Short Communication

Prevalence and risk factors of poor sleep quality among Inner Mongolia Medical University students: A cross-sectional survey

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Lan Wang [a,1], Peng Qin [b,1], Yunshan Zhao [a,1], Shengyun Duan [a], Qing Zhang [c], Ying Liu [a], Yueling Hu [a], Juan Sun [a,*]

[a] Inner Mongolia Medical University, Hohhot, China
[b] Hohhot University for Nationalities, Hohhot, Inner Mongolia, China
[c] Inner Mongolia Medical University Affiliated Hospital, Hohhot, China

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ABSTRACT

Medical students face new challenges at the beginning of college life, such as being responsible for oneself, an unfamiliar environment, social obligations, and academic stress, all of which influence or even heavily change their sleep quality and life, leading to sleep-related problems to some degree. This study investigated the relationship between sleep quality and behavior among students at the Inner Mongolia Medical University in China. Self-administered questionnaires were used to collect information on sociodemographic characteristics and lifestyle habits. The Pittsburgh Sleep Quality Index was also used. A total of 6044 and 6085 students completed the questionnaires in 2011 and 2013. According to the index, 27.8% (1694) of students had poor sleep quality with major risk factors being poor academic performance and interpersonal relationships in 2013. Among others, regular exercise less than three times a week, skipping breakfast, and studying in higher grades were associated with poor sleep quality. These results will help university administrators understand the risk factors of poor sleep quality among students, which can be improved through individual efforts, and provide adequate counseling and systematic education to improve their behavior and lifestyle.

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1. Introduction

Medical students, as a part of the wider college student cohort, experience tremendous biological, cognitive, emotional, and interpersonal changes. Students face new challenges at the beginning of college life, such as being responsible for oneself, new schedules, an unfamiliar environment, social obligations, and academic stress (Walter et al., 2002). Most students are forced to change their duration of sleep and alter their sleeping habits for these reasons (Pilcher et al., 1997). Thus, college students are particularly affected by sleep difficulties and are known to be one of the most sleep-deprived age groups. Some studies suggest that over 70% of college students experience sleep-related problems to some degree (Buboltz et al., 2001; Hicks et al., 2001). Medicine is one of the most stressful fields of education because of its highly demanding professional and academic requirements, and students may shorten their leisure activities and hours of sleep to achieve their desired goals (Waqas et al., 2015).

It is well known that behavioral and lifestyle factors, such as physical inactivity and skipping breakfast, are associated with poor sleep quality (Bixler, 2009; Nakade et al., 2009). The sense of safety and security necessary for good sleep originates from the interpersonal environment (Dahl and Lewin, 2002). Therefore, distress within the interpersonal environment may signal that it is not "safe" to sleep (Dahl and Lewin, 2002) via increased psychological and physiological arousal at bedtime and throughout the night. Additionally, poor sleep quality frequently co-occurs with mental disorders. This study indicated that sleep problems were most strongly associated with mood disorders, followed by anxiety disorders and then by substance-use disorders (Stein et al., 2008). Laar and colleagues proposed that personality factors may play a causal role in the development of insomnia, but may also be a consequence of associated daytime dysfunction (Laar et al., 2010).

In many countries, the study of sleep quality of medical students involved the use of the Pittsburgh Sleep Quality Index (PSQI); the standard for poor sleep quality was a global score of > 5 (Brick et al., 2010; Feng and Chen, 2005; James et al., 2011; Waqas et al., 2015). In our study, we also used a consistent standard to further investigate the relationship between sleep quality and behavior in Inner Mongolia Medical University students in China. These results will help university administrators identify

* Correspondence to: Inner Mongolia Medical University, No.5, Xinhua Street, Hohhot, Inner Mongolia Autonomous Region 010110, China.
E-mail address: 2573479397@qq.com (J. Sun).
[1] Lan Wang, Peng Qin, and Yunshan Zhao contributed equally to the paper.

factors associated with poor sleep and provide approaches to enhance sleep hygiene and relevant knowledge in university students.

2. Method

2.1. Census

Two censuses were conducted at the Inner Mongolia Medical University (2011 and 2013). Census participants were all students living on the campus. These students belonged to different faculties and their duration as undergraduates of these faculties was also different. For clinical medical, traditional Chinese medicine, Mongolian medicine, and other faculties, the duration of study was 5 years, while for public health administration, medicine information management, and medicine, it was four years, of which clinical medical, traditional Chinese medicine, and Mongolian medicine students have to take up internships in various hospitals for their last 2 years, which is off the campus. Consequently, for these faculties we only surveyed students in years 1–3. For students belonging to other faculties in year 5, a part of them lived on the campus, while most stayed off the campus, doing internships (Bian et al., 2012).

