice issues and decreased quality of care. Perceived contributing factors were (1) an increased need and or desire for students to seek employment while a full-time student, (2) a lack of sleep may be due to long working and clinical nursing experience hours, (3) these issues combined may lead to an increased risk for errors, increased stress, poor study performance, and increased risk for unsafe practice and decreased quality of care.

### 2.2 Design

The study was approved by the university institutional review board (IRB). This was a descriptive study addressing quantitative data using a 4-point Likert scale and open-ended questions regarding sleep and work habits and required clinical nursing experiences of nursing students enrolled in an associate and or baccalaureate nursing program and having had at least one clinical experience. The study questionnaire

was constructed from the results of the initial sleep study conducted by Thomas et al.<sup>[6]</sup> Individual questions were developed to learn more about nursing students' sleep hygiene practices and the potential negative impact on patient safety and quality of care. The questionnaire was sent via email to all nursing student members of the National Student Nurses Association (NSNA). Qualtrics was used as the online survey method. The Qualtrics link was available for 60 days with 2 reminders sent within the 60-day period. The reminders were sent in 30-day intervals. Additional information regarding the study importance and an invitation to participate was included in the study documents.

There were (N-317) participants who started the questionnaire and (N-250) completing the entire questionnaire.

### 2.3 Target sample

All undergraduate nursing student members of the National Student Nurses' Association (NSNA) for the 2021-2022 academic year were invited to participate in the study.<sup>[9]</sup> Specific criteria to participate in the study required the participant to have experienced at least one nursing clinical experience. The NSNA was selected due to the broad range of nursing student members across the United States representing associate and baccalaureate nursing programs. The survey was sent to the President of the NSNA who agreed to send out the survey link to all student members of the organization via their individual organizational emails and two reminders at 30-day intervals.

### 2.4 Instrumentation

The questionnaire was titled the Second Phase: A Study on Sleep Deprivation and the Impact on Nursing Student Safety and Practice. Students had 3 sections to complete. Part (A) addressed aspects of personal sleep habits with 8 questions/statements. Part (B) addressed employment and clinical nursing experiences with 6 questions. Part (C) addressed safety and expectations during a didactic class and or clinical nursing with 9 questions. There were a total of 23 survey questions. Descriptive statistics was used to analyze the quantitative questions, and qualitative content analysis were used for open-ended questions. All three researchers participated in the data analysis. The questionnaire was sent to students using the NSNA member email addresses. No individual names were included in the study. Only group information was reported.

### 2.5 Demographics

The majority of participants were between the ages of 18-24 (N-140), 25-30 (N-64), 31-36 (N-60), and 37-70 (N-53). There were freshman (N-19) and sophomore (N-55) students with the majority of students in their junior level

(N=98) or senior level (N=144) of the academic nursing program. Participants identifying as White were (N=212), Hispanic/Latino were (N=43), Native Hawaiian/Pacific Islander (N=3), Black/African American (N=32), Asian (N=24), and American Indian/Alaskan Native (N=2).

### 3. RESULTS

Overall, results indicate that the amount of sleep needed is not being achieved, and nursing students are using a variety of substances to stay awake and/or to induce sleep. There were no questions targeted to a specific age group of participants. While 72.8% of participants reported needing 7-9 hours of sleep to be alert, only 32.4% are sleeping 7-9 hours prior to class. Alarmingly, only 25.2% are sleeping 7-9 hours prior to a clinical nursing experience. The majority of participants reported receiving only 4-6 hours of sleep prior to class

and clinical nursing experiences; yet, over half of participants reported that they “sometimes” do not obtain enough sleep to feel alert during class or clinical nursing experience, and only 39.6% of participants reported “often” or “always” not obtaining enough sleep to feel alert during class or clinical nursing experience. This disparity in responses is of note since the answers are in direct contrast and may indicate a lack of insight or fear of answering truthfully. To address lack of sleep, 84.6% of respondents admit to consuming substances containing caffeine and/or amphetamines. This item allowed participants to type in preferred wakefulness-inducing substance(s) if they chose, and answers (N=169) ranged from caffeinated drinks to medications commonly prescribed for attention deficit hyperactivity disorder (see Figure 1).

