

Sleep Quality and Its Relationship with Temporomandibular Disorders and Oral Health-Related Quality of Life Among Dental Students and Interns: A Cross-Sectional Study

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Purpose: This cross-sectional study aimed to evaluate sleep quality and its relationship with temporomandibular disorders and oral health-related quality of life among dental students and interns.

Patients and Methods: This study was conducted on dental students and interns at Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. Undergraduate male and female dental students and interns voluntarily participated in the study. The participants completed the Pittsburgh Sleep Quality Index (PSQI) questionnaire for sleep quality, Fonseca's questionnaire for temporomandibular disorders (TMD), and the Oral Health Impact Profile (OHIP) for oral health-related quality of life (OHRQoL) in addition to demographic data. Pearson's correlation test and multiple linear regression analysis were performed in the study.

Results: The study included 159 participants, with 42.8% males and 57.2% females. Most participants (89.3%) demonstrated poor sleep quality. More than half of the study sample (57.2%) had TMD, with 29.6% having mild TMD, 23.3% having moderate TMD, and 4.4% having severe TMD. Bivariate analysis showed that sleep quality was significantly correlated with TMD ($r=0.211$, $P=0.008$) and OHRQoL ($r=0.200$, $P=0.012$). In addition, TMD were significantly correlated with OHRQoL ($r=0.443$, $P<0.001$). According to multiple linear regression analysis models, sleep quality was significantly correlated with TMD ($P=0.029$) and OHRQoL ($P=0.016$) after controlling for age, gender, class year, educational levels of parents, and monthly family income. Similarly, regression analysis showed that TMD was significantly correlated with OHRQoL ($P<0.001$). Mediation analysis showed a significant indirect effect of sleep quality on OHRQoL through TMD (effect = 0.31, 95% CI=0.09, 0.56).

Conclusion: The study showed that poor sleep quality was very common among dental students and interns. Sleep quality was significantly correlated with TMD and OHRQoL, and TMD significantly impacted OHRQoL.

Keywords: sleep quality, temporomandibular disorders, quality of life

Introduction

Sleep quality is defined as "an individual's satisfaction with all aspects of the sleep experience".¹ Sleep is crucial for human development and mental health, and inadequate sleep can lead to depression, fatigue, and reduced attention span.² An individual with poor sleep quality is at an increased risk of cognitive, systemic, and oral health problems.³ It has been recommended that adults regularly get seven or more hours of sleep per night to promote optimal health.⁴ However, 1 in every 3 adults was found to sleep less than 7 hours per night in Riyadh, Saudi Arabia.⁵ On average, Saudi dental students sleep for 5.85 ± 1.85 hours per night.⁶ Academic stress and anxiety can cause students to experience insufficient sleep, potentially leading to sleep disorders, and decreased academic performance.² In Saudi Arabia, 35% of dental students were reported to have poor sleep quality, which was negatively correlated with academic performance.⁶



Evidence shows that sleep disorders can affect the immune system and periodontal health of individuals, hence compromising their oral health.⁷ Sleep deficiency is significantly associated with tooth loss, which has adverse effects on systemic health and quality of life.⁸ Therefore, poor sleep quality can significantly compromise oral health-related quality of life (OHRQoL).⁹ Globally, temporomandibular disorders (TMD) affect approximately 31.1% of adults and the elderly.¹⁰ In Saudi Arabia, 54.2% of health professions students and 36.99% of dental students experience TMD.^{11,12} Previous studies reported that poor sleep quality was common among young adults, and it was associated with TMD with dysfunctional pain.^{13–15} On the other hand, a study of dental students showed no association between poor sleep quality and TMD.¹⁶ A recent overview of systemic reviews reported an association between sleep disorders and TMD among adults.¹⁷ Poor sleep quality is a significant factor associated with TMD due to increased production of inflammatory cytokines, which enhance pain associated with TMD.^{18,19} In addition, sleep disorders can cause hyperalgesia, which may contribute to heightened TMD symptoms.¹⁹

