1 ## *Original Research Article*

2 **Sleep, Stress Management, and Internet Use among**

3 **Nursing Students in Saudi Arabia**

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5

6 **Abstract**

Background: Good sleep quality and quantity are crucial for ensuring a successful academic life for university students. Stress is a part of university students' academic life. Internet addiction is particularly a problem among young adults and undergraduate students.

Method: The study explored sleep patterns, stress management, and Internet use in 114 nursing students from a nursing college in Saudi Arabia. A self-administered questionnaire collected data on sociodemographic characteristics, sleep patterns, stress management, and Internet use. Data were collected over two weeks at the beginning of the spring semester in 2018.

Results: Results showed that only 16.3% of the students slept for ≥8 hours daily. The main cause of students' stress was exams (89.4%) and 38.5% used the Internet for >6 hours daily.

Conclusions: Further studies are recommended to assess the correlation of university students' sleep patterns with academic performance, effects of different coping strategies to alleviate stress, and Internet addiction.

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Keywords: Sleep patterns, stress management strategies, Internet use

22 **Introduction**

23 Sleep is considered a vital aspect of cognitive health restoration, particularly for
24 university students and academic personnel; moreover, it is important for successful
25 academic performance and personal functioning in university students (Ali et al., 2013).
26 Sleep affects information processing and retention, learning ability and capability, and
27 memory recall (Schlarb, Friedrich, et al., 2017). In addition to the number of hours spent
28 sleeping, the time at which people sleep is crucial for adequate daytime functioning (Schlarb
29 et al., 2015; Schlarb et al., 2017). Disordered sleep is considered a complex condition and has
30 a significant impact on physical and mental health, cognition, learning, and overall wellbeing
31 (Lichliard et al., 2017). Uninhibited

32 Up to 60% of all college students suffer from poor sleep quality, and a small number
33 of them meet all criteria of insomnia and its related disorders (Schlarb, Friedrich, et al.,
34 2017). Students' enrollment at universities is associated with numerous factors, including
35 academic obligations and requirements, a new and exciting social atmosphere, and changes in
36 sleeping circumstances, which contribute to changes in sleep hours and habits (Qidwai et al.,
37 2010). Most sleep specialists concur that although adults require from 6–8 hours of sleep
38 daily, sleep patterns in young adults differ from those of their adult counterparts in several
39 ways, including the need for long sleep duration (Gray & Watson, 2002). University students
40 are at high risk of developing sleep disorders such as difficulty falling asleep, insomnia,
41 waking frequently at night, and nightmares. Poor sleep quality hurts activities of daily living
42 and academic performance in university students (Schlarb, Friedrich, et al., 2017; Schlarb et
43 al., 2012).

44 According to Thawabieh and Qaisy (2012), psychological well-being is negatively
45 related to levels of stress among university students, and the use of positive coping strategies
46 for stress exerts significant positive effects on psychological health. Stress is considered one

of the main concerns affecting university students, as they experience academic stress resulting from exposure to different methods of teaching and learning, varying academic requirements, and unique social and professional relationships with peers and faculty members. In addition, stress could prevent university students from focusing and enjoying learning, behaving cordially, and using their special abilities (Thawabieh & Qaisy, 2012).

Cumulative and unresolved stressors contribute to anxiety, disappointment, depression, substance abuse, and violence. Stress has become common and is considered a critical issue in university students; however, it can be controlled via stress management strategies (Chen et al., 2009).

The Internet is a particularly significant resource for university students' education and entertainment. Numerous academic institutions and universities provide Internet access to their students and faculty members. Moreover, there are various learning materials entrenched on the Internet, and students can access information quickly (Hossain et al., 2018). Many researchers have shown that university students use the Internet to gather information; send and receive emails or texts; chat; download music, movies, or images; shop; and play games (Alshammari, 2014).

Internet addiction, or excessive use of the Internet, is a worldwide problem that emerged with the rapid development of advanced technology. It is an issue in all age groups, but particularly among teenagers and undergraduate university students. Recently, high levels of Internet overuse, which is considered a type of behavioral addiction, have been reported in university students (Alshammari, 2014). Moreover, adolescents who engage in Internet overuse are at a high risk of serious psychological disorders such as depression (Ko et al., 2012).