In 2011 and 2013, self-administered questionnaires were used to collect information, including sociodemographic characteristics, lifestyle habits, sleep duration, and the subjective sleep quality of the students. In 2013, in addition to the above content, we added the PSQI to the questionnaires. A total of 6044 and 6085 students completed the questionnaires in 2011 and 2013, respectively. For the students who were not admitted in 2011 or who graduated before 2013, 1063 students completed both questionnaires in 2011 and 2013.

2.2. Variable definitions

The PSQI included 19 items evaluating sleep quality during the previous month. These items were grouped into seven components of sleep. Global PSQI scores range from 0 to 21, with higher scores indicating poorer sleep quality. A global score of > 5 indicates poor sleep quality, while scores of ≤ 5 indicate good sleep quality (Buysse et al., 1989). Chinese scholars also use the international PSQI to study sleep quality, and this was documented as reliable and valid in 1999; Cronbach's alpha for the seven components was 0.84, split-half reliability was 0.87, and test–retest reliability was 0.81. For the validity tests, sensitivity was 98.3% and specificity was 90.2%, with the global PSQI of 7 as the demarcation (Chen et al., 1999).

In our study, grades were merged into a lower grade (Grades 1 and 2) and higher grade (Grades 3, 4, and 5).

Breakfast skippers were defined as those who did not consume breakfast on at least one of the 2 days in our previous study (Alexander et al., 2009; Sun et al., 2013).

Interpersonal relationships were assessed based on students' self-ratings of their relationships with classmates and teachers. Responses were coded on a three-point scale ranging from poor to good (Guo et al., 2014).

Academic performance was ascertained by asking for a personal appraisal of students' performance relative to their classmates on a three-point scale from good to bad (Guo et al., 2014) according to the total ranking of the final examination results of the last term. Ranking in the top 20% was classified as good and ranking in the bottom 10% was classified as bad; the remaining 70% was classified as medium.

Exercise was recorded via a 7-day recall and presented in minutes and times. Exercise comprised 150 min per week of moderate activity (Ahmad et al., 2015; Haskell et al., 2007). Based on this definition, and for the simplicity of analysis and interpretation in our study, exercise was defined as occurring at least three times a week with all such activities being over 50 min in duration.

2.3. Statistical analysis

Descriptive results were expressed as frequencies, percentages, prevalence, and means $\pm$ SD. Group differences between students with good and poor sleep quality for the seven PSQI components in 2013 were analyzed via t-test. Using the data from 2011 and 2013, we conducted two comparisons. One comparison was for all students who participated in either the 2011 or the 2013 census. The other comparison was for students who participated in both censuses. The differences in subjective sleep quality and sleep duration between 2011 and 2013 were determined using Wilcoxon rank-sum tests. The differences in the prevalence of subjective sleep quality and sleep duration for students who participated in both censuses were determined using a self-matching chi-square test. Binary logistic regression was used to identify predictors of poor sleep quality in 2013. Ordinal logistic regression was used to identify predictors of subjective poor sleep quality in 2011. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated to summarize these predictors. Internal consistency refers to the correlation between items (Streiner, 2003). If the items had a high correlation in the same latitude, then there was proof of high internal consistency (Wen and Ye, 2011):

$$\alpha = \frac{k}{k-1}\left[1 - \frac{\sum \sigma_k^2}{\sigma_{Total}^2}\right],$$

where k is the number of items, $\sum \sigma_k^2$ is the sum of the variances of all of the items, and σ_{Total}^2 is the variance of the total scores. Data were recorded using EpiData 3.1. Data analysis was conducted using SPSS Statistical Software for Windows 20.0 (IBM, Chicago, Illinois) with a significance level of $p < 0.05$.

2.4. Ethical approval

This was obtained from the Ethical Committee of the Inner Mongolia Medical University. Consent was obtained from all study participants.

3. Results

According to the PSQI results in 2013, 1694 (27.8%) out of 6085 students had poor sleep quality. The mean PSQI score was 4.46 ± 2.18. The internal consistency of the questionnaire in this study was good ($\alpha = 0.981$ and $\alpha = 0.956$) in 2011 and 2013, respectively.

The prevalence of poor sleep quality in participants is shown in Table 1. Students in higher grades have a higher prevalence of poor sleep quality compared with students in lower grades. The prevalence of poor sleep quality in students with poor interpersonal relationships was nearly 20% higher compared with the students with good interpersonal relationships. The prevalence of poor sleep quality was 1.75 times higher for students with poor academic performance compared with students with good academic performance. In students who skipped breakfast, lost weight, were picky eaters, ate sweet foods, and regularly exercised less than three times a week, there was a higher prevalence of poor sleep quality.

Differences between students with poor and good sleep quality for the seven PSQI components in 2013 are shown in Table 2.