# Are University Students Have a Good Quality of Sleep?: An Exploratory Study(*)

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## Abstract:

**Background:** Sleep is an important factor in activity and achievement. This study aims to examine the quality of sleep among university students in Yemen and Saudi Arabia.

**Methods:** An online survey method was used. The sample size was (636) (46.23% female N=294, 36.64% N= 233 Yemeni students and 63.36% N=403 Saudi students). Participants responded to Arabic version of the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Difficulties Questionnaire (SDQ).

**Results**: The prevalence of poor sleep quality among university students was (25.63%) and sleep difficulties was (25%). A total of 23.60% of Yemeni students had poor sleep quality and 27.90% had sleep difficulties. While, 26.79% of Saudi students had poor sleep quality and 23.32% had sleep difficulties. There were no significant differences between students of two countries in sleep quality or sleep difficulties. Quality of Sleep and Sleep difficulties were significantly correlated with academic performance in the overall sample and in the group of Saudi students.

**Conclusions**: The prevalence of poor sleep quality and sleep difficulties is high among university students, which may negatively affect their academic performance. There is an urgent need for psychological intervention, as well as a need for more research in this field.

**Keywords:** Sleep Disorders, Sleep Quality, Sleep Difficulties, Insomnia, Academic Average, Middle East, and University students.

## 1. Introduction

Sleep quality refers to the quantitative and qualitative sufficiency of sleep, and to the enjoyment of vitality and activity during one's work. Sleep quality helps facilitate the process of remembering and learning (Maheshwari & Shaukat, 2019) and improve executive functions and information processing. It has also become known that sleep difficulties and decreased sleep quality are associated with lower quality performance and daily behavior among humans.

The complaint of sleep difficulties is consistent with the information confirmed by researchers about the negative effects that sleep difficulties has on public health, function and quality of life (Abdel-Khalek & El Nayal, 2017). These effects appear in the form of excessive daytime sleepiness, decreased memory and attention, and other disturbances in the activity of some bodily systems (Kryger, Monjan, Bliwise, & Ancoli-lsrael, 2004). It has been found that the negative effects of poor sleep quality on daily activities extend to students' performance (Merdad, Merdad, Nassif, El-Derwi, & Wali, 2014). Studies have shown that university students constitute one of the groups that are most vulnerable to sleep problems (Friedrich, Claßen, & Schlarb, 2018) and that they might have difficulty sleeping as well as experience nightmares, wake up frequently at night, and experience poor daytime activity (Schlarb, Friedrich, & Claßen, 2017).

A German study compared students in Germany and Luxembourg and found an increasing prevalence of poor sleep quality among university students in both countries (Schlarb, Claßen, Grünwald, & Vögele, 2017). Also, one of the most striking results of the study revealed by Schlarb and colleagues (Schlarb et al., 2017b) was that 74% of university students reported symptoms of insomnia, while 51.9% met the DSM-5 criteria for insomnia. Jain and Verma (2016) found that 4% of the study sample had insomnia. Thomas (2014) reported higher prevalence of sleep problems among university students. The researcher diagnosed sleep disorders in 24% of students, among whom two-thirds suffered from insufficient sleep or late sleep, while 6% suffered from insomnia. Other studies have indicated high prevalence rates of low sleep quality among university students (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017; Thomas & Sundar, 2019; Abu-Snieneh, Aroury, Alsharari, Al-Ghabeesh, & Esaileh, 2020).

Additionally, sleep problems negatively affected academic performance. Studies have shown that low sleep quality affects academic achievement, memory, learning and other cognitive functions among university students (Nije Bijvank, Tonnaer, & Jolles, 2017; Stormark, Fosse, Pallesen, &

Hysing, 2019). Ming et al. (2011) found a significant relationship between low sleep quality and low academic achievement. While others found significant differences in sleep quality according to the academic level. The relationship between sleep quality and excellent academic average was significant (Mirghani, Mohammed, Almurtadha, & Ahmed, 2015).

The poor sleep quality among university students in Saudi Arabia ranged from 54.4% (Khayat et al., 2018) to 70.4% (Ibrahim et al., 2017) and poor sleep quality was associated with the academic average. An Iraqi study found high prevalence rates of poor sleep quality and a significant relationship between sleep quality and academic performance among Babylon university students. It was found that three quarters of those fail in one or more subjects have poor sleep quality (Al-Humairi, 2018).