In addition, university students and their physical and mental health are of concern and the focus of global attention, in particular for nursing students, as the role of student

nurses in health maintenance and promotion is of prime significance. Among overall health promotion services, nurses play a specific role: they are often expected to be role models for their patients. Nurses serve as role models of health-promoting lifestyles and as leaders for health promotion in communities (Al-Kandari & Vidal, 2007). Furthermore, teaching about a healthy lifestyle is one of the most effective techniques of fostering health promotion among nurses. Therefore, this study aimed to explore sleep patterns, stress management, and Internet use among nursing students.

Research Question

80 What are nursing students' sleep patterns, stress management strategies, and patterns of Internet use?

82 **Methods**

Research Design

84 A quantitative descriptive design was conducted to accomplish the aim of the study.

Setting

86 The study was conducted at King Saud bin Abdulaziz University for Health Sciences

Sample

88 The study sample included all Level-4 female nursing students ($N = 114$) completing their second academic semester. We chose to assess Level-4 students' practices, as they are at the beginning of their university careers. No information related to healthy sleep patterns, stress management strategies, or Internet addiction hazards was provided to the students. Data were collected during the spring semester of the 2017-2018 academic year.

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Inclusion Criteria

96   The inclusion criteria were being Level-4 nursing students, attendance at a lecture hall

97 at the time of data collection and consenting to participate in the study. The exclusion

98 criterion was nursing students at other levels.

Data Collection Tool

100   Following an extensive review of the literature and related research papers, the

101 researcher developed a structured self-administered questionnaire to collect data regarding

102 students' practices related to sleep patterns, stress management strategies, and Internet use. The

103 questionnaire included four sections as follows.

Section I: Sociodemographic Characteristics

105   Section 1 collected data regarding sociodemographic characteristics including age,

106 marital status, and place of residence.

Section II: Sleep Pattern Assessment

108   This section included twelve statements designed to clarify students' sleep patterns,

109 and measured the number of hours spent sleeping, sleep quality, sleep disorders, the presence

110 of fixed sleep and wake times, special rituals at bedtime, and afternoon naps (responses:

111 usually, sometimes, and rare).

Section III: Stress Management Assessment

113   This section assessed students' stress management strategies and included three

114 subsections. **a)** Causes of stress (12 items). Participants were required to choose one or more

115 of the twelve items that caused them stress. **b)** Experiences related to stress (10 items).

116 Examples of these items are as follows: "I maintain meaningful and positive relationships

117 with others," "I spend time with a close friend whenever possible," and "I take some time off

118 to relax each day" The responses were categorized into usually, sometimes, and rarely. **c)**

119 Different strategies used to manage stress (15 items). These items included dancing, reading,

119 praying, eating, or crying. Participants were required to choose one or more responses from

121 the list.

Section IV: Internet Use Assessment

123 This section included two parts. **a)** One statement to identify the number of hours of

124 Internet use per day (including Facebook, Twitter, WhatsApp, Messenger, searching,

125 chatting, watching movies, etc.). The participants were required to choose the total number of

126 hours of daily Internet use from the following: 1-2, 3-4, 5-6, or more than 6 hours. **b)** Ten

127 statements assessing students' patterns and effects of Internet use including interference of

128 the Internet with students' sleeping hours, studying hours, academic performance, eating and

129 nutrition, effects of the Internet on stress and mood, Internet use hours exceeding intended

130 use, and going online before completing other tasks. Students responded "Yes" or "No"

131 based on their experience.

132 The validity of the questionnaire was evaluated via revision conducted by a panel of

133 seven nursing faculty members in psychiatric, medical-surgical, and community health

134 nursing. The reliability of the questionnaire was assessed by using test-retest before data

135 collection, and Cronbach's α was .90. A pilot study was conducted with ten students to assess

136 the clarity and applicability of the questionnaire. The necessary revisions were then

137 completed, and these ten students were excluded from the main study. Data were collected

138 over two weeks at the beginning of the spring semester in 2018.

