Original Research

The Association between Emotional Intelligence and Sleep Quality Components in University Students

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Abstract

Background and Objective: Emotional intelligence is defined as the ability to perceive emotions in oneself and others. Studies indicate that there might be a relationship between emotional intelligence and sleep. The aim of this study was to investigate the association between emotional intelligence with components of students' sleep quality.

Materials and Methods: In this cross-sectional study, 377 students affiliated to Ferdowsi University in Mashhad, Iran, were selected and evaluated by two questionnaires of Pittsburgh Sleep Quality Index (PSQI) and Emotional Intelligence Scale (EIS) after obtaining participants’ consent.

Results: The prevalence of poor sleep was nearly 61% in students. The highest level of correlation was observed after total sleep quality, with sleep disturbances and subjective sleep quality, respectively. The lowest level of non-significant correlation was observed with sleep duration (P > 0.05). Regulation, appraisal, and utilization of emotions were the most empowerment strategies in emotional intelligence among students.

Conclusion: The optimal sleep quality can be related to higher emotional intelligence. Amongst the two sleep quality components, the total sleep quality had a stronger relationship with emotional intelligence. It may be inferred that to increase student productivity, emotion-focused psychological interventions should focus on utilization, appraisal, and regulation of emotions.

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Keywords: Emotional intelligence; Sleep; Students


Introduction

The term “emotional intelligence” was first used by Salovey and Mayer as a type of social intelligence that enables an individual to assess emotions and use results for contemplation and practice (1, 2). The efforts made by Goleman led to a better understanding of this concept. According to Goleman, the main function of emotional intelligence was introduced as the ability to monitor oneself and others’ emotions, arouse oneself, and manage emotions, feelings, and communications with others (3). Based on various definitions of emotional intelligence, different subscales have been introduced. One of the most widely-used definitions describes emotional intelligence with three components including regulation of emotion, appraisal of emotions, and utilization of emotions (4).

So far, various studies have assessed the impact of emotional intelligence on psychiatric
symptoms and signs (5-9). Recent evidence suggests that this personality trait is more closely related to specific areas of the brain, such as the ventromedial prefrontal cortex (vmPFC), insular cortex, and amygdala (10-12). In particular, studies have shown that people with damage to the vmPFC area have deep defects in social judgment and emotional decision-making (13-15). It is believed that this region of the brain acts as a cognitive and emotional information integrator (16-19). Interestingly, the PFC seems to be related to a less efficient performance in neural processing during long-term deprivation of sleep (20, 21). So, a relationship may exist between sleep and emotional intelligence beyond the level of our knowledge.

Sleep is a psycho-physiological and natural phenomenon associated with reduced awareness of the environment. Various studies have shown that sleep deprivation leads to deficiencies in decision-making (22, 23), inhibitory control (24-26), mood regulation (27-30), moral judgment (31, 32), and responses to frustration (33, 34) which are considered to be the main functions of emotional intelligence. The results of a study by Killgore et al. indicated that sleep deprivation affected the ability to integrate emotions and cognition, which was mediated by emotional intelligence (31). Although this study showed the association of sleep deprivation with emotional intelligence, it did not provide sufficient information about the quality of sleep in healthy people and their emotional intelligence. Another study by Brown and Schutte on 167 students in the United Kingdom (UK) showed that the quality of sleep was partially mediated by subjective fatigue and emotional intelligence; however, the authors did not assess the relationship between components of sleep quality and emotional intelligence (35).

Therefore, this study was designed; first, to examine the association between sleep quality components such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, daytime dysfunction, sleep disturbances, and use of sleeping medication with emotional intelligence. Second, to compare the mean scores of emotional intelligence components, including regulation of emotions, utilization of emotions, and appraisal of emotions according to optimal and poor sleep quality.

Materials and Methods

This was a cross-sectional study. Statistical population comprised of all students affiliated to Ferdowsi University of Mashhad, Iran. Simple random sampling was used to select the participants. A total of 382 students were selected based on the Krejcie and Morgan table. Out of 12 colleges, including Literature and Humanities, Theology and Islamic Sciences, Sport Sciences, Veterinary, Administrative and Economic Sciences, Basic Sciences, Educational Sciences and Psychology, Mathematical Sciences, Agriculture, Engineering, Architecture and Urbanism, and Natural Resources and Environment, sample selection was done amongst undergraduate and master students.

The inclusion criteria were defined as voluntary participation, informed consent, and having enough time to answer the questionnaires, while exclusion criterion was defined as unwillingness to answer the rest of the questionnaire.

A total of 377 students completed the questionnaire including demographic information, Emotional Intelligence Scale (EIS), and Pittsburgh Sleep Quality Index (PSQI) in the presence of the study researchers. The status of the previous psychiatric care was not investigated in our study. Ethical considerations were voluntary participation and having consent to participate. The questionnaires were distributed anonymously and by email option in order to access the interested students in their personal environment and in order to comply with ethical standards.

