

Examining The Impact Of Anxiety And Depression On Sleep Quality Among Healthcare Providers

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Abstract

Background: Anxiety and depression can significantly impact sleep quality. This can lead to difficulties falling asleep, staying asleep, or experiencing restful sleep. Racing thoughts, worry, and physical symptoms like increased heart rate can make it hard to relax and drift off to sleep, which will affect the quality performance of healthcare providers.

Aims: Our objective was to study the influence of anxiety, and depression on sleep quality and to find the factors of sleeping quality to give a recommendation that would reflect well on the healthcare providers' job satisfaction.

Methods: A descriptive cross-sectional design was used utilizing a self-administered questionnaire. Data was collected from healthcare providers using the Zung Self-Rating Depression Scale (SDS). and the Generalized Anxiety Disorder Scale-7. In this study, 350 questionnaires were58

distributed to qualified respondents, and a total of 190 valid questionnaires (excluded incomplete questionnaires) were returned, indicating a valid response rate of 54%.

Results: Statistics showed that more than a quarter of respondents had at least a mild level of depression, which is about 26.9%. Noticed that respondents with sleep disorders (mean = 2.35), and mental disorders (mean = 2.42) showed significantly higher levels of depression as compared to those without the disorder. In addition, 26.4% of respondents had at least a mild level of anxiety. Respondents with sleep disorders (mean = 2.32), and mental disorders (mean = 2.50) showed significantly higher levels of anxiety as compared to those without disorders. There were 13.7% of respondents having mild sleep problems, while 7.9% of respondents having severe sleep problems.

Conclusion: Both anxiety and depression can disrupt sleep quality, making it essential to address these mental health conditions to improve overall well-being and sleep patterns.

Keywords: Depression; anxiety; sleep quality; mental health; healthcare providers; health care facilities.

Introduction

Healthcare services are widely recognized as a challenging occupation; healthcare workers, who receive rigorous training to prepare themselves for this occupation, report a higher level of sleep disturbance. For instance, [1] reported that worldwide, the prevalence of sleep disturbance has been estimated to be between 18.4 and 84.7% in healthcare providers and 17.65–81% in the general population. Anxiety and depression are common mental health conditions that can significantly impact various aspects of healthcare providers, including their sleep quality. Understanding how these conditions influence sleep is crucial for improving overall well-being [2,3]. Numerous studies have delved into the effects of anxiety and depression on sleep quality [4,5,6], revealing significant correlations between these mental health conditions and disturbances in sleep patterns. However, most studies explored the association between basic socio-demographic characteristics and the level of depression and anxiety among healthcare workers. Other socio-demographic characteristics that were not sufficiently

studied include the type of healthcare facility, working facility, and working area. However, the current study explored the association between the level of depression and anxiety with sleep quality among healthcare providers in Saudi healthcare facilities. A research study by [7] indicates that anxiety disorders are closely linked to poor sleep quality, with individuals experiencing difficulties falling asleep, staying asleep, and achieving restful sleep. A study by [8] found that higher levels of anxiety were associated with increased sleep disturbances, including insomnia symptoms and restless sleep patterns. Moreover, [9] highlighted the bidirectional relationship between anxiety and poor sleep quality, emphasizing the need for targeted interventions to address both issues simultaneously. Studies by [10,11] have consistently demonstrated a strong connection between depression and disruptions in sleep architecture, leading to sleep onset difficulties, frequent awakenings, and altered sleep continuity. [12,13] reported in a meta-analysis that, psychiatry revealed that individuals with depression are more likely to experience sleep disturbances, such as reduced total sleep time and increased wakefulness during the night. Longitudinal studies have shown that the severity of depressive symptoms is closely related to the extent of sleep problems, underscoring the impact of depression on overall sleep quality [14]. Combined Impact of Anxiety and Depression on Sleeping Quality, studies exploring the combined effects of anxiety and depression on sleep quality have highlighted a compounding influence, with individuals experiencing both conditions exhibiting more severe sleep disturbances [15,16,17,18].

Aim of the study

This study explores the intricate relationship between anxiety, depression, and sleep quality among healthcare providers.