Ethical Considerations

140 Ethical approval for the study was obtained from the IRB committee at the King Saud

141 Bin Abdul-Aziz University for Health Sciences and King Abdulla International Medical

142 Research Center (approval No H-18-419812-114561). The participants who agreed to take

143 part in the study were requested to sign an informed consent form, which incorporated

144 detailed information regarding the research aims and objectives, the voluntary nature of

participation, and their right to withdraw from the study at any time throughout the study

process without penalty or interference with their studies or grades. Confidentiality was

ensured throughout the study process, and the students were assured that all data would be

used only for research purposes.

Data Collection Procedure

The questionnaire was distributed to all nursing students in a lecture hall, during their

free time, and according to student availability. Each questionnaire took 20–30 minutes to

complete, and the researcher was available to provide clarification and answer any questions.

Statistical Analysis

SPSS version 22 was used to analyze the students' data. Means and standard

deviations were used to report continuous variables, and frequencies and percentages were

presented for categorical variables.

Results

A total of 104 students participated in this study. The results showed that students'

ages ranged from 18–23 years. Most of them (78.8%) were 20 years of age or older, while the

remaining 21.2% were younger than 20 years. Additionally, all students were single and lived

in Riyadh, Saudi Arabia.

The distribution of the number of hours that students usually slept showed that the

proportion of those who slept for 4–5 hours per night was the largest (47%). Approximately

one-third of participants (36.5%) slept for 6–7 hours per night and only 16.3% of students

reported that they slept for ≥8 hours per night.

Table 1 presents the distribution of students' sleep patterns. The results showed that

more than half of the students usually took a nap in the afternoon or early evening, and an

equal number usually felt that they had not slept enough almost every morning. Moreover,

169 most students reported that they rarely went to bed at a fixed time each night or early every night 170

171 The same table also indicates that less than half of the students sometimes felt that they 172 had slept for long enough, and an equal number sometimes felt exhausted when they woke 173 up in the morning. Additionally, more than a third of the students stated that they usually 174 enjoyed a good night's sleep, and a similar number usually woke up early every morning 175. Moreover, some students experienced sleeping difficulties and followed special rituals 176 at bedtime.

177 [Table 1 here]

178 Table 2 shows the experience of stress and its causes among the students. The results indicate 179 that the main cause of students' stress was exams, followed by the burden of studying 180, poor time management, and the burden of the clinical setting. The least common cause 181 of their stress was psychological problems, followed by social relationships and financial 182 problems.

183 [Table 2 here]

184 The same table shows that the majority of the students usually believed that their lives had 185 purpose and looked forward to the future. In addition, more than half of the students usually 186 took time off to relax each day, maintained meaningful and fulfilling relationships with 187 others, and felt content and at peace with themselves.

188 This table also indicates that more than a third of students spent time with close friends 189 whenever possible and had special strategies to relieve their stress. Additionally, small 190 proportions of students sometimes believed that their lives had a purpose and looked forward 191 to the future. Moreover, less than half of the students rarely found it easy to show or share 192 their emotions and feelings, while an equal proportion rarely believed that their lives

had 193 purpose. Further, a small proportion rarely took time off to relax every day, look

forward 194 to the future, or felt content and at peace with themselves.

195 Table 3 illustrates the distribution of students' stress management strategies. The

results 196 showed that the most common strategy used by students to manage stress was Internet

use, 197 followed by reading the Quran, going to bed or sleep, eating, and watching TV or

movies 198. Further, more than half of the students chatted with friends, listened to music, and

cried 199 to relieve stress, while the smallest proportion of students managed stress through

housework 200 or chores and cooking.

201   [Table 3 here]

202 Figure 1 illustrates the distribution of the number of hours during which students used

the Internet 203. The results showed that very few students spent 1–2 hours using the Internet

daily, 204 while more than a third used the Internet for 5–6 hours or >6 hours daily. In addition,

less 205 than a quarter of students spent 3–4 hours using the Internet daily.