Pittsburgh Sleep Quality Index (PSQI): PSQI distinguishes optimal sleep from poor sleep over the past month by using 19 questions through 7 components. Each question is scored from 0 to 3. The total score of these seven components ranges from 0 to 21. The higher score means the poorer sleep quality. Scores of 6 and higher denote poor sleep quality (36, 37). The Cronbach’s alpha of PSQI was 0.80 and its test-retest reliability ranged from 0.93 to 0.98 (38), and it has been shown to be highly reliable in previous studies (36, 37).

Emotional Intelligence Scale (EIS): The EIS-41 is a revised version of the 33-item EIS of Schutte et al. (39). The three components of this questionnaire include optimism/mood regulation, utilization of emotions, and appraisal of emotions (39). This questionnaire has a good validity and reliability (4, 39). The internal reliability of overall emotional intelligence measured by the EIS-41 was 0.85 similar to that reported for the EIS-33 (39). The internal reliabilities of scales derived
from the Farsi version of EIS-41 (FEIS-41) were 0.83, 0.78, and 0.81, respectively (4). The alpha coefficient for the FEIS was reported as 0.89. The three components of the original version have been verified (4).

Data were analyzed by SPSS software (version 22, IBM Corporation, Armonk, NY, USA). The Kolmogorov-Smirnov test (K-S test) was used to determine the normality distribution of the data, and Pearson correlation coefficient was used to determine the association between sleep quality components and emotional intelligence. Independent t-test was used to compare the mean scores of emotional intelligence components in optimal and poor sleep quality groups.

**Results**

A total of 377 students were recruited in this study, of whom 197 (52%) were male and 180 (48%) were female. The average age of the participants was 23.40 ± 2.31 years (from 18 to 43 years). 61% of students had poor sleep quality (PSQI > 6) with an average of 8.13 ± 3.04. On average, the regulation of emotions component received the highest score in the emotional intelligence variable. The details are shown in table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td>23.40 ± 2.30</td>
</tr>
<tr>
<td>Emotional intelligence</td>
<td>Regulation of emotions</td>
<td>37.66 ± 7.78</td>
</tr>
<tr>
<td></td>
<td>Utilization of emotions</td>
<td>25.72 ± 4.46</td>
</tr>
<tr>
<td></td>
<td>Appraisal of emotions</td>
<td>34.73 ± 5.19</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>197 (52)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>180 (48)</td>
</tr>
</tbody>
</table>

SD: Standard deviation

One of the goals of this study was to examine the relationship between each component of sleep quality with total emotional intelligence scores. The correlation results are presented in table 2.

As shown in table 2, a significant correlation was observed between total emotional intelligence with all components of sleep quality (P < 0.001), except for sleep duration that was not significant. The highest and lowest correlation between sleep quality components and emotional intelligence were related to total sleep quality and sleep duration, respectively. The total sleep quality with other components of sleep quality in this study showed a high and significant correlation.

The mean of total emotional intelligence score was 94.86 ± 19.27.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total sleep quality</th>
<th>Total emotional intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective sleep quality</td>
<td>0.69*</td>
<td>-0.44*</td>
</tr>
<tr>
<td>Sleep latency</td>
<td>0.59*</td>
<td>-0.21*</td>
</tr>
<tr>
<td>Sleep duration</td>
<td>0.57*</td>
<td>-0.04*</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>0.49*</td>
<td>-0.45*</td>
</tr>
<tr>
<td>Use of sleeping medication</td>
<td>0.39*</td>
<td>-0.39*</td>
</tr>
<tr>
<td>Daytime dysfunction</td>
<td>0.57*</td>
<td>-0.33*</td>
</tr>
<tr>
<td>Sleep efficiency</td>
<td>0.53*</td>
<td>-0.22*</td>
</tr>
<tr>
<td>Total sleep quality</td>
<td>1.00</td>
<td>-0.47*</td>
</tr>
</tbody>
</table>

SD: Standard deviation; *P < 0.001

Based on the second goal of this study, the components of emotional intelligence were compared in two groups: optimal sleep quality and poor sleep quality. Table 3 depicts that all three components of emotional intelligence, including regulation of emotions, utilization of emotions, and appraisal of emotions were significantly different between the two groups, while the mean scores of these components were higher in people with optimal sleep quality.

**Discussion**

The purpose of this study was to investigate the correlation and association of sleep quality and its components with emotional intelligence. Emotional intelligence can play a significant role in the social, economic, political, occupational, and psychological well-being, so the importance of this field of study seems more obvious.
Sleep is one of the main characteristics of human being, especially students; whereas students are one of the most vulnerable communities. Although the association between sleep characteristics and emotional intelligence appears to be undeniable, simultaneous measures of these two are scarce. Studying sleep components in this study allowed us to determine the relationship between each of them with emotional intelligence. Hence, the results of this study can be helpful in the area of sleep-related recovery interventions and information about the prognosis of people who are affected by these interventions.