There is a high prevalence of poor sleep quality among dental students, affecting their health as well as academic performance. However, the influence of poor sleep quality on TMD and OHRQoL has not been adequately investigated among dental students and interns. Additionally, previous studies have explored the relationship between sleep quality and TMD and OHRQoL in isolation and have not modelled them together. It is hypothesized that poor sleep quality contributes to an increased severity of TMD symptoms and deteriorates OHRQoL. Poor sleep quality may not only directly affect OHRQoL but also indirectly affect it through its exacerbation of TMD symptoms. The study results may guide stakeholders to implement interventions aimed at improving sleep quality and oral health among student populations. Therefore, this cross-sectional study aimed to evaluate sleep quality and its relationship with temporomandibular disorders and oral health-related quality of life among dental students and interns in Dammam, Saudi Arabia.

Materials and Methods

Study Population

A cross-sectional questionnaire-based study was conducted on dental students and interns at the College of Dentistry, Imam Abdulrahman Bin Faisal University (IAU), Dammam, Saudi Arabia. Undergraduate male and female students from the 2nd to the 6th year and interns were eligible to participate in the study. At IAU, students complete a one-year preparatory program and then start dental courses from the second year to the sixth year. The participants who provided written informed consent were eligible to participate in the study. The exclusion criteria included participants under treatment for TMD, sleep disorder, and neurological conditions because these may have confounding effects on their assessment as well as relationships between TMD, sleep quality and OHRQoL.

Ethics and Consent

This study is part of the project, which was approved (IRB-2025-02-0054) by the Institutional Review Board at the Deanship of Scientific Research, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. The participants received information about the aims and details of the study. They were assured of the privacy and confidentiality of their responses. Participation in the survey was anonymous and voluntary. The voluntary and written consent forms were obtained from the participants who agreed to participate in the study. The research protocol followed the ethical guidelines of the Declaration of Helsinki.

Measurement Instruments

The participants completed the Pittsburgh Sleep Quality Index (PSQI) questionnaire, Fonseca's questionnaire, and Oral Health Impact Profile (OHIP) in addition to demographic data. The study administered English versions of PSQI, Fonseca, and OHIP-14 instruments because all participants were proficient in English, as it is the medium of instruction at the dental college.

The PSQI was used to evaluate sleep quality among participants. Developed by Buysse et al, the instrument is used to assess sleep quality and disturbances over one month. Nineteen items in PSQI yield seven component scores, such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping

medication, and daytime dysfunction. The addition of individual scores of each component produces a final score ranging from 0 to 21.²⁰ A higher score on the scale indicates lower sleep quality (a score of ≥ 5 shows poor sleep quality).²¹ A previous study showed that PSQI had validity, internal reliability, and internal homogeneity.²²

Fonseca's questionnaire is a valid and reliable instrument for screening participants with TMD.^{23,24} It is commonly used in research and clinical practice because of its simplicity. The instrument is composed of 10 questions, each with a three-option scale (yes, sometimes, and no).²⁵ A score of 10 is assigned to "yes", 5 to "sometimes" and 0 to "no". The total score is calculated by adding the score of individual items, and it ranges from 0 to 100. Fonseca index classification is used to assess the severity of TMD, and a score of the instrument from 0 to 15 is classified as the absence of TMD, 20–40 as mild TMD, 45–65 as moderate TMD, and 70–100 as severe TMD.¹¹

The Oral Health Impact Profile (OHIP-14) questionnaire is widely used to evaluate Oral Health-Related Quality of Life (OHRQoL).²⁶ It is a reliable and valid tool and consists of 14 questions that describe various health aspects affecting quality of life from an oral health perspective.^{27,28} Each item is rated on a 5-point Likert scale (never=0, rarely=1, occasionally=2, often=3, and very often=4). These items describe seven dimensions of the instrument such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.²⁶ The final score of the questionnaire is obtained by adding the score of each item, and it ranges from 0 to 56. The greater score of the scale indicates lower OHRQoL and vice versa.²⁷

Procedure

The researchers made an announcement in classrooms, student lounges, and clinical settings, and they physically distributed hard copies of questionnaires in classrooms after their lectures and in student lounges and clinical settings during break time. The participants were provided with further information if they experienced any difficulty in understanding certain questions. The researchers ensured that participants completely understood the questions and responded to all items in the survey. They returned questionnaires to the participants if any item was not answered completely. This approach resulted in the collection of complete questionnaires without any missing data. There were approximately 271 dental students and interns, and all of them were approached. However, 180 participants agreed to participate in the study, and they were provided with questionnaires, 159 returned completed questionnaires, resulting in a response rate of 88.3%.