206   [Figure 1 here]

207 Table 4 shows the distribution of students' purpose and patterns of Internet use. The

results 208 showed that similar proportions of students reported that their Internet use interfered

with 209 their sleep and that they usually stayed online longer than intended. Additionally, more

than 210 half of the students used the Internet before performing any other tasks. Moreover, most

students 211 reported that their Internet use interfered with their studies; stated that they felt

satisfied 212, happy, and in a good mood while online; and using the Internet as a stress-relieving

strategy 213. Further, more than half of students found life without the Internet boring, empty,

and joyless 214; however, more than a third stated that their Internet use interfered with their

academic 215 performance and tried to conceal from others the number of hours they spent

online 216

217 The same table shows that the proportion of students who used the Internet for social

218 interaction was the largest, followed by those who used it for academic reasons, to send e-

219 mails, and to listen to the Quran. The lowest proportion of students used the Internet to play

220 games and read the news.

221   [Table 4 here]

222   **Discussion**

223 Sleep patterns exert considerable effects on physical health, mood stability, and

224 cognitive functioning. The present study showed that approximately half of the nursing

225 students lacked sleep, as they slept for only 4–5 hours per day, while most adults require 7–9

226 hours of sleep daily (Cappuccio et al., 2010). Consequently, more than half of the students

227 felt that they had not slept for long enough almost every morning, and approximately half felt

228 tired and exhausted when they woke up in the morning. Additionally, only small proportions

229 of the students usually slept for a sufficient number of hours, went to bed early every night,

230 and felt relaxed and well upon waking up in the morning.

231 These results are consistent with those reported by Zeek et al. (2015), who found that

232 more than half of their participants reported sleeping for ≤6 hours each night and felt tired

233 upon waking almost every day. The results are also congruent with those of Ali et al. (2013),

234 who stated that, because of various academic requirements, students could not go to bed early

235 or sleep for long enough to perform well during the day. Further, the findings support those

236 of Scharb, Claßen et al. (2017), and numerous other previous studies (e.g., Nadorff et al.,

237 2011; Taylor et al., 2011) which indicated that students showed symptoms of impaired

238 subjective sleep quality. Recently, Lawson et al. (2019) reported results indicative of poor

239 sleep quality among university students.

240 In contrast, the present results are inconsistent with those of Gilbert and Weaver

241 (2010) which indicated that participants slept for an average of 7.2 hours; however, 70%

reported poor sleep quality and poor sleeping habits, which may be attributed to the change in lifestyle since 2010 and being online for a long time, especially at night.

Stress prevents college students from focusing on and enjoying learning, behaving cordially, and exposing their unique abilities. The present results suggested that exams, the burden of studying, poor time management, and the clinical setting were the main causes of students' stress. In addition, most students usually believed that their lives had a purpose, looked forward to the future, and felt content and at peace with themselves, which could be attributed to the fact that junior university students are at the beginning of adult life; have visions of the future; are full of hope, energy, and have many plans to achieve; and are exposed to open university communities wherein they can create meaningful relationships with peers, friends, and faculty members. In addition, the students frequently used eating, praying, reading the Quran, online interactions, and watching TV or movies as stress relief and management strategies.

The current results were consistent with those of Bukhsh et al. (2011) who showed that most of the university students in their study reported that they received support from friends and family members when stressed and watching TV or movies and staying occupied with various activities of interest, reduced their stress. Similar results were reported by Bhargava and Trivedi (2018), who showed that students coped with stress by talking to family members, watching movies, playing games, and using the Internet; in contrast, the findings of the Bhargava and Trivedi (2018) study contradict the present findings regarding the causes of students' stress, as they showed that the main stressors for university students were psychological, financial, and career-related.

The results of many other studies are congruent with those of the present study, in that they demonstrated that academic burden and having numerous assignments to complete were the most frequently reported causes of student stress, and the main coping strategies were

going to a movie or dancing (Agolla & Ongori, 2009; Bakhsh & Sayed, 2015; Mason, 2017; McGonigal, 2015). Furthermore, the findings of Ab Latif and Mat Nor (2019) are consistent with the results of the present study and showed that nursing students perceived heavy workload as one of their major stressors. Shdaifat et al. (2018) supported the present study and found that students reported that the most common sources of stress were assignments and workload, teachers and nursing staff, and the stress of taking care of patients.