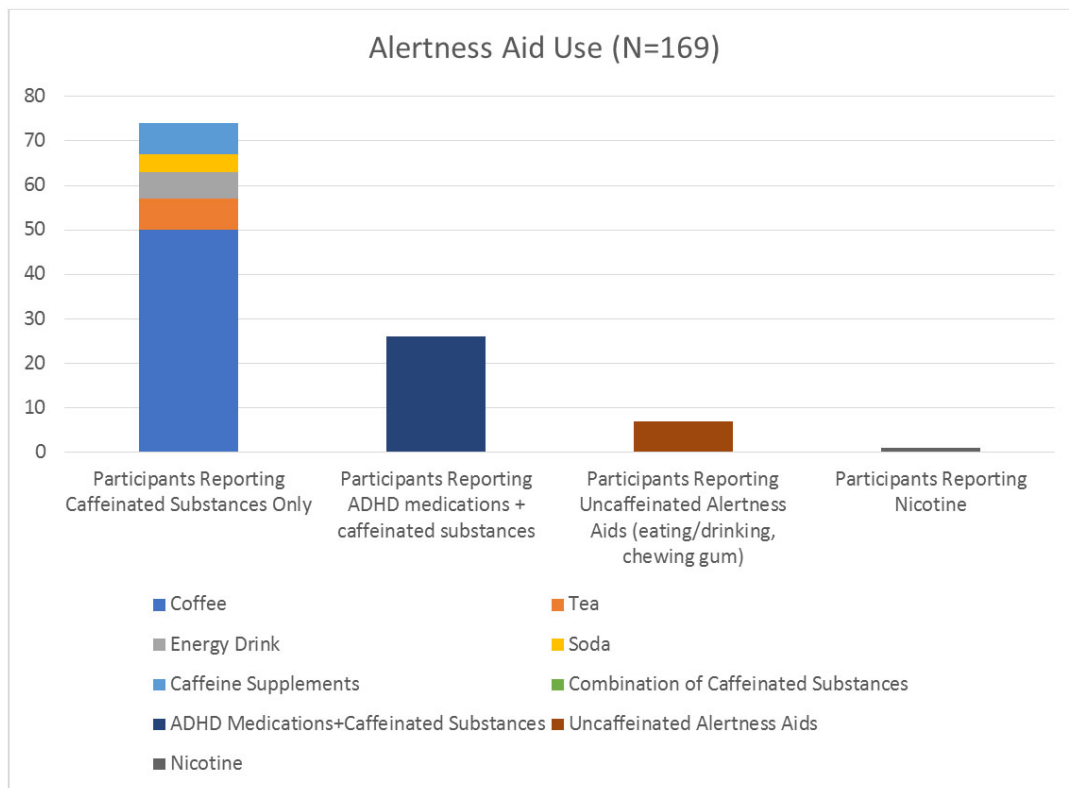
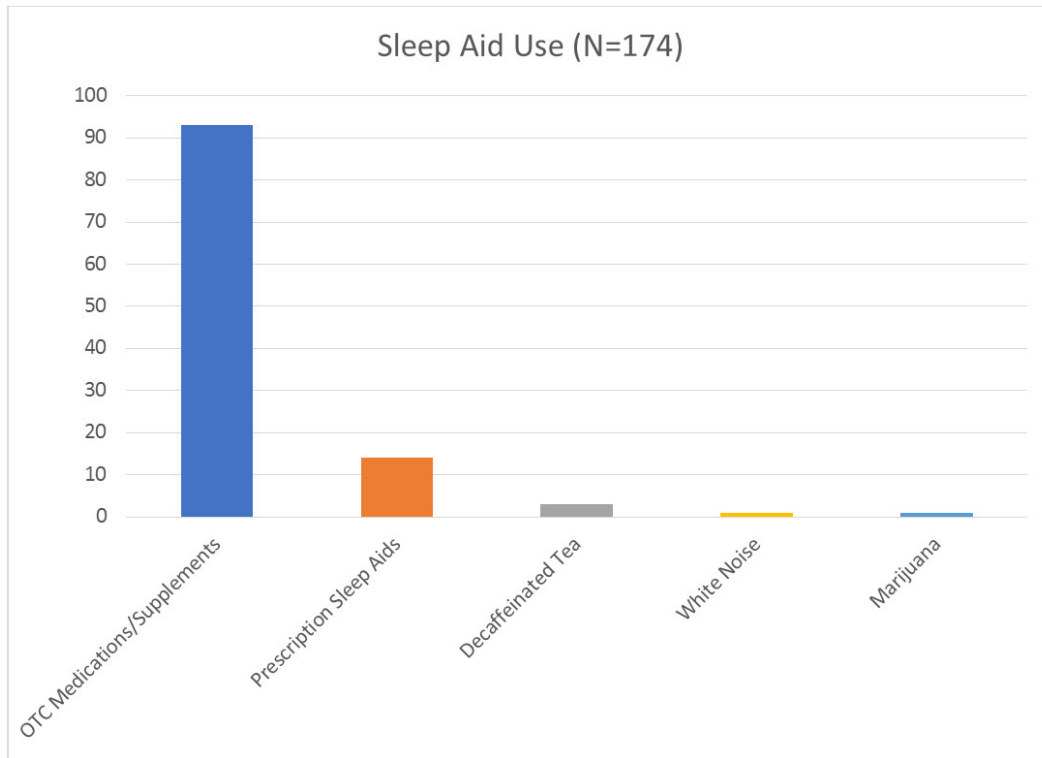