Statistical Analysis

Data analysis was performed by using SPSS software (IBM SPSS Statistics for Windows, version 22.0. Armonk, NY: IBM Corp) and a statistical significance level of 0.05 was used. Descriptive statistics were presented in tables and graphs and included means, standard deviation, and proportions. Parametric tests were performed after checking the normality of data for PSQI, TMD, and OHIP-14 (Shapiro–Wilk test, $p > 0.05$). One-way ANOVA test was used to compare mean scores of TMD and OHIP-14 in categories of participants with different sleep quality to determine the relationship between sleep quality and TMD and OHRQoL. Pearson's correlation test and multiple linear regression analysis were performed to evaluate the relationship between sleep quality and TMD and OHRQoL. Age, gender, GPA in the last year, monthly family income, and parental education levels were used as covariate for regression models. The multicollinearity in these regression models was assessed using variance inflation factors, which was less than 3. PROCESS macro (Model 4) was used to conduct mediation analysis to examine the relationship between sleep quality, TMD, and OHRQoL. A p -value of less than 0.05 was considered statistically significant.

Results

The study included data from 159 dental students and interns with 42.8% males and 57.2% females. The mean age of the study sample was 22.07 ± 1.81 years and their mean GPA in the last year was 4.32 ± 0.33 . Most participants had college/university education fathers (70.4%) and mothers (66.0) and 49.1% belonged to the high-income group (Table 1). More than half of the study sample (57.2%) demonstrated TMD. Mild TMD were found in 29.6%, moderate TMD in 23.3%, and severe TMD in 4.4% of participants (Figure 1).

Table 1 Demographic Data of the Study Participants (N=159)

| Study Variables | N (%) |
|------------------------------|------------|
| Gender | |
| Male | 68 (42.8) |
| Female | 91 (57.2) |
| Class year | |
| Second year | 25 (15.7) |
| Third year | 19 (11.9) |
| Fourth year | 18 (11.3) |
| Fifth year | 17 (10.7) |
| Sixth year | 54 (34.0) |
| Interns | 26 (16.4) |
| Father's education | |
| No/school education | 47 (29.6) |
| College/University education | 112 (70.4) |
| Mother's education | |
| No/school education | 54 (34.0) |
| College/University education | 105 (66.0) |
| Monthly family income | |
| Low: less than 5000 SR/month | 7 (4.4) |
| Middle: 5001–20000 SR/month | 47 (29.6) |
| High: ≥20000 SR/month | 78 (49.1) |
| Do not know | 27 (17.0) |

The results show a high prevalence of poor sleep quality (89.3%) among participants. The mean score for the PSQI scale of the study sample was 9.02±3.51. The sleep efficiency component had the highest mean score (2.34±1.15), and this was followed by sleep latency (1.36±1.0), and subjective sleep quality (1.30±0.85), whereas the lowest mean score was related to the use of sleep medicine (0.50±0.82) (Table 2).

There was a statistically significant relationship between sleep quality and TMD (P=0.012) with a medium effect size ($\eta^2 = 0.069$), and participants with no TMD showed significantly lower scores of the PSQI compared to those with TMD. The participants with no TMD demonstrated significantly lower scores on the OHIP-14 scale than those with severe TMD (P<0.001), indicating better oral health-related quality of life, with a large effect size ($\eta^2 = 0.162$) (Table 3).