Study design

A descriptive cross-sectional non-interventional design was used for the current study. An anonymous self-administered, paper and pencil survey was used to collect data from the targeted setting. Participation in the study was voluntary and participants were assured that information gathered for the study would be kept confidential and will be used for the study purposes only. No informed consent was deemed necessary and was waived by the IRB. Data were identified for

the use of this publication and the study adhered to the ethical guidelines of the Declaration of Helsinki and good clinical practice. The initial sample size was estimated using G_Power3 and based on multiple linear regression using the independent two-tailed t-test, confidence level of 95%, margin rate of error at 5% and power of 80.0%, medium effect size of 0.30 (determined based on the review of current literature), and a 10% increase to address the non-response rate, the minimum required sample size for this study was 190 subjects. In this study, 350 questionnaires were distributed to qualified respondents, and a total of 190 valid questionnaires (excluded incomplete questionnaires) were returned, indicating a valid response rate of 54%. Saudi and non-Saudi healthcare providers were eligible to be participants in this study if all of the following criteria were met: (1) is 18 years of age or older (2) works in healthcare settings as a healthcare provider (3) has spent at least 3 months in the current unit. Healthcare providers who work in the current healthcare sectors in Riyadh, Saudi Arabia were invited to participate in the study by completing and returning the questionnaire. Data collection continued for 2 weeks between 2 and 15 April 2022.

Data collection instrument

The Zung Self-Rating Depression Scale SDS was used to collect data from the participants. It consists of 20 items and has been widely used as a screening tool for depression in multiple populations. The SDS statements are framed in a positive and negative pattern with a 4-Likert point scale ranging from 1 a little of the time, 2 some of the time, 3 good part of the time, and 4 most of the time. The scale score may range from 20 to 80, with scores from 20 to 49 indicating no depression, 50 to 69 indicating depression, and scores from 70 to 80 indicating severe depression [19]. The scale has shown good validity and acceptable reliability for clinical and research purposes with an alpha value of 0.84 [19]. An additional part of the questionnaire about the socio-demographic characteristics of the respondents was added to the current study. This included age, gender, marital status, economic status, nationality, profession, working area, years of working experience, and type of healthcare facility. The data collection instrument included two parts: socio-demographic and sleep quality. Socio-demographic characteristics include Type of healthcare facility

(Government and private) and age, gender, nationality, working area, profession, type of healthcare facility and years of working experience, Sleeping disorder, and Mental Disorder. The second part of the questionnaire asked respondents about their overall sleep quality, where the score ranged from 1 = "No problem at all", to 4 = "A very big problem" The level of Depression and Anxiety is the dependent variable in the current study which were measured by the Zung Self-Rating Depression Scale SDS. The socio-demographic profile of the participants is the independent variable. The Zung Self-Rating Depression and Anxiety Scale SDS occurrence was used to collect data from the participants. It consists of 20 items and has been widely used as a screening tool for Depression and Anxiety in multiple populations. The SDS statements are framed in a positive and negative pattern with a 4-Likert point scale ranging from 1 a little of the time, 2 some of the time, 3 good part of the time, and 4 most of the time. The scale score may range from 20 to 80, scores from 20 to 49 indicating no depression, 50 to 69 indicating depression, and scores from 70 to 80 indicating severe depression.

Data analysis

Frequencies and percentages for nominal/ordinal level variables were employed. A chi-square analysis was conducted to determine the association between demographic profiles with anxiety and depression. The ANOVA test for differences in anxiety score, level of depression, and sleep quality between different demographic factors. The effect of anxiety and depression on sleep quality of healthcare providers using Multiple Linear Regression method in Smart PLS 4.0. A P-value of ≤ 0.05 was accepted as the significance level for all inferential statistical tests.