Despite the importance of studying sleep quality and sleep difficulties among university students, studies in Yemen and Saudi Arabia are still few in number. There is a total absence of cross-cultural studies comparing Yemen and Saudi students in terms of sleep difficulties—a fact that increases the importance of this study. Consequently, in the current study we aimed to investigate the quality of sleep and sleep difficulties among university students in Yemen and Saudi Arabia.

## 2. Methodology:

### 2.1. Sample:

The study sample consisted of undergraduate students in two large universities: Aden University (36.63% N= 233) in Yemeni and King Khalid University (63.36% N=403) in Saudi Arabia. The participation in the sample was completely voluntary and the students give informed written consent while answering the questionnaire and all responses were anonymous.

### 2.2. Measures:

The online survey included two scales, **(a) The Pittsburgh Sleep Quality Index (PSQI)** (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) is a self-assessment scale consisting of (9) items, used to assess subjective sleep quality in seven areas related to sleep: sleep latency, sleep duration, sleep disturbances, quality of sleep, sleep efficiency, use of sleep medication, and daily dysfunction due to lack of sleep. **(b) The Sleep Difficulty Questionnaire (SDQ)** is a self-report questionnaire that the researcher prepared to assess students' sleeping difficulties. The initial form of this questionnaire was presented to mental health experts at the

university; the final form consisted of (4) items. The questionnaire requires "yes" or "no" answers (1-2) and a high score indicates sleep difficulties.

Students were also asked about their grade point averages in the previous semester and for other demographic variables, such as gender, age, marital status, year of study, and college.

## 2.3. Procedures:

The present study relied on the descriptive method (i.e., online survey). Collection of data for this study was approved by the Deanship of Scientific Research of Aden University in Yemen (Ref 201/3/311) and King Khalid University in Saudi Arabia (Number 28423). The research tools were distributed to students through Email. Students received a sufficient amount of information about the purpose of this study, including the components of the measures and the methods by which to answer each scale.

Self-report scales were applied to assess sleep quality and sleep difficulties. In sleep disturbances, comparisons were made between academic performance levels (excellent, very good, good, and low), and between Yemeni and Saudi students, as well as between males and females in the overall sample. We assessed the prevalence of poor sleep quality and sleep difficulties overall, then according to academic performance.

## 3. Results:

### 3.1. Participants Characteristics:

Of 998, 636 students agreed to participate in this study (the response rate was 63.73%). A total of 294 were Female (46.23%) and 342 were male (53.77%). Students were distributed into three academic levels in seven colleges: Medicine, Arts, Education, Sharia, Engraining, Humanities, and the College of Science.

Table 1 sets out the descriptive statistics of the demographic variables of the sample.

**Table 1. Demographic characteristics.**

| Variables | Yemen Sample (N=233) | | Saudi Sample (N=403) | | Total (N=636) |
|---|---|---|---|---|---|
| **Academic performance** | Frequency | Percentage | Frequency | Percentage | |
| Excellent (>4) | 84 | 36.05% | 213 | 52.85% | 297 (46.70%) |
| Very good (3-3.5) | 90 | 38.62% | 99 | 24.57% | 189 (29.72%) |
| moderate (2-2.5) | 47 | 20.17% | 64 | 15.88% | 111(17.45%) |
| Low (Less than 2) | 12 | 5.15% | 27 | 6.70% | 39 (6.13%) |
| **Year of Study** | | | | | |
| Second | 74 | 31.76% | 53 | 13.15% | 127 (19.97%) |
| Third | 90 | 38.63% | 184 | 45.66% | 274 (43.08%) |
| Fourth | 69 | 29.61% | 166 | 41.19% | 235(36.95%) |
| **Marital status** | | | | | |
| Single | 203 | 87.12% | 371 | 92.06% | 574 (90.25%) |
| Married | 30 | 12.88% | 27 | 6.70% | 57 (8.96%) |
| Divorced/widower | 0 | 0 | 5 | 1.24% | 5 (0.79%) |
| **Age** | Mean | SD | Mean | SD | 636 |
| | 21. 56 | 2.551 | 21.28 | 2.265 | |

The age ranged between 18-31 years (21.55 SD=2.88), without significant differences between students of both countries (t-test =1.446 $P$=0.149).

### 3.2. *Psychometric properties of the study tools:*

The PSQI is a validated scale. In this study, *Cronbach's alpha* was 0.76. Likewise, the SDQ has good reliability and validity, the *Cronbach's alpha* reliability was 0.52 and the split-half reliability was 0.53. The questionnaire achieved good internal consistency. The correlation between the item score and the total score of the questionnaire was significant at the 0.01 level; it ranged between 0.56 and 0.75.