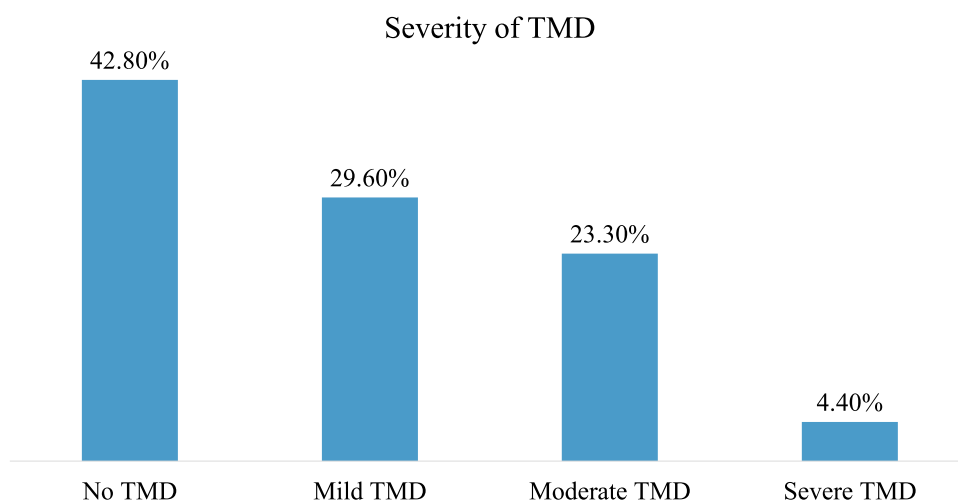


Figure 1 Distribution of participants' responses about the severity of TMD.

Table 2 Descriptive Statistics for the Seven Components and Global Score of the PSQI

| Components of PSQI Scale | Mean± SD |
|--------------------------|------------|
| Subjective sleep quality | 1.30±0.85 |
| Sleep latency | 1.36±1.0 |
| Sleep duration | 1.24±1.06 |
| Use of sleep medicine | 0.50±0.82 |
| Daytime dysfunction | 1.09± 0.86 |
| Sleep disturbance | 1.19±0.62 |
| Sleep efficiency | 2.34±1.15 |
| Global PSQI Score | 9.02±3.51 |

Table 3 Comparison of Sleep Quality (PSQI) and OHRQoL (OHIP-14) Scores Across TMD Severity Groups

| Categories of TMD | PSQI Score Mean± SD | Eta-Squared (η^2) | P-value | OHIP-14 Score Mean± SD | Eta-Squared (η^2) | P-value |
|-------------------|---------------------|--------------------------|---------|------------------------|--------------------------|---------|
| No TMD | 7.98±3.47 | 0.069 | 0.012 | 10.78±10.81 | 0.162 | <0.001 |
| Mild TMD | 9.98±3.29 | | | 14.34±11.92 | | |
| Moderate TMD | 9.70±3.60 | | | 21.41±10.58 | | |
| Severe TMD | 9.0±2.45 | | | 27.14±14.28 | | |

The [Table 4](#) shows that the participants with mild TMD demonstrated significantly poorer sleep quality compared to the participants with no TMD (P= 0.013). However, no statistically significant differences in sleep quality were observed between no TMD group versus moderate TMD group (P = 0.071) and between no TMD group versus the severe TMD group (P= 0.878). The pairwise comparisons in [Table 5](#) revealed no statistically significant difference in OHRQoL between the participants with no TMD versus the participants with mild TMD (P= 0.344). Statistically significant

Table 4 Tukey's HSD Post-Hoc Pairwise Comparisons of TMD Severity Groups on Sleep Quality (PSQI Score)

| Categories of TMD | Mean Difference (PSQI Score) | Std. Error | P-value |
|----------------------------|------------------------------|------------|---------|
| No TMD versus Mild TMD | -1.99 | 0.65 | 0.013 |
| No TMD versus Moderate TMD | -1.72 | 0.70 | 0.071 |
| No TMD versus Severe TMD | -1.01 | 1.36 | 0.878 |

Table 5 Tukey's HSD Post-Hoc Pairwise Comparisons of TMD Severity Groups on Oral Health-Related Quality of Life (OHIP-14 Score)

| Categories of TMDs | Mean Difference (OHIP-14 Score) | Std. Error | P-value |
|----------------------------|---------------------------------|------------|---------|
| No TMD versus Mild TMD | -3.56 | 2.13 | 0.344 |
| No TMD versus Moderate TMD | -10.62 | 2.30 | 0.001 |
| No TMD versus Severe TMD | -16.36 | 4.46 | 0.002 |

Table 6 Bivariate Analysis: Relationship Between Sleep Quality and TMD and OHRQoL Among Study Participants

| Variables | Correlation Coefficient | P-value |
|--------------------------|-------------------------|---------|
| Sleep quality and TMD | 0.211 | 0.008 |
| Sleep quality and OHRQoL | 0.200 | 0.012 |
| TMD and OHRQoL | 0.443 | <0.001 |

differences in OHRQoL were found between no TMD group versus moderate TMD group (P= 0.001) and between no TMD group versus severe TMD group (P= 0.002).