The Internet is currently used for academic achievement, social and personal interactions, commercial and political purposes, and entertainment. The present study demonstrated that the proportion of students who spent >6 hours using the Internet daily was the largest. This interfered with their sleeping and studying, and they used the Internet for longer than intended; moreover, they felt satisfied and happy, and we are in a good mood when online and used the Internet before performing any other tasks. In addition, large proportions of students used the Internet for social interactions, academic purposes, sending emails, and listening to the Quran, while few used it to play games or read the news. This result could have occurred because students were required to submit numerous assignments to meet academic requirements and used the Internet to gain knowledge easily; in addition, being a woman in an Islamic country could have made them less involved in playing Internet games or reading the news.

The findings of Hossain and Rahman (2017) supported the results of the present study and indicated that the Internet is a crucial tool used by students for education and entertainment. The current results were also in line with those of Ruzgar (2005), which showed that saving time and ease of work were the main reasons for Internet use among university students. Moreover, a study conducted at engineering colleges in the states of Punjab and Haryana in India showed that all respondents used the Internet frequently (Kaur & Manhas, 2008), and Hossain and Rahman (2017) found that most respondents used the

Internet almost every day for academic, communication, entertainment, and financial purposes. Numerous other studies have demonstrated that university students' Internet use was mainly for academic, educational, research, social media, or entertainment purposes, and the duration of Internet use ranged from 1 to 2 hours daily (Almarabeh et al., 2016; Chhachhar et al., 2013; Mostafa, 2011; Pempek et al., 2009).

In contrast, the findings of a study in Bangladesh contradicted the present results and showed that several factors, including the high cost of Internet connectivity, unavailability of power, and infrastructure concerns, obstructed Internet use (Sujatha, 2010). This may be explained by the fact that in Saudi Arabia, where economic and financial conditions are good, the reasonable cost of Internet connectivity proportionate to an individual's income and the availability of smartphones, laptops, and iPads have made long-term Internet use available and easily accessible. In the same context, Apuke and Iyendo (2018) stated that the rationale for Internet utilization for academic and research purposes stems from the benefits derived, such as free access to online journals, magazines, and other information resources; moreover, Ali et al. (2013) reported that the main purpose of using the Internet was for study, recreation, relaxation and using social networking sites.

Conclusion

The present study showed that most students lacked sleep and felt exhausted upon waking. Regarding stress, exams and the burden of studying were the main causes of student stress, which could be relieved via different stress management strategies. Concerning Internet use, a considerable proportion of students spent >6 hours per day using the Internet, which interfered with their sleep and study, and they used the Internet mainly for academic, social media, or entertainment purposes.

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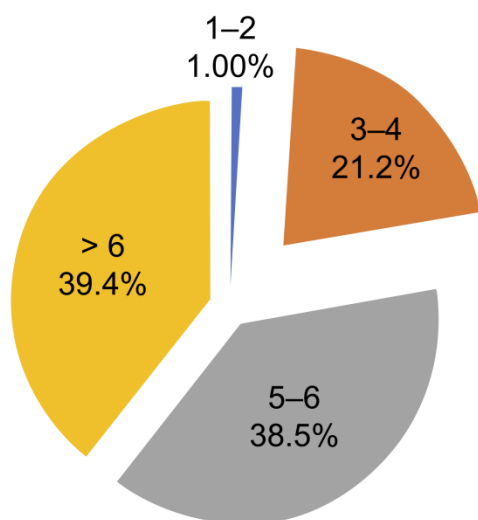
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431

Figure legend

Figure 1. Numbers of hours during which students used the Internet

435

436

Table 1

Distribution of students' sleep patterns

Sleep pattern	Students (N = 104)					
	Usually		Sometimes		Rarely	
	n	%	*n*	%	*n*	%
1. I sleep for long enough.	10	9.6	48	46.2	46	44.2
2. I enjoy a good night's sleep.	38	36.5	33	31.7	33	31.7
3. I go to bed at a fixed time every night.	13	12.5	16	15.4	75	72.1
4. I go to bed early every night.	4	3.8	17	16.3	83	79.8
5. I wake up early every morning.	40	38.5	44	42.3	20	19.2