Results

Demographic profile analysis

Table 1 summarizes the study participants' demographic profile. From the data, respondents were approximately the same from government hospitals (48.9%) and private hospitals (51.1%). Looking into the age group, the majority of respondents were 31-40 years old (47.9%), followed by 20-30 years old (29.5%), 41-50 years old (17.9%), and lastly only about 4.7% of respondents were above 50 years old. Results also showed that the majority of participants were female,

accounting for 72.1% of total respondents, as compared to male respondents of 27.9%. As for the nationality of participants, statistics showed that the majority of respondents were non-Saudis, which is about 62% of total respondents, while only about 38% of them are Saudi. In terms of profession, results showed that the majority of participants were nurses (51.1%), while the rest of them were physicians (24.7%) and others (24.2%). Among the participants, the majority of them work in the ICU, accounting for 55.8% of total respondents. A significant number of them work in wards (19.5%), and others (16.3%). Note that only a minority of respondents work in ER, about 8.4% of total respondents. As far as work experience is concerned, results showed that respondents were well distributed in 1 to 5 years (34.7%), 6 to 10 years (29.5%), and 11 years and above (35.8%). Furthermore, results also showed that about 19.5% of respondents claimed to have a sleep disorder, while 6.8% of respondents claimed to have a mental disorder

Table 1. Demographic profile of the respondents

Demographic Profile	N	%
Type of health care facility		
Government	93	48.9
Private	97	51.1
Age		
20-30 Years Old	56	29.5
31-40 Years Old	91	47.9
41-50 Years Old	34	17.9
Above 50 Years Old	9	4.7
Gender		
Male	53	27.9
Female	137	72.1
Nationality		
Saudi	72	37.9
Non-Saudi	118	62.1
Profession		
Physician	47	24.7
Nurse	97	51.1
Others	46	24.2
Work Area		
ER	16	8.4
Ward	37	19.5
ICU	106	55.8
Others	31	16.3

Years of experience		
1-5Years	66	34.7
6-10Years	56	29.5
11 Years and Above	68	35.8
Sleeping disorder		
Yes	37	19.5
No	153	80.5
Mental Disorder		
Yes	13	6.8
No	177	93.2

Anxiety and Differences by Demographic Profile

From the questionnaire, a composite score of anxiety was calculated and further grouped into normal (1.000 – 2.499), mild (2.500 – 3.499), and severe (3.500 – 4.000). Based on the summary table (Table 2), note that more than a quarter of respondents had at least mild levels of anxiety, which is about 26.4%.

Table 2. Anxiety groups of respondents

Anxiety Level	N	%
Normal	140	73.7
Mild	40	21.1
Severe	10	5.3

Table 3 summarizes the ANOVA test for differences in anxiety scores between different demographic factors. From the results, there were significant differences in anxiety levels for respondents' nationality ($p < 0.001$) at a 0.05 significance level. Noticed that Saudi respondents have significantly higher anxiety scores (mean = 2.27), as compared to Non-Saudi (mean = 1.84). This finding showed that Saudi healthcare workers are enduring higher levels of anxiety as compared to non-Saudi healthcare workers. Results also showed that there were significant differences in anxiety levels for respondents' work areas ($p = 0.010$) at a 0.05 significance level. The post hoc test showed that respondents from ER (mean = 2.23) and ICU (mean = 2.15) have significantly higher anxiety levels compared to other areas (mean = 1.61). In addition, respondents from the ward area (mean = 1.82) do not show significant differences from ER, ICU, and other working areas. Results also showed that there were significant differences in anxiety levels for sleep disorder ($p = 0.005$) and mental

disorder ($p = 0.018$) at a significance level. Respondents with sleep disorders (mean = 2.32), and mental disorders (mean = 2.50) showed significantly higher levels of anxiety as compared to those without disorders.

Table 3. Anxiety level between demographic group

Demographic Profile	n	Mean	SD	p value
Type of health care facility				0.081
Government	93	1.11	0.77	
Private	97	0.91	0.78	
Age				0.095
20-30 Years Old	56	1.88	0.76	
31-40 Years Old	91	2.14	0.79	
41-50 Years Old	34	1.96	0.76	
Above 50 Years Old	9	1.61	0.70	
Gender				0.116
Male	53	1.86	0.74	
Female	137	2.06	0.79	
Nationality*				<0.001
Saudi	72	2.27	0.83	1
Non-Saudi	118	1.84	0.70	2
Profession				0.464
Physician	47	2.08	0.83	
Nurse	97	1.94	0.72	
Others	46	2.07	0.85	
Work Area*				0.010
ER	16	2.23	0.92	1
Ward	37	1.82	0.66	1, 2
ICU	106	2.15	0.83	1
Others	31	1.61	0.43	2
Years of experience				0.159
1-5Years	66	1.90	0.74	
6-10Years	56	2.17	0.81	
11 Years and Above	68	1.98	0.79	
Sleeping disorder				0.005
Yes	37	2.32	0.85	1
No	153	1.93	0.74	2
Mental Disorder*				0.018
Yes	13	2.50	0.93	1
No	177	1.97	0.76	2

