

The prevalence and association of stress with sleep quality among medical students



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ARTICLE INFO

Article history:

Received 3 February 2017

Received in revised form 21 April 2017

Accepted 30 April 2017

Available online 5 May 2017

Keywords:

Medical student

Prevalence

Stress

Sleep

ABSTRACT

Introduction: Medical students tend to reduce their sleep, in an effort to adjust and cope with their workload and stressful environment. This study estimated the prevalence of and the relationship between poor sleep quality and stress among medical students.

Methods: This cross-sectional study was conducted using a stratified random sample of male and female medical students in King Saud bin Abdulaziz University for Health Sciences in Riyadh, Saudi Arabia. A self-administered questionnaire was distributed to assess sleep quality using the Pittsburgh Sleep Quality Index, and the stress level by using the Kessler Psychological Distress Scale.

Results: A high prevalence of poor sleep quality (76%) and stress (53%) were found, with a statistically significant association ($p < 0.001$). Logistic regression indicated that students who are not suffering from stress are less likely to have poor sleep quality ($OR = 0.28$, $p < 0.001$), and the risk of having poor sleep quality is almost four times higher in students whose cumulative grade point average (GPA) is less than 4.25 ($OR = 3.83$, $p = 0.01$).

Conclusion: The study documents a statistically significant association between stress and poor sleep quality. A recommendation for the management of medical college is to establish academic counseling centers focusing in promoting good sleep hygiene and strengthening students' study skills and coping with their stressful environment.

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1. Introduction

A high prevalence of stress is one of the most important issues reported among medical students globally. It is defined as the “wear and tear” the body experiences as it adjusts to pressure or a threatening situation [1]. Many factors can contribute to medical school being a very stressful environment. Some of those factors include: extensive curricula, numerous academic requirements, frequent, difficult and various types of examinations [2,3]. High proportions of stress have been reported among medical students in different countries, for example in Pakistan (60%), Thailand (61%), Malaysia (42%), and the United States (57%) [2,4–6]. Locally, the prevalence of stress among medical students is reported as 63% at King Saud University [7], and 53% at King Faisal University [8].

Although some studies have found that some level of stress has good effects on the physiological functioning and can facilitate the learning process (favorable stress), it is well documented that high levels of stress has negative effects on the physical and mental health of medical students (distress or unfavorable stress) [1]. Specifically, high levels of stress can affect cognitive functioning, level of concentration and academic performance [9].

Medical students may not consider sleep as a top priority in the context of their academic requirements as they reduce their sleeping time to have extra hours for studying and workload. Consequently, they develop poor sleeping habits especially in the weeks preceding an examination [10]. It is reported that 51% and 59% of medical students had a poor sleep quality in the United States [11] and Lithuania [12], respectively. Few studies have been done to investigate sleep-related problems in Saudi medical students [13,14] reporting that more than a third (37%) of the medical students at King Saud University have abnormal sleep habits [13].

Since sleep plays a significant role in the cognitive processes as well as physical and mental health [15,16], sleep deprivation can affect the academic performance of medical students [10]. Many

Peer review under responsibility of Ministry of Health, Saudi Arabia.

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<http://dx.doi.org/10.1016/j.jegh.2017.04.005>

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studies in the United States, Australia, India and other countries have found that students with a poor sleep quality have poor marks on their examinations and were more depressed than their colleagues [17–19]. However, there are no recent studies investigating the association of stress with sleep quality. Two studies, conducted in 1989 and 1997, concluded that sleep disturbance could be either a cause, symptom or comorbidity with stress or with a psychiatric disorder [20,21]. Another study indicated that stress causes many sleep difficulties, such as restless sleep, mid-sleep awakening and waking up too early [22].

From a Saudi perspective, it is important to have a better understanding of medical students' mental and physical health and to identify their additional needs not yet met through medical school counseling centers. Therefore, the objectives of this study were to determine the prevalence of and the association between poor sleep quality and self-perceived stress among medical students in a College of Medicine in Saudi Arabia.