Figure 1. Alertness aid use

Over 90% of participants report ingesting substances in order to stay awake, and 69.5% of participants reported that they “always” or “often” consume substances to promote wakefulness. Conversely, 63.2% of participants admit to ingesting something to induce sleep. Again, this item allowed for students to type in preferred sleep aid(s) (see Figure 2).

Of the participants who reported taking sleep-inducing aids, 32.6% reported they “always” or “often” consume sleep aids

(see Figure 2). Further, approximately (N=165) 64.2% of participants reported having stayed awake 1 or more times in a 7-day period, and 48.8% report “sometimes,” “often,” or “always” staying awake 1 or more 24-hour periods per week. To ascertain the number of hours participants typically worked during a shift, researchers inquired about employment. Less than half (41.6%) of participants worked 8-hour shifts while 58.4% of participants worked 10-hours, 12-hours, or longer shifts.



**Figure 2.** Sleep aid use

Finally, Tables 1 and 2 illustrate nursing students’ perceptions of tiredness, resulting impacts personally, and to clinical practice, as well as student knowledge of sleep hygiene.

**Table 1.** Tiredness

	Never	Sometimes	Often	Always
“I often feel tired during my clinical nursing experiences.”	14 (5.62%)	119 (47.8%)	83 (33.3%)	33 (13.25%)
“I have fallen asleep during my clinical nursing experiences.”	230 (92.4%)	19 (7.6%)	0 (0%)	0 (0%)
“I often feel tired.”	6 (2.4%)	73 (29.3%)	101 (40.6%)	69 (27.7%)
“When I am tired, I often experience symptoms such as brain fog, inattention, &/or fatigue.”	9 (3.6%)	110 (44.2%)	93 (37.4%)	37 (14.9%)
“I believe I provide care consistent with clinical expectations when in a clinical nursing experience.”	1 (0.4%)	12 (4.8%)	100 (40.3%)	135 (54.4%)
“Clinical nursing experiences of 12 hours or more do not impact my ability to provide care consistent with clinical expectations.”	33 (13.3%)	104 (41.9%)	66 (26.6%)	45 (18.2%)
“Some of my nursing program clinical experiences are 12 hours or more.”	100 (40.5%)	69 (27.9%)	49 (19.8%)	29 (11.7%)
“I have worked more than 8-hours in a 24-hour period at my job prior to a didactic class or nursing clinical experience.”	98 (39.5%)	75 (30.2%)	51 (20.6%)	24 (9.7%)
“I have worked at my job 8-hours or more and had a nursing clinical experience within the same 24-hour period.”	149 (60.1%)	59 (23.8%)	27 (10.9%)	13 (5.2%)
“I have had a near miss error related to feeling tired during my clinical nursing experiences.”	211 (85.1%)	32 (12.9%)	4 (1.6%)	1 (0.4%)
“I have made an error related to feeling tired during my clinical nursing experiences.”	200 (81%)	46 (18.6%)	1 (0.4%)	0 (0%)

**Table 2.** Risk to self or patient safety

	Yes	No
"I believe 12-hour shifts pose no patient or personal safety issues for my clinical nursing experiences."	67 (26.8%)	138 (55.2%)
"I have worked at my job and then immediately went to my clinical nursing experience (or clinical nursing experience and then to my job) for multiple days in a row."	47 (19%)	201 (81.1%)
My nursing faculty have addressed the need for sufficient sleep prior to a class and or a clinical nursing experience.	175 (70.6%)	73 (29.4%)