*Significant at 0.05 significance level

Depression and Differences by Demographic Profile

From the questionnaire, a composite score of depression was calculated and further grouped into normal (1.000 – 2.499), mild (2.500 – 3.499), and severe (3.500 – 4.000). From the summary table (Table 4), statistics showed that more than a quarter of respondents had at least mild levels of depression, which is about 26.9%.

Table 4. Depression groups of respondents

Depression Level	n	%
Normal	139	73.2
Mild	49	25.8
Severe	2	1.1

Table 5 presents the result of the ANOVA test for differences in depression scores between different demographic factors. From the results, there were significant differences in depression levels for respondents' nationality ($p = 0.002$) at a 0.05 significance level. Noticed that Saudi respondents have significantly higher depression scores (mean = 2.24), as compared to Non-Saudi (mean = 1.99). This finding showed that Saudi healthcare providers are facing higher levels of depression as compared to non-Saudi healthcare workers. Furthermore, results showed that there were significant differences in depression levels for sleep disorder ($p < 0.001$) and mental disorder ($p = 0.020$) at a 0.05 significance level. Noticed that respondents with sleep disorders (mean = 2.35), and mental disorders (mean = 2.42) showed significantly higher levels of depression as compared to those without the disorder.

Table 5. Depression level between demographic group

Demographic Profile	N	Mean	SD	p value
Type of health care facility				0.145
Government	93	2.14	0.51	
Private	97	2.03	0.58	
Age				0.184
20-30 Years Old	56	2.11	0.52	
31-40 Years Old	91	2.14	0.58	
41-50 Years Old	34	1.93	0.51	
Above 50 Years Old	9	1.89	0.42	
Gender				0.204
Male	53	2.00	0.58	

Female	137	2.12	0.53	
Nationality*				0.002
Saudi	72	2.24	0.52	1
Non-Saudi	118	1.99	0.54	2
Profession				0.807
Physician	47	2.05	0.60	
Nurse	97	2.08	0.50	
Others	46	2.13	0.59	
Work Area				0.167
ER	16	2.18	0.62	
Ward	37	2.01	0.53	
ICU	106	2.14	0.55	
Others	31	1.93	0.50	
Years of experience				0.067
1-5Years	66	2.13	0.50	
6-10Years	56	2.18	0.57	
11 Years and Above	68	1.96	0.55	
Sleeping disorder				<0.001
Yes	37	2.35	0.56	1
No	153	2.02	0.53	2
Mental Disorder*				0.020
Yes	13	2.42	0.55	1
No	177	2.06	0.54	2

*Significant at 0.05 significance level

Sleep Quality and Differences by Demographic Profile

This section used a question that asked respondents about their overall sleep quality, where the score ranged from 1 = “No problem at all”, to 4 = “A very big problem”, which means the higher the score, the lower the respondents’ sleep quality. Similarly, the study grouped the scores into normal (1.000 – 2.499), mild (2.500 – 3.499), and severe (3.500 – 4.000). Table 6 shows the statistics of respondents grouped by sleep disorder/ quality. From the table, there were 13.7% of respondents having mild sleeping problems, while 7.9% of respondents having severe sleeping problems.

Table 6. Sleep Disorder groups of respondents

Sleep Quality Level	n	%
Normal	149	78.4
Mild	26	13.7
Severe	15	7.9

Table 7 depicts the result of the ANOVA test for differences in sleep quality scores between different demographic factors. Based on the results, there was a significant difference in sleep quality between respondents' nationalities ($p = 0.013$) at a 0.05 significance level. Noticed that Saudi respondents have significantly higher sleep quality scores (mean = 2.29), as compared to Non-Saudi (mean = 2.00). This finding showed that Saudi healthcare providers have poor sleep quality compared to non-Saudi healthcare providers. Further, the results showed that respondents from different work areas had significantly different sleep quality ($p = 0.002$) at a 0.05 significance level. A perusal of the table showed that respondents from the Others area (mean = 1.77) had significantly better sleep quality compared to those from ER (mean = 2.06), Ward (mean = 1.95), and ICU (mean = 2.27). Lastly, the study discovered that there were significant differences in depression levels for sleep disorder ($p < 0.001$) and mental disorder ($p = 0.006$) at a 0.05 significance level. Clearly, respondents with sleep disorders (mean = 2.51), and mental disorders (mean = 2.69) showed significantly higher sleep quality scores as compared to those without the disorder. This finding indicates that healthcare providers with sleep disorders and mental disorders tend to have bad sleep quality as compared to those who do not have such disorders.