In the present study, the average of PSQI score among the students as a subset of the general population showed that they had poorer sleep quality, as 61% of them suffered from poor sleep quality. Various studies using various outcomes have investigated the quality of students' sleep. In a study by Lund et al. on students aged 17-24 years, approximately 60% of students reported poor sleep quality (40).

In Iran, a study conducted by Mansouri et al. reported the prevalence of poor sleep quality to be approximately 73% in 277 students living in dormitories in Tehran, Iran (41). In a meta-analysis carried out by Ranjbaran and Khorsandi (42), while the pooled prevalence was calculated as 56%, the prevalence of poor sleep quality varied between 15.5-86.4 percent depending on sample size and study setting. These findings are roughly consistent with the data of our research and confirm the hypothesis that students generally have a poorer sleep quality than the general population. In particular, studies have clearly shown that in the general population, the prevalence of poor sleep quality is about 5-40 percent (42, 43). Technology utilization (44, 45), less physical activity (46), consumption of addictive substances (47), and need to optimum academic performance (48) can be some factors explaining this difference. Yet, the magnitude of sleep problems in students requires more health attention from healthcare professionals.

Amongst various well-studied personality traits, emotional intelligence is shown to be more related to physical and mental health. The findings of the present study showed that among emotional intelligence components, regulation of emotions was the most crucial component among students. The appraisal of emotions and the utilization of them were important in the following levels. Consistent findings were observed in a study by Besharat on 442 students (4). This fact highlights the importance of emotion regulation among the students who can point out their more social encounters and the need for appropriate communication as factors of the importance of emotion regulation among them.

One of the main goals of this study was to examine the relationship between sleep quality components and total emotional intelligence score. The present study found a significant correlation between emotional intelligence and components of the total sleep quality, sleep disturbances, and subjective sleep quality. This, in turn, indicated that emotional intelligence and its components had the greatest impact on these components. In general, various studies have shown that factors associated with emotional intelligence such as emotion and mood are strongly associated with changes in the structure of sleep (49-54). A study by Killgore et al. found that sleep deprivation could damage recognition of specific emotions (54). Deliens et al. showed that the relationship between sleep and emotional processing was an undeniable reality (53). These studies clearly have shown that emotional intelligence can have a great impact on sleep and its components. On the other hand, sleep duration was not significantly correlated with emotional intelligence in this study. Since students usually compensate for lost sleep with napping (55), it cannot be expected that the reported total sleep time was affected by issues related to their emotions. Various studies showed that sleep and sleep-related problems could affect alertness, vigilance, attention, and concentration and might cause problems in cognitive and emotional processes (22, 23). Since emotional intelligence is affected by these processes, the correlation between sleep quality and this personality trait is expected (31).

All three components of emotional intelligence including emotion regulation, utilization of emotions, and appraisal of emotions had significant differences between the two groups. The mean scores of these components in individuals with optimal sleep quality was higher. Killgore et al. showed that sleep deprivation could negatively affect emotional intelligence and constructive thinking skills (31). Another study also found a two-way relationship between sleep disturbances and emotional intelligence (56). Sleep deprivation and related disturbances are factors affecting the quality of sleep. From one side, various studies...
have shown that people with higher emotional intelligence are more capable in social relationships (57), have a better response to stress (33), have a higher quality of life (58), have fewer psychiatric symptoms, and are better suited (59). On the other hand, people with optimal sleep quality are also less likely to face these problems (60). Therefore, the optimal sleep quality can be related to higher emotional intelligence.

The first limitation of this study was the lack of examination of students' psychiatric status, which could bring important implications for the results. Second, the method of assessing the quality of sleep in this study was only through self-report questionnaire (subjectively rather than objectively); hence, using objective methods such as actigraphy or polysomnography (PSG) is strongly recommended in future studies. Third, in order to generalize the findings more and reduce the limitations, conduction of the same methodology in the general population is recommended, since students usually have poorer sleep quality and different severity of psychiatric symptoms than the general population.

**Conclusion**

Considering the limitations of this study, it can be concluded that the optimal sleep quality can be related to higher emotional intelligence, which can also be used for emotional intelligence components such as regulation, utilization, and appraisal of emotions. Among the components of sleep quality, the total sleep quality, which is actually the combination of six other components, had a stronger relationship with emotional intelligence. According to these findings, the use of emotion-focused psychological interventions in order to enhance students' ability to utilize, appraise, and regulate emotions can be discussed and prioritized.

**Conflict of Interests**

Authors have no conflict of interests.

**Acknowledgments**

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