The exploratory factor analysis revealed one factor account for (41,303) of the variance. The items loading ranged between 0.45 and 0.773.

Confirmatory factor analysis was also used to confirm the validity of the scale, and the results showed that there are appropriate goodness fit indexes (CMIN/DF=1.485; NFI= 0.983; GFI= 0.998; RMSEA= .028), which indicated that the SDQ standards proposed model is acceptable, as shown in Figure 1.

**Figure 1. Confirmation Factor Analysis of SDQ.**
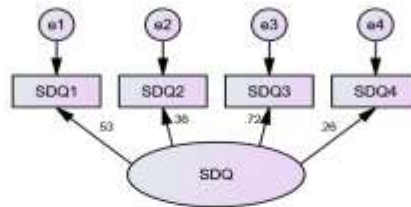


As per Figure 1, there is good validity of the Sleep Difficulty Questionnaire in college students.

### 3.3. *Quality of sleep prevalence*:

The study revealed that one quarter of students rated their sleep quality as poor; (18.77%) said that their sleep was of poor quality, while (7.86%) said that their sleep was of very poor quality. The prevalence of poor sleep was 23.60% (N=55) and 26.79% (N= 108) among university students in Yemen and Saudi Arabia, respectively. There were no significant differences between students in the two countries with respect to a good or poor quality of sleep ($X^2$ 1.2849 $P = 0.733$).

### 3.4. *Quality of sleep prevalence according to academic average*:

The prevalence of good sleep (very good and good sleep quality) according to academic average was 37.42% (N=238) among excellent students, 21.54% (N=137) among very good students, 12.11% (N=77) among moderate students, and 3.30% (N=21) among students with a low academic average. A total of 80.13% of students with an excellent academic average had good-quality sleep (27.95% very good and 52.19% good), while 19.86% of students with an excellent academic average had poor-quality sleep (15.15% bad and 4.71% very bad). The prevalence of good-quality sleep among students with a very good academic average was 72.49% (23.81% very good, and 48.68% good), while 27.51% of students

with a very good academic average had poor-quality sleep (15.87% bad and 11.64% very bad). The prevalence of good-quality sleep among students with a moderate academic average was 69.37% (23.42% very good and 45.95% good), while 30.63% of students with a moderate academic average had poor-quality sleep (21.62% very bad and 9.0% bad). The percentage of students with low academic performance was 6.13%; among them, 53.85% reported good-quality sleep (15.38% very good and 38.46% good), while 46.15% reported poor-quality sleep (35.89% bad and 10.26% very bad). These results are shown in Figure 2.
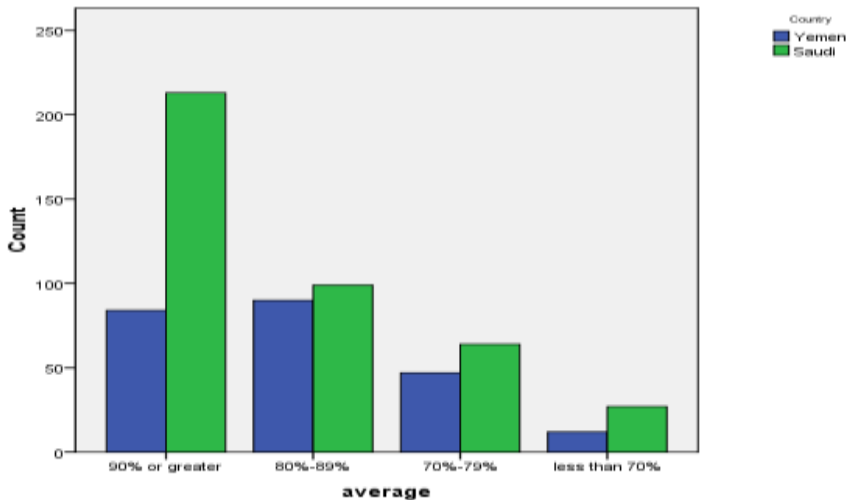


**Figure 2. Quality of sleep and academic average of Yemeni and Saudi university students.**

The correlation between sleep quality and sleep difficulties with academic average was calculated using the chi-square test ($X^2$) for the total sample and for a country-specific sample. These results are shown in Table 2.