In the study, the mean score for TMD was 26.98±23.27 and for OHIP-14 was 15.03±12.17. Bivariate analysis showed that sleep quality was significantly correlated with TMD (r=0.211, P=0.008) and OHRQoL (r=0.200, P=0.012), indicating modest effect sizes. In addition, TMD was significantly correlated with OHRQoL (r=0.443, P<0.001) (Table 6). Figure 2 shows a weak positive correlation between sleep quality and OHIP-14 scores among participants. Similarly, a weak correlation was found between sleep quality and TMD scores (Figure 3). There was a moderate correlation between TMD and OHIP-14 scores (Figure 4).

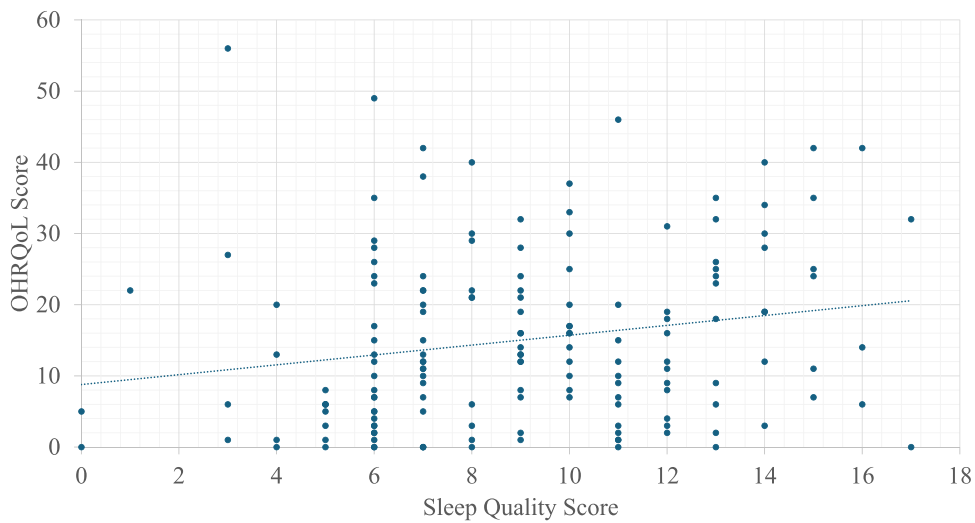


Figure 2 Scatterplot of the correlation between sleep quality and OHRQoL among study participants.

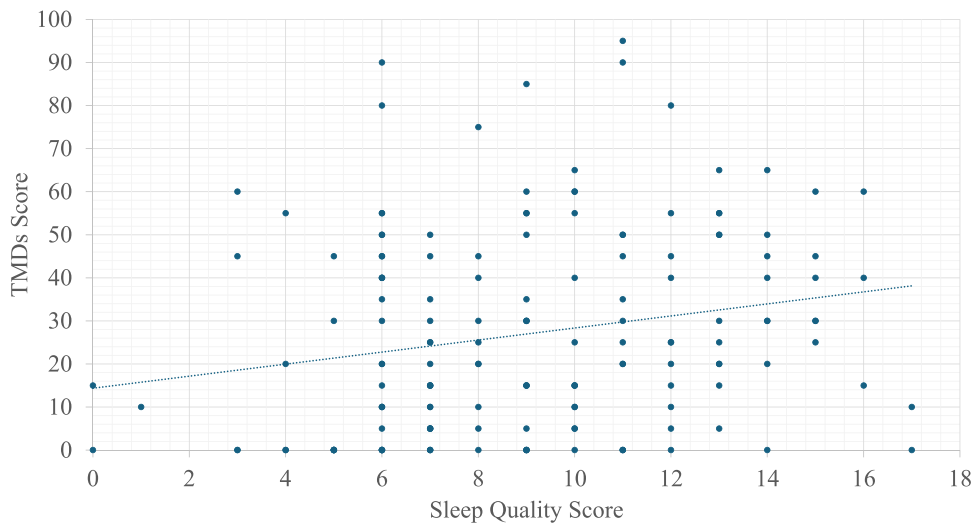


Figure 3 Scatterplot of the correlation between sleep quality and TMD among study participants.