2. Material and methods

2.1. Study design and setting

This cross-sectional study was conducted from April to May 2016 at the College of Medicine at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) in Riyadh, Saudi Arabia. At KSAU-HS, students are required to spend two years in the Pre-Professional Program at the College of Science and Health Profession (COSHP) before they enroll in the College of Medicine. Most of the KSAU-HS students are undergraduates, and their average age at the beginning of medical school is 20 years old. The College of Medicine at KSAUHS offers a four-year problem-based learning (PBL) program, divided into two phases namely a pre-clinical (the first two years) and the clinical phase (the last two years). The cumulative grade point average (GPA) in KSAU-HS is out of five and can be described as a grade (e.g. GPAs 4.75 and above are considered as A+ Excellent).

2.2. Subjects and sample size

The participants of this study were medical students in KSAU-HS. During the 2015–2016 academic year, there were 756 medical students (512 males and 244 females) registered in the College of Medicine. There were 290 first year students, 180s year, 152 third year, and 134 fourth-year medical students. Students in each academic year were divided into two groups based on their gender, which gave a total of eight groups for the four academic years.

To obtain a confidence interval (CI) of 95% and a 5% margin of error, a sample size of 255 participants was required. An additional 20% was added to the sample size to ensure an adequate percentage response rate and to compensate excluded students, resulting in a sample of 306 participants. Students who refused to take part in the study, or did not complete the questionnaire were excluded from the study.

2.3. Data collection and sampling technique

This study was approved by the Institutional Review Board of King Abdullah International Medical Research Center (KAIMRC), which is affiliated with KSAU-HS. The Students Affairs Department provided the student name list for each group. To obtain an unbiased sample size that represents the whole population, participants were selected from the eight lists through stratified random sampling using Microsoft Excel 2016. Examinations dates were obtained from the Student Affairs Department for each academic year, and a week was assigned for each group, at least two

weeks prior to any examination to collect the data under the same circumstances for each group. Participants were informed that they were selected randomly, their participation was voluntary, and their responses were confidential. The study's objectives and information about the instruments were explained to the participants, and an informed consent was obtained from each participant. The questionnaires were distributed at the beginning of the day, and completed during breaks between lectures. Locked boxes were put outside each lecture hall and the participants were requested to deposit their completed questionnaire in the boxes to maintain confidentiality. After collecting the data, each questionnaire was given a serial number and no personal identifiers were used.

2.4. Outcome measures

The questionnaire consisted of three sections: the first section focused on demographic and lifestyle related information, the second section was the Kessler Psychological Distress Scale (K10), and the third section the Pittsburgh Sleep Quality Index (PSQI). Demographics and lifestyle variables included age, gender, academic year, current GPA, residence, having a physician among first-degree family members, and frequency of caffeine consumption (including coffee, tea and energy drinks).

The Kessler Psychological Distress Scale (K10), developed by Kessler, is a widely used instrument in many epidemiological studies to assess the severity of stress that students have experienced during the last four weeks [23]. It is a self-administered questionnaire consisting of ten questions about emotional states, each with a five-point Likert scale ranging from 'none of the time' to 'all of the time' and was scored from 1 to 5, respectively. The lowest score that could be achieved is 10 and the highest possible score 50. The scores were classified as follows: 20–24 are classified as mild stress, 25–29 as moderate stress and 30–50 as severe stress. The questionnaire can differentiate between cases and non-cases, is valid for use in general-purpose health surveys, and have good psychometric properties with a Cronbach's alpha of 0.89 [95% confidence interval (CI) 0.88–0.90] [23].

The last section contained the Pittsburgh Sleep Quality Index (PSQI), which was used to measure the quality and patterns of sleep over the last month [24]. The PSQI is the gold standard questionnaire for assessing subjective sleep quality and has been validated in both clinical and non-clinical populations [25,26]. The questions are framed in a 4-point Likert scale (0–3) and analyze seven factors including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. The scores from each component are added to give a sum score, also called a global score (range 0–21). Combined, these numerical scores provide the clinician with an efficient overall summary of a patient's quality of sleep and sleep health.

2.5. Statistical analysis

Data were entered in Microsoft Excel 2016 and analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 22. Categorical variables were presented by frequency and percentages, and continuous variables by mean and standard deviation. The association between sleep quality and stress as well as the demographic variables was examined using the Pearson's Chi-square test. Forward stepwise binary logistic regression was used to determine the predictors of sleep quality, and to calculate the odds ratio (OR) and 95% confidence intervals (95% CI). Sleep quality was used as a dependent variable and stress level and demographic variables as independent variables. A test with a p-value < 0.05 was considered as statistically significant.

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