6. I take a nap in the afternoon or early evening.	64	61.5	23	22.1	17	16.3
7. I do not feel that I have slept for long enough almost every morning.	64	61.5	26	25.0	14	13.5
8. I do not have a good night's sleep, as I wake up once or twice at night.	25	24.0	37	35.6	42	40.4
9. I feel relaxed and well when I wake up every morning.	17	16.3	49	47.1	38	36.5
10. I feel exhausted when I wake up every morning.	30	28.8	48	46.2	26	25.0
11. I have sleeping difficulties/problems.	22	21.2	36	34.6	46	44.2
12. I have special bedtime rituals	35	33.7	27	26.0	42	40.4

439

Tab14e02

Dis4421ution of students' causes and experience of stress

Cause of stress	**Students**	
	(N = 104)	
	n	*%*
1. Burden of studying	89	85.58
2. Different educational setup	50	48.08
3. Assignments	78	75.0
4. Clinical setting	85	81.73
5. Exams	93	89.42

	n	%
6. Poor time management	88	84.62
7. Teacher-student relationships	78	75.0
8. Competitive university environment	76	73.08
9. Career growth	46	44.23
10. Social relationships	34	32.69
11. Financial issues	35	33.65
12. Psychological problems	20	19.23

Stress experience	Students (N = 104)					
	Usually		Sometimes		Rarely	
	n	%	n	%	n	%
1. When I feel stressed, I discuss my problems and concerns with people close to me.	38	36.5	27	26.0	39	37.5
2. I take time off to relax each day.	55	52.9	43	41.3	6	5.8
3. I believe that my life has purpose.	84	80.8	15	14.4	5	4.8
4. I maintain meaningful and fulfilling relationships with others.	71	68.3	26	25.0	7	6.7
5. I look forward to the future.	85	81.7	14	13.5	5	4.8
6. I spend time with close friends whenever possible.	51	49.0	39	37.5	14	13.5
7. I feel content and at peace with myself.	64	61.5	38	36.5	2	1.9
8. I find it easy to show/share my emotions and feelings.	13	12.5	44	42.3	47	45.2

	44	42.3	37	35.6	23	22.1
9. I have special strategies to relieve my stress.	44	42.3	37	35.6	23	22.1
10. I seek help and counseling when needed.	36	34.6	30	28.8	38	36.5

Note. More than one answer was chosen for causes of stress

Table 3

Distribution of the students' stress management strategies

Strategy	Students (N = 104)	
	n	%
1. Eating	65	62.5
2. Dancing	34	32.7
3. Shopping	36	34.6
4. Reading	37	35.6
5. Physical exercise	46	44.2
6. Praying	64	61.5
7. Reading the Quran	70	67.3
8. Internet use	71	68.3
9. Speakingor chatting with friends	58	55.8
10. Going to bed/sleeping	66	63.5
11. Housework/chores	31	29.8
12. Cooking	31	29.8
13. Watching TV or movies	65	62.5
14. Listening to music	54	51.9
15. Crying	55	52.9

Note. 445 More than one answer was chosen

Table 4 447

Distribution of the purposes and pattern of students' internet use 448

Purpose of internet use	Students (N = 104)	
	n	*%*
1. Academic (topics, information gathering, and assignments)	89	85.58
2. Social interaction	100	96.15
3. Online shopping	53	51.0
4. Emailing	67	64.42
5. Reading the news	18	17.31
6. Watching movies and videos	43	41.35
7. Playing music	52	50.0
8. Listening to the Quran	65	62.5
9. Playing games	12	11.54
Pattern of Internet Use	**Students (N = 104)**	
	n	*%*
1. My Internet use interferes with my sleep.	69	66.3
2. My Internet use interferes with my study	79	76.0
3. My Internet use interferes with my academic performance.	40	38.5
4. My Internet use interferes with my eating habits.	52	50.0
5. I usually stay online longer than intended.	69	66.3
6. I use the Internet before performing any other tasks.	65	62.5

449

7. Life with no Internet is boring, empty, and joyless.	54	51.9
8. I try not to tell others how many hours I spend online.	37	35.6
9. I feel satisfied and happy and am a good mood when I am online.	67	64.4
10. Being online relieves my stress	55	52.9

Note. More than one answer was chosen

449

450

451