**Table 2. Correlation between sleep quality and academic average of students.**

| Pearson Chi-Square | | $X^2$ Value | df | *P*. Value |
|---|---|---|---|---|
| **Quality of sleep** | Yemen | 4.528 | 9 | 0.873 |
| | Saudi | 30.672 | 9 | 0.001 |
| | Total | 21.685 | 9 | 0.010 |

### 3.5. *Prevalence of sleep difficulties:*

The prevalence of sleep difficulties was 25%. A total of 16.84% of students with an excellent academic average, 31.22% of students with a very good academic average, 31.53% of students with a moderate academic average, and 38.46% of students with a low academic average, 27.90% of Yemeni students, and 23.32% of Saudi students said that they have sleep

difficulties. The differences between Yemeni and Saudi students were not significant (t-test 1.642 *P*=0.101). There was a significant relationship between sleep difficulties and academic performance ($X^2$ 29.44 *P*= 0.003).

A one-way ANOVA showed significant differences among students in terms of total PQSI score and sleep difficulties according to their academic averages. These results are shown in Table 3.

**Table 3. Differences in PQSI and sleep difficulties according to academic average.**

| PQSI | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 165.811 | 3 | 55.270 | 4.658 | .003 |
| Within Groups | 7499.037 | 632 | 11.866 | | |
| Total | 7664.847 | 635 | | | |
| **Sleep difficulties** | | | | | |
| Between Groups | 25.721 | 3 | 8.574 | 7.175 | .000 |
| Within Groups | 755.202 | 632 | 1.195 | | |
| Total | 780.923 | 635 | | | |

Table 4 summarizes the results of the post hoc comparisons (Tukey's test).

**Table 4. Differences among academic groups.**

| Multiple Comparisons: Tukey HSD | | | | | | | |
|---|---|---|---|---|---|---|---|
| | (I) average | (J) average | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
| | | | | | | Lower Bound | Upper Bound |
| **PQSI** | **Excellent** | Low | -1.04923* | .38321 | .032 | -2.0363 | -.0621 |
| | **Very Good** | Low | -1.65838* | .58668 | .025 | -3.1696 | -.1472 |
| **Sleep difficulties** | **Excellent** | Very Good | -.291* | .102 | .023 | -.55- | -.03- |
| | **Excellent** | Moderate | -.401* | .122 | .006 | -.71- | -.09- |
| | **Excellent** | Low | -.647* | .186 | .003 | -1.13- | -.17- |

*The mean difference is significant at the 0.05 level.

As per Table 4, there are significant differences among students in the sleep according to the academic average. Students with a higher academic

average have low total score in the PSQI scale and sleep difficulties questionnaire than a lower academic average. There are significant differences between groups of Excellent and Very Good students in the Sleep difficulties.

## 4. Discussion:

The current study demonstrates the prevalence rates of sleep quality and sleep difficulties among university students. And the prevalence of poor sleep quality was high. In terms of academic group, fifth of excellent students, one eighth of very good students, one third of moderate students, about half of students with a low academic average, a quarter of Yemeni students, and one third of Saudi students had poor-quality sleep.

The inevitable result of a lack of sleep or a decrease in sleep quality is an increase in drowsiness and weakness during the day, which affects the student's ability to achieve an excellent academic performance (Hershner & Chervin, 2014; Maheshwari & Shaukat, 2019). Increased drowsiness during work leads to decreased attention and concentration as well as to dysfunction in certain areas of the brain, including the prefrontal lobe, which can cause disturbances in many important cognitive functions (Dimitriou, Knight, & Milton, 2015). Academically excellent students get the sleep they need, unlike students with low academic performance, who do not get sufficient sleep and whose performance decreases during the day due to feelings of tiredness and drowsiness (Schlarb et al., 2017a; Friedrich et al., 2018).

These findings are in line with students' own belief that low sleep quality adversely affects their academic performance (Hershner & Chervin, 2014). And the scientific literature has confirmed that high-quality sleep helps improve the processes of learning and remembering and is associated with excellent academic performance (Maheshwari & Shaukat, 2019; Reisi, Jalilian, Azizi et al., 2017).

Additionally, the results of this study are consistent with those of other studies which found high prevalence rates of poor sleep among university students (Ibrahim et al., 2017; Khayat et al., 2018; Lemma, Gelaye, Berhane, Worku, & Williams, 2012; Thomas, 2014). An Ethiopian study estimated that the prevalence of poor sleep quality among university students was 55.8% (Lemma et al., 2012). Schlarb and colleagues (Schlarb et al., 2017c) found that the prevalence of poor sleep quality among university students in Germany and Luxembourg was high.

Our Results shows significant relationships between sleep quality and sleep difficulties with academic average of university students in the overall

sample and in the Saudi sample. These relationships were not significant in the group of Yemeni students.