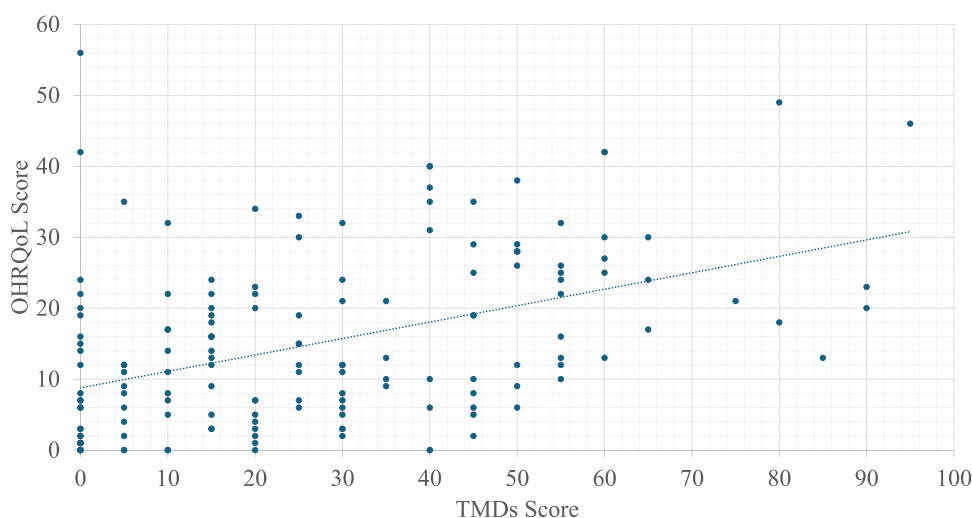


Figure 4 Scatterplot of the correlation between TMD and OHRQoL among study participants.

After adjusting for covariates in multiple linear regression analysis models, poor sleep quality remained significantly associated with higher odds of TMD ($B = 1.89$, 95% CI: 0.19, 3.59, $p = 0.029$), indicating that each one-point increase in PSQI score was associated with a 1.89-point increase in TMD severity. Poor sleep quality was also associated with worse OHRQoL ($B = 0.06$, 95% CI: 0.011, 0.103, $p = 0.016$). Similarly, TMD severity remained significantly associated with poor OHRQoL ($B = 0.21$, 95% CI: 0.10, 0.33, $p < 0.001$), demonstrating that each one-point increase in TMD severity was associated with a 0.21-point increase in OHIP-14 scores (Table 7).

Mediation analysis showed that poor sleep quality significantly influenced the severity of TMD ($B = 1.39$, $P = 0.008$). Similarly, there was a statistically significant effect of TMD on OHRQoL ($B = 0.22$, $P < 0.001$). Poor sleep quality was not significantly associated with OHRQoL ($B = 0.39$, $P = 0.129$). However, there was a significant indirect effect of sleep quality on OHRQoL through TMD (effect = 0.31, 95% CI=0.09, 0.56) (Table 8).