Table 7. Sleep quality level between demographic group

Demographic Profile	n	Mean	SD	p value
Type of health care facility				0.158
Government	93	2.19	0.76	
Private	97	2.03	0.82	
Age				0.375
20-30 Years Old	56	1.96	0.95	
31-40 Years Old	91	2.15	0.71	
41-50 Years Old	34	2.18	0.72	
Above 50 Years Old	9	2.33	0.71	
Gender				0.862
Male	53	2.09	0.63	
Female	137	2.12	0.85	
Nationality*				0.013
Saudi	72	2.29	0.83	
Non-Saudi	118	2.00	0.75	

Profession				0.200
Physician	47	2.23	0.81	
Nurse	97	2.01	0.78	
Others	46	2.20	0.78	
Work Area*				0.002
ER	16	2.06	0.85	1
Ward	37	1.95	0.74	1
ICU	106	2.27	0.82	1
Others	31	1.77	0.56	2
Years of experience				0.090
1-5Years	66	1.94	0.91	
6-10Years	56	2.18	0.69	
11 Years and Above	68	2.22	0.73	
Sleeping disorder				<0.001
Yes	37	2.51	0.90	1
No	153	2.01	0.73	2
Mental Disorder*				0.006
Yes	13	2.69	0.95	1
No	177	2.07	0.77	2

*Significant at 0.05 significance level

Impact of Anxiety and Depression on Sleep Quality

In this section, the study investigates the relationship, or more specifically, the influence effect of anxiety and depression on the sleep quality of healthcare providers, using the Multiple Linear Regression method in Smart PLS 4.0. Statistically, the regression model of sleep quality as a function of anxiety and depression was portrayed in Figure 1. From the regression model estimation, the model was significant, with F value = 115.875, and p value < 0.001 at a 0.05 significance level. Table 8 shows the quality of the estimated regression model. The R² value of 55.3% indicates that both anxiety and depression were able to explain 55.3% of changes in sleep quality. In addition, the Durbin-Watson test value of 1.738 is between 1.5 and 2.5 and close to 2 showing that there is no significant autocorrelation [20]. The regression model statistics are summarized in Table 9. From the results, the study concludes that there is a significant positive effect of anxiety on sleep quality score, with regression weight (B = 0.454, p = 0.000) at a 0.05 significance level. This indicates that when healthcare providers' anxiety levels increase, their sleep quality score will increase, thus leading to worse sleep quality. Further, results showed that there is a significant positive effect of depression on sleep

quality score, given the regression weight ($B = 0.523$, $p = 0.000$), at a 0.05 significance level. This shows that as healthcare workers' depression level increases, their sleep quality score will increase, hence, resulting in worse sleep quality. Lastly, the study assesses the relative influence of depression and anxiety through standardized regression weight (BETA). From the results, clearly, anxiety had more influence on sleep quality with a BETA value of 0.446, as compared to depression with a BETA value of 0.361.

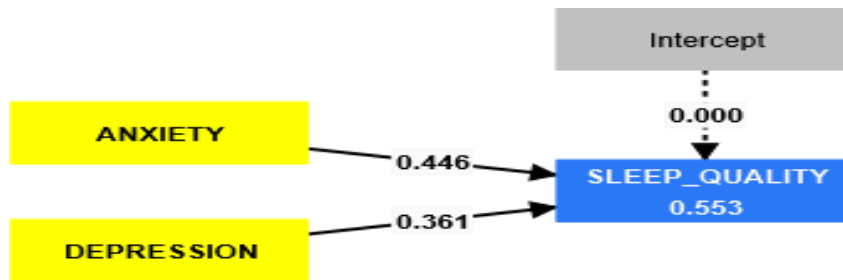


Figure 1. Regression model of sleep quality

Table 8. Regression model quality

Model Statistic	SLEEP_QUALITY
R-square	0.553
R-square adjusted	0.549
Durbin-Watson test	1.738