Several previous studies indicated that poor sleep have a negative impact on the academic performance of students (Ming et al., 2011; Lemma et al., 2012; Jain & Verma, 2016; Mirghani et al., 2015; AlQahtani et al., 2017; Ibrahim et al., 2017; Nije Bijvank et al., 2017; Gianfredi et al., 2018; Khayat et al., 2018; Stormark et al., 2019; Maheshwari & Shaukat, 2019; Merdad et al., 2014; Schlarb et al., 2017b;).

Previous research has linked low academic motivation to poor sleep quality, sleep difficulties, or sleep disorders (Gianfredi et al., 2018; Jain & Verma, 2016) or to sleep habits (BaHammam et al., 2012; Merdad et al.,2014). A study in Saudi Arabia revealed that low sleep time was associated with low academic performance among medical students (BaHammam, Alaseem, Alzakri, & Almeneessier, 2012). Alsaggaf and his colleagues (Alsaggaf, Wali, Merdad, & Merdad, 2016) found that the prevalence of poor sleep quality among Saudi medical students was 30%, that 33% suffered from insomnia, and that insomnia symptoms were associated with decreased academic performance.

An Ethiopian study estimated that the prevalence of poor sleep quality among university students was 55.8% (Lemma et al., 2012), while in China it was 25.7% (Jin, Zhou, Peng, Ding, & Yuan, 2018), 58.2 % among medical students (El Hangouche et al., 2018); the rate was 60.4% at Babylon University in Iraq (Al-Humairi, 2018), and 64.24% among students in Pakistan (Maheshwari & Shaukat, 2019). Also, poor sleep quality impacted students' performance (Maheshwari & Shaukat, 2019).

However, the study of Alqarni and colleagues (Alqarni, Alzahrani, Alsofyani, & Almalki, 2018) did not find a significant relationship between sleep quality and academic average among university students in Saudi Arabia. While ElArab et al. (2014) found that sleep disturbances were severe in students with good and very good academic score. Thomas (2014) did not find differences between students with and without sleep disorders in academic performance.

The prevalence of good-quality sleep was slightly higher among Yemeni students as compared to Saudi students, though there were no significant differences between students in both countries in terms of sleep quality, whether the quality was high or poor. These results are in line with those of the study of Schlarb and colleagues (Schlarb et al., 2017c), who did not find differences between students in Germany and Luxembourg.

The results of the current study indicated a high prevalence of sleep difficulties among university students. Including "physical or psychological

impairment due to lack of sleep, sleep less than five hours a day and affecting academic performance by sleep disturbance". With a significant relationship between sleep difficulties and academic average. The prevalence rate continued to rise consistently with a decrease in academic average. Students with low academic average had a higher prevalence rate of sleep difficulties than students with other academic averages. The results showed that there were no significant differences between Yemeni and Saudi students in terms of sleeping difficulties.

In Gianfredi and his colleagues' (Gianfredi et al., 2018) study, the prevalence of insomnia among university students was 18.8% and sleep disorders were associated with lower academic progress. Other reports indicate that 70.6% of college students sleep less than eight hours a day and that 36.9%- 60% suffer from poor sleep quality (Schlarb et al., 2017a). Zeek and colleagues (Zeek et al., 2015) concluded that 54.7% of students sleep less than seven hours a day while studying and that a longer sleep duration before an examination was associated with elevated grades or performance.

Abdul-Ghani et al. (2012) stated that, in Saudi Arabia, 36.6% of study participants (especially female students) had abnormal sleep habits, that the relationship between high academic scores and obtaining enough hours of sleep was significant, and that sleep disorders were associated with low academic performance.

## Conclusions:

In summary, there are high prevalence rates of poor sleep quality and sleep difficulties among university students in Yemen and Saudi Arabia. Sleep quality and Sleep difficulties are significantly correlated with academic performance in the overall sample and in the group of Saudi students but not in the group of Yemeni students. Students with a low academic average had a higher prevalence rate of poor sleep quality and Sleep difficulties compared to students with excellent or very good averages.

According to the results of this study, sleep is important to the academic performance. University students need adequate-quality sleep to successfully complete their assignments, so the better the quality of sleep, the better the academic performance. There is an urgent need for psychological intervention in order improve students' sleep quality and academic performance, as well as a need for more research in this field.

## Limitations

This study relied on self-reported academic grades, given that obtaining student grades from the university registrar would be very difficult with

reliance on the random method in selecting the study sample. However, this study relies on correct data from those students who responded to the Petersburg sleep quality index (PSQI) and the sleep difficulties questionnaire. These scales have good psychometric properties, as we indicated earlier in this study.

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