Table 7 Multivariable Regression Analysis: Relationship Between Sleep Quality and TMD and OHRQoL Among Study Participants

| Study Variables | Unstandardized Coefficients | | P-value | 95% Confidence Interval for B |
|--------------------------|-----------------------------|------------|---------|-------------------------------|
| | B | Std. Error | | |
| Sleep quality and TMD | 1.89 | 0.85 | 0.029 | (0.19, 3.59) |
| Sleep quality and OHRQoL | 0.06 | 0.02 | 0.016 | (0.011, 0.103) |
| TMD and OHRQoL | 0.21 | 0.06 | <0.001 | (0.10, 0.33) |

Table 8 Mediation Analysis: Indirect Effect of Sleep Quality (PSQI) on OHRQoL (OHIP-14) Through TMD Severity

| Path | Coefficient (B) | SE | p-value | 95% Confidence Interval |
|---|-----------------|------|---------|-------------------------|
| Direct Effect Sleep Quality → TMD (Path a) | 1.39 | 0.52 | 0.008 | (0.37, 2.42) |
| Direct Effect TMD → OHRQoL (Path b) | 0.22 | 0.04 | <0.001 | (0.14, 0.29) |

(Continued)

Table 8 (Continued).

| Path | Coefficient (B) | SE | p-value | 95% Confidence Interval |
|--|-----------------|------|---------|-------------------------|
| Direct Effect Sleep Quality → OHRQoL (Path c) | 0.39 | 0.25 | 0.129 | (-0.11, 0.88) |
| Indirect Effect Sleep → TMD → OHRQoL | 0.31 | 0.12 | – | (0.09, 0.56) |

Discussion

The present study evaluated the prevalence of poor sleep quality among dental students in the eastern province of Saudi Arabia. The study also investigated the relationship between poor sleep quality and TMD and OHRQoL. In the present study, poor sleep quality was found in most participants (89.3%), which was similar to the results reported by Gaikwad et al, who showed that 89.8% of dental students experienced poor sleep quality in India.²⁹ Compared to the present study, a lower proportion of dental students (68.13%) reported poor sleep quality in Brazil.¹⁶ On the other hand, the prevalence of poor sleep quality was 36.7% and 38% among dental students in Malaysia³⁰ and India,³¹ respectively. Studies of university students conducted in different countries showed poor sleep quality in 58.7% of participants in Lebanon,³² 54.7% in Taiwan,³³ and 60% in the U.S.³⁴ The variations in the prevalence of poor sleep quality in dental and other student populations can be attributed to different didactic and clinical workloads, study hours, levels of psychological stress, and cultural differences related to sleep habits.^{29,30} There is a trend of sleeping late at night and having a short duration of nighttime sleep among populations in Saudi Arabia, which may account for a high prevalence of poor sleep quality in the present study.³⁵ The findings of present study should not be generalized to other populations from different geographic locations due to its limited external validity.

Globally, the prevalence of TMD among dental students, as assessed by the Fonseca Anamnestic Index, is as follows: Pakistan (66.9%),³⁶ Brazil (58.9%),³⁷ and India (42%).³⁸ The present study showed that 57.2% of dental students exhibited signs of TMD. These findings corroborate the results of a previous study conducted in Dammam, Saudi Arabia, where 55% of health professions students reported having TMD.¹¹ Previous studies on dental students in Saudi Arabia showed that the prevalence of TMD ranged from 45% to 62.8%.^{39,40} Gender and demographic differences, lifestyle variations, academic stress, and methodological differences in the conduct of studies may account for differences in the prevalence of TMD among dental students in the present and previous studies.^{11,36} TMD is a multifactorial disorder which may explain the high prevalence of TMD in our sample, which included considerable population of high-income students. A high prevalence of poor sleep quality and TMD in the present study underscores the importance of preventive measures to minimize their adverse consequences on the oral health of dental students.

According to a systematic review and meta-analysis, individuals with poor sleep quality were 4.45 times more likely to have TMD than those without poor sleep quality.⁴¹ It is known that poor sleep can affect the immune system, causing the production of inflammatory cytokines, which promote pain and inflammation in the temporomandibular joint.⁴² Sleep quality was significantly correlated with TMD in our sample of dental students. In addition, the regression analysis in the present study showed that sleep quality was significantly correlated with TMD. Moreover, mediation analysis revealed that sleep quality significantly influenced TMD. These results are in accordance with findings of an Iranian study that showed lower sleep quality was significantly correlated with higher severity of TMD after controlling for demographic factors.⁴³ A recent study from Pakistan also confirmed significant correlation between sleep quality and TMD symptoms.⁴⁴ On the contrary, a study of dental students found no significant correlation between sleep quality and TMD in India.²⁹ Similarly, another study of dental students showed no significant association between poor sleep quality and TMD symptoms in Brazil.¹⁶

