Annals of Clinical and Analytical Medicine

Depression, Anxiety and Stress during COVID-19 Pandemic among Physicians and their Families at King Abdulaziz University, Rabigh, Saudi Arabia

Lujain Talaat Idress (1) *, Naseem Abdulmohi Alