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The Interaction between Sleep Quality and Gender on Depression Level among Chinese International Students

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Abstract: Sleep plays a vital role in biological and psychological processes, as during sleep the brain restores homeostasis and clears toxins. As such, depression is considered the most common psychiatric disorder associated with insomnia, with data showing that 90% of depressed patients have sleep quality problems. Women are more likely to suffer from mental illness due to the different physiology and hormone levels of different genders. Therefore, in order to further study the relationship between sleep quality and depression, this paper assessed the specific effects of sleep quality on depression and gender differences through questionnaires.

Keywords: sleep quality, depression, gender

1. Introduction

Abundant studies concluded that sleep acts as a vital function in biological and mental processing, during which the brain returns to homeostasis and removes toxins[1]. Contemporary psychologists also emphasized the importance of sleep quality on daily performances, such as the ability to stay focused and motor balancing. According to Dement and Vaughan, The reason sleep is so important has to do with the hormones[1]. Additionally, Kim et al. further supported the theory by revealing that the regulation of these hormones is controlled by interactions between the effects of sleep and the intrinsic circadian clock, thus when the sleep cycle and intrinsic timing system are out of sync, detrimental health effects owing to hormonal or metabolic imbalances may ensue[2]. Meanwhile, in both endocrine and psychiatric patients, a clear link existing between changes in several hormonal systems and mental problems can be identified. This prompted clinical and scientific investigations on the effectiveness of various hormones for treating depression. Therefore, depression is considered to be the most frequent psychiatric condition linked to sleeplessness, with data suggesting that 90% of depressed sufferers have sleep quality complaints.

Ample evidence suggested that early in pregnancy, it was discovered that there was a statistically significant and clinically relevant association between depression and sleep quality for women [3]. In theory, hormone level varies between sexes due to different biological structures, especially in the reproduction system, therefore, scholars, such as explicated the phenomenon that females' diagnosis of depression is higher than male from a biological perspective, that is fluctuations of female hormones make women more prone to mental diseases[4]. Although most studies are consistent with the theory, the major argument is that women are more likely to report mental issues, so the conclusion lacks reliability. Additionally, the interaction with sleep quality remains unknown. As a

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result, to further investigate the topic, the study focused on the association between sleep quality and gender in depression.

Psychologists reached a consensus that depression severely harms individual and societal well-being and hence studying relevant factors to reduce the likelihood and prevalence of depressive symptoms is significant in the field of psychology. Among all influencing factors, the essay endeavors to evaluate the effect of sleep quality and gender. As a lifestyle, sleep quality is a significant public health concern since it is closely related to measures of both physical and mental health. Through the questionnaire, the essay aimed to assess how sleep quality affects depression specifically. Meanwhile, the self-reported anonymous questionnaire study is capable of consolidating the previous theory that females are more sensitive to depression by avoiding male's reluctance of expressing mental difficulties. The insights into how lifestyle and gender interact with depression enable psychologists to develop more plausible interventions to improve mental issues.

In addition, the essay aims at increasing adolescence awareness, if such a decline is positively correlated with depression.

2. Methodology

2.1. Questionnaire

Combined with previous researches, the international study targeted a specific group, especially, Chinese students at international universities. It is estimated that in 2022, approximately 830 thousand decide to study abroad (Frost Sullivan). This group was selected for in-depth study for two reasons, one being that this group is at high risk of depression as most of them have left their home country to study independently and live in unfamiliar environments. Secondly, university students belong to the teenage group, which generally experienced a declined sleep quality [5][6]. Based on the literature reviews and social context, sleep quality and gender was designed as the independent variables (IV), while depression is the dependent variable (DV).

The researcher recruits restricted participants and yields three hypothesized results.

- Hypothesized1: sleep quantity is positively correlated to depression level.
- Hypothesized2: gender can also influence an individual's mental state. The null hypothesis predicts no significant correlation for both IVs and DV.
- Hypothesized3: the interaction between quantity and stress has an impact on risk-taking behaviour, whereas the null hypothesis is that the interaction is not significant.

2.2. Tools

Two self-reported questionnaires with the scale-ranking system were employed, Sleep Quality Questionnaire (SQQ) and the Self-rating depression scale (SDS). Both Questionnaires had moderate internal consistency ($.7 > \alpha > .6$).

2.3. Participants

There were 74 voluntary participants, however, unanswered questions resulting in missing data was found in10 sets of samples, and hence 64 valid data were collected from Chinese international students (male:female=1:4). Participants were aged between 18-25 ($m=19.76$, $SD=1.15$), mostly 19 ($n=27$) and 20 ($n=25$).

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2.4. Ethical Consideration

Textual consent was provided by all participants after they have the essential knowledge of experiment-related information, the right to withdraw, and the protection of anonymity.

2.5. Material

There were two questionnaires, Sleep Quality Questionnaire (SQQ) and the Self-Rating Depression Scale (SDS) contains six questions that measure sleep quality, for each question, the scale ranges from one to five (Five-point Likert scale) and the maximum score is 30. Three negative questions were reverse-coded, such as question 2, "I fall asleep later than 11 pm." The five-point Likert scale ranged from Never (1) to Always (5). Three positive question scores were added up with three reversed negative question scores, resulting in the overall score. Higher scores indicated better sleep quality. SDS contains 20 questions, for each question scale ranges from one (a little of the time) to four (most of the time). A maximum score of 80 measures participants' depression levels. Statements include, question 1, "I feel down-hearted and blue." Nine questions are reverse-coded, for example in question 5, participants were asked to choose the frequency of "I eat as much as I used to.". The results for 20 questions were added up. A higher sum indicated a higher level of stress.

2.6. Procedure

Demographic data including gender was first collected. After that, two scaled questionnaires were applied to the study. Participants were employed randomly online through a link that is spread over social media (Wechat) that is commonly used by Chinese students. It approximately took five minutes for students to complete the questionnaires. After all the participants finished the questionnaire, data was downloaded and analyzed.

2.7. Analytic Procedure

Statistical Product and Service Solutions (SPSS) was employed to analyse the data. Firstly, a variable sheet and data sheet for the questionnaire was created. Invalid data was excluded while the data for five negative questions were reversed coded. After that, a reliability test was employed to determine Cronbach's alpha which indicated the internal consistency of the two questionnaires. Then, the data from the two questionnaires were added up separately, resulting in an overall score for sleep quality and stress level. Next, histograms were drawn separately to test the normality of the two datasets. The study involves one categorical data and two numerical data. For descriptive and inferential statistical analysis, participants were firstly divided by gender, and then a 2x2 ANOVA test was applied to gather more detailed information.

3. Result

The sample size was sufficient, and as confirmed by the result of Levene's test, the homogeneity of variance was satisfied. Additionally, histograms for the sleep quantity and depression level both produced a normally distributed line. The average sleep quality for females (M=20.54, SD=.68) was slightly worse than for males (M=24.78, SD=.85). Independent variables were categorically re-encoded. Gender was categorised according to the information collected into males and females. Meanwhile, sleep quality was also divided into two categories, below and above half score, 15. Finally, a 2x2 ANOVA was applied to analyze the effect of gender and sleep quantity on depression levels among Chinese international students.

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3.1. Gender

The results indicated a slightly higher depression level for female participants (M=55.67, SD=.54), compared to male participants (M=49.80, SD=.63). However, a two-way ANOVA revealed no statistically significant relationship between being in gender difference and depression level F(1, 62)=.65, p>.05.

3.2. Sleep Quality

Participants with sleep quality scores less than 15 were more depressed (M=61.38, SD=.57), while those who rated above 15 points are less likely to be depressive (M=52.07, SD=.77). A two-way analysis of variance yielded a significant effect for sleep, F(1, 62)=5.58, p<.001.

Additionally, as illustrated by figure 1, the interaction effect between gender and sleep quality was insignificant, F(1, 62)=.08, p>.05.

4. Discussion

4.1. Gender and Depression Level

The study aimed to establish an interaction between gender and sleep quality on depression level. A statistically significantly positive correlation can be established between sleep quality and individual depression level, and hence the first null hypothesis is accepted. Nevertheless, although according to the average score of the questionnaires, females have a higher tendency to be depressed, no statistically significant result can be generated. Also, no data suggest an interaction of the two variables on the dependent variable. Therefore, the null hypotheses are accepted.

The results herein coincide with Augner's findings[7], in which the study confirms prior research linking symptoms of physical and mental health to inadequate sleep. The fact that the research discovered this relationship among young, generally healthy adults is particularly significant. Meanwhile, epidemiological research from a variety of cultures consistently demonstrates that women experience significant depression, dysthymia, and anxiety disorders two to three times more frequently than males do, starting at puberty[8], the data collected from participants, although consistent with the literature review, was not significant and hence no relationship can be established between the gender and depression level for Chinese international students. Researchers formulated two main hypothesis to explain female's preponderance in depression.

4.1.1. "Sex Role"

According to the "sex role" hypothesis, specific gender-based role experiences influence the formation of the "self" and, as a result, any susceptibility to anxiety and depression. Girls may have a larger tendency to "internalise" or to be more docile and less "mentally tough" than males, which may lead to a stronger predisposition to anxiety or depression. Other examples include offering dolls for girls and war figures for boys as playthings [9]. In practice, the paper raises the awareness of sleep quantity for teenagers, to prevent them from conducting possible risky and harmful behaviours.

4.1.2. Social Factor

According to the "social factor" concept, women are either differentially exposed to more stressful life events or are more susceptible to them. One example is the assertion that men have more dispersed self-esteem investments, being spread throughout personal and social connections as well as invested in their employment, whereas women preferentially invest their self-esteem in an intimate dyadic relationship. Consequently, the theory postulates that because women tend to place all their self-

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esteem in one basket, they are more susceptible to depression if their investment is at risk (e.g. when their husband neglects, abuses or leaves them). Organisational variations between male and female brains are produced by exposure to gonadal steroids in the pre- and postnatal periods [10].

4.2. Teenagers

Nevertheless, the gender difference was not significant among teenagers. The aforementioned explanations may not apply since the adolescent mind and their sense of self is still developing, and because the participants are still students and have not yet integrated into society or gone through the challenges of starting a family. The disparities in depression level, therefore, might result from biological factors. Scholars examined pubertal hormonal changes that cause more "limbic system hyperactivatio in women, which confers more responsiveness to unpleasant emotional stimuli and increases the chance of certain anxiety and depression states. These organisational effects interact in females with cyclical steroid hormone changes after puberty, followed by menopause and the loss of these same steroids, suggesting that stress responsiveness and susceptibility to stress-related disorders may vary significantly over the course of a woman's lifetime [9].

4.3. Sleep Quality

In practice, the study raises the awareness of sleep quality as literature reviews, as well as the data presented all suggested its correlation with depression. Additionally, the study generated a hypothesis that is the possibility of treating depression by enhancing sleep quality. To test this theory, additional study is required. Meanwhile, further studies should focused on the gender difference on teenager depression, because it was evident that there were gender variations in response to depression psychotherapies [11]. While men did not describe any antidepressant treatment modality as preferentially advantageous, women were more likely to rate two of the three nominated psychological therapies (i.e. CBT and counselling) as more effective, according to our own web-based poll [12].

5. Conclusion

In conclusion, the study revealed a statistically significant positive correlation between sleep quality and depression, while providing the foundation for researching how gender affects depression. Women were found to be more likely than men to experience depression in the study, but the statistics were significant.

Regarding the study, one alternative hypothesis was accepted, while the other two were rejected. In general, the results were statistically reliable because of the use of SPPS and the execution of relevant tests. The suitable application of the 2x2 Anova test provided a clear layout of the results. Moreover, both questionnaires satisfied the internal consistency and hence were available of scientific data analysis. However, several drawbacks should be taken into consideration, especially regarding the two statistically insignificant results. Firstly, the standardization of participants was not strictly controlled. Conformation factors including the family status, universities pressure and medical conditions may alter the resulting depression level. Secondly, individual’s perception of depression and sleep quality may differ and hence may not be included in the questionnaires. To compensate individuality, follow-up interviews is suggested. Thirdly, 2x2 ANOVA only demonstrated correlation, but not causation. It remains arguable whether poor sleep quality causes depression or vice versa.

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