The findings of the present study demonstrate a clear relationship between sleep quality and OHRQoL, showing a statistically significant correlation between these variables. However, mediation analysis found no significant influence of sleep quality on OHRQoL but sleep quality indirectly affected OHRQoL through TMD. The study also showed that an increase in TMD significantly and independently deteriorated OHRQoL in our sample. This was also confirmed in the

mediation analysis, which showed a significant effect of TMD on OHRQoL. There were statistically significant associations between sleep quality and TMD, sleep quality and OHRQoL, and TMD and OHRQoL; however, the effect sizes were modest, indicating that other factors beyond sleep quality and TMD also contribute substantially to OHRQoL. Weak to modest correlations observed in the study could be because of multifactorial nature of sleep quality, TMD, and OHRQoL, and small sample size. A recent study of dental and dental hygiene students in Spain showed that poor sleep quality significantly affected OHRQoL because of physical pain, physical disability, psychological disability, and functional limitation.⁴⁵ Similarly, another recent study from Australia also reported a strong positive association between sleep quality and OHRQoL.⁹ Given the challenging and demanding nature of dental programs, students experience a decline in sleep quality and elevated stress levels, contributing to the perception of poor OHRQoL. The results of the present study suggest the need for oral health promotion strategies aimed at enhancing the sleep health of dental students to support their quality of life as well as academic performance.²

The impact of TMD on OHRQoL is multifaceted, often presenting as difficulties in mastication and speech, which can compromise nutritional intake. Additionally, pain and discomfort associated with TMD may contribute to impaired sleep quality, reduced ability to perform routine activities, and overall poor quality of life.⁴⁶ Our data suggested that as TMD severity increased, OHRQoL worsened significantly. These findings are consistent with the results of a study by Bal et al, where dental students with TMD reported significantly poorer OHRQoL compared to those students without TMD.⁴⁷ In a recent study from Saudi Arabia, AlSahman et al also showed that TMD was significantly associated with poor OHRQoL, affecting physical pain and psychological discomfort domains.⁴⁸

This study used valid and reliable instruments to provide valuable evidence about the interrelationships between sleep quality, TMD, and OHRQoL among dental students. A comprehensive understanding of these factors can help improve the oral health of dental students, who in turn may play a role in the prevention of sleep disturbance, TMD, and OHRQoL in the community. The sample calculation was not performed because all dental students and interns were invited to participate in the study. A high response rate was achieved in the study and the sample of 159 participants demonstrated adequate power to detect the significant indirect effect in the mediation model. However, small and unbalanced TMD groups limited statistical power for some pairwise comparisons. The study was conducted in a dental college, which limits the generalizability of results to dental students from other institutions. Fonseca Anamnestic Index is a screening tool and not a clinical diagnostic instrument, which limits the accurate assessment of TMD in our sample. The administration of questionnaires is prone to bias due to students' subjective replies as well as social desirability bias. In addition, stress, anxiety, depression, academic workload, caffeine intake, and screen time can influence relationships between sleep quality and TMD; however, these variables were not included in the study due to its scope and resource constraints. It is known that cross-sectional studies provide valuable evidence, which can be further investigated in cohort studies or intervention trials, but they are limited in drawing conclusions about cause and effect. In the future, longitudinal studies should be conducted among students from multiple dental institutions to determine the temporal and causal relationships between sleep quality, TMD, and OHRQoL after adjusting for demographic variables as well as stress, anxiety, and academic workload. Future studies should use clinical diagnostic tool for the assessment of TMD.

Conclusion

The study showed that the majority of dental students and interns demonstrated poor sleep quality. There were significant correlations between sleep quality and TMD and OHRQoL, and sleep quality was significantly associated with TMD and OHRQoL. The study also showed that TMD significantly impacted OHRQoL. Regular health check-ups of dental students should include screening for TMD and poor sleep quality. Dental institutions should support the well-being of students by integrating sleep hygiene and stress management into dental curricula, offer mental health and TMD screening services, and promote a culture that prioritizes work-life balance.

Disclosure

The authors report no conflicts of interest in this work.

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