#### 4. DISCUSSION

Study results revealed that nursing student participants recognized a need for, but were not achieving, adequate sleep due to school and employment responsibilities, which aligns with Blome, Johnson, Beck, and Jones's<sup>[28]</sup> and Thomas, et al.'s<sup>[6]</sup> studies. In an effort to induce asleep and then wake up when schedules require, students ingest substances to promote alertness and then induce sleep on a regular basis. These substances are of particular concern because of the potential side effects, especially related to long-term use: resetting of circadian rhythms, cardiac dysrhythmias, blood pressure variances, gastrointestinal disturbances, and cognitive abnormalities.<sup>[29-31]</sup> Lack of sleep and side effects of sleep/wake aids can negatively impact personal safety and, furthermore, may affect patient safety, as evidenced by 15% of participants reporting sometimes, often, or always making near-miss errors and 19% of participants reporting sometimes or often making errors during clinical nursing experiences. Researchers did not inquire about the types of errors made, but any errors during clinical practice are of concern; and while researchers cannot directly attribute near-miss and actual errors to lack of effective sleep hygiene practices, the correlation is certainly present and concerning.

The results of this broader study support and generalize the results of Thomas, et al.'s<sup>[6]</sup> initial study, which was limited to one nursing school's population of nursing students. Also, this second study further articulates the issues involved in nursing students' schedules and sleep hygiene and provides insight into the actual impact of insufficient sleep. Nursing students enrolled in nursing schools around the country reported similar experiences surrounding nursing school requirements and employment obligations, while also attempting to achieve sufficient sleep and to provide safe patient care. Consequently, these findings highlight the need for a systematic approach to addressing sleep hygiene in nursing students. While individual schools of nursing may take a proactive approach to addressing sleep hygiene, potential risks from lack

of appropriate sleep, and chronic use of sleep/wake-inducing substances, some schools may not. Therefore, it may be necessary to address this issue from a national perspective and make safe sleep hygiene part of the accreditation process.

#### Implications and recommendations

Nurse educators and nursing school leadership must collaborate for effective solutions that promote nursing student and patient safety. Research results indicated that nurse educators are encouraging effective sleep hygiene, but other results indicated that this encouragement is largely ineffective, so additional actions need to be taken. Actions may include surveying faculty and nursing students for identification of common times when decreased sleep occurs, such as nights prior to clinical experiences when students may stay awake to complete nursing care plans, and/or during days or weeks of multiple exams when students stay awake to study. Faculty may need to be more aware of sleepiness and impose consequences upon the students to gain their attention to this issue. Efforts to avoid requiring completed care plans/papers at the beginning of clinical experiences, and coordination with other faculty to prevent multiple exams on the same day or week, may be necessary. Moreover, sleep hygiene education at the beginning of nursing school courses may be more effective. Addressing incidents of errors or sentinel events related to lack of sleep or impairment in each course may reinforce the need for appropriate sleep hygiene. Education should include physical and psychological effects of unhealthy sleep/wake patterns to self and others, time management concepts, adverse effects of sleep/wake aids (especially when used chronically), holistic strategies for healthy sleep hygiene, and a requirement of students to create, commit to, and submit personal plans to manage time so that adequate sleep is achievable. Research demonstrates that holistic strategies, including relaxation techniques, physical exercise regimens, environmental modifications (such as lowering light and decreasing screen time before sleep), certain herbal teas and other natural supplements, massage, aromatherapy, and psychotherapy, all have the potential to improve sleep/wake cycles if used correctly.<sup>[32]</sup> College-age students may need motivation to seek out holistic therapies appropriate for them individually since not everyone reacts the same way and each student's schedule is different. Nursing students may fall within a wide age range and therefore, it would be interesting to determine if there is a higher incident of poor sleep hygiene among a particular age group. Nursing faculty may identify and provide students with information related to resources available within the larger university, as many student services departments offer different types of assistance related to student life and obligations, and health clinics may have helpful ideas and resources, as well.

## 5. CONCLUSION

Previous studies have found poor sleep hygiene may increase the risks for errors and personal safety for nursing students. Students may be naive in their thinking that short- and long-term use of sleep-inducing aides and stimulants for wakefulness pose little to no risks to their personal safety and the safety of the patients entrusted in their care. This naïve thinking about poor sleep hygiene should be of grave concern for patient safety and the quality of care provided to patients. This broader study confirmed many nursing students are engaged in dangerous practices of poor sleep hygiene and may

continue the practices into the professional registered nurse role.

By identifying and addressing systemic causes of nursing student lack of sleep using a more comprehensive approach to educate, impose consequences, and promote sleep hygiene at the local and national levels, students will have fewer reasons and justifications for not achieving adequate sleep.

## CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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