Table 9. Regression model statistics table

Factor	B	BETA	SE	t value	P value	2.5%	97.5%	VIF
Depression	0.523	0.361	0.098	5.327	≥ 0.0001	0.330	0.717	1.926
Anxiety	0.454	0.446	0.069	6.584	≥ 0.0001	0.318	0.590	1.926
Intercept	0.110	0.0001	0.153	0.722	0.471	-0.191	0.411	

Higher Sleep Quality score = Low/ Bad sleep quality

Discussion

Anxiety and depression are linked to various sleep disturbances, such as insomnia (difficulty falling or staying asleep), hypersomnia (excessive daytime sleepiness), or changes in sleep patterns. Sleep can be disrupted due to negative thought patterns or changes in brain chemistry associated with depression [18,21] Effects of Anxiety on Sleep Quality: Anxiety can lead to difficulties falling asleep, staying asleep, or experiencing restless sleep. Symptoms such as racing

thoughts, worry, and physical tension can disrupt the sleep cycle. Chronic anxiety may contribute to insomnia, sleep disturbances, and overall poor sleep quality. Cognitive behavioral therapy and relaxation techniques can help manage anxiety-related sleep issues [15,21]. Impact of depression on sleep quality, depression is often associated with changes in sleep patterns, such as insomnia or hypersomnia. Individuals with depression may experience difficulty initiating sleep, early morning awakening, or excessive daytime sleepiness. Sleep disturbances can exacerbate depressive symptoms and contribute to a vicious cycle of poor mental health. Treatment strategies for depression, including therapy and medication, can also target sleep problems [15,21]. Bidirectional Relationship, Anxiety and depression can directly influence sleep quality, while poor sleep can worsen anxiety and depression symptoms. Addressing sleep disturbances is essential in managing anxiety and depression effectively. Establishing healthy sleep habits, creating a relaxing bedtime routine, and seeking professional help are vital steps in improving sleep quality in individuals with anxiety and depression [15,22]. Recommendations for Better Sleep: Maintain a consistent sleep schedule and create a sleep-conducive environment. Limit exposure to screens before bedtime and practice relaxation techniques. Engage in regular physical activity and avoid caffeine and heavy meals close to bedtime. Seek support from mental health professionals for managing anxiety, depression, and sleep issues concurrently [23]. The present study was conducted through self-reported questionnaires, which could only quantitatively measure the participants' experiences; however, such emotionally charged and challenging topics need more insights that can only be presented through qualitative studies. Further, the present study was limited to a single private tertiary care hospital and not reflective of the entire region's population. Moreover, there can be high chances of underreporting anxiety, depression and sleep issues; therefore, we suggest an in-depth qualitative study to draw affirmative conclusions. Lastly, determining anxiety, depression and sleep issues, and their relationship is complex and multifaceted, and it cannot be fully understood by only a few factors analysis. Literature has listed several risk factors, but the present study was limited to only a few.

Conclusion

The study concludes that there is a significant positive effect of anxiety on sleep quality scores, this indicates that when healthcare providers' anxiety levels increase, their sleep quality score will increase, thus leading to worse sleep quality. Further, results showed that there is a significant positive effect of depression on sleep quality score, this shows that if healthcare providers' depression level increases, their sleep quality score will increase, hence, resulting in worse sleep quality. Lastly, the study assesses the relative influence of depression and anxiety through standardized regression weight (BETA). From the results, clearly, anxiety had more influence on sleep quality with a BETA value of 0.446, as compared to depression with a BETA value of 0.361. By recognizing the interconnected nature of these conditions and prioritizing sleep quality, healthcare providers can take proactive steps to improve their overall well-being. Seeking professional guidance and adopting healthy sleep practices are crucial in managing the complex relationship between anxiety, depression, and sleep quality.

Consent for publication

Participation in the study was voluntary and participants were ensured that information gathered for the study would be kept confidential and will be used for the study purposes only.

Availability of data and materials

Not applicable

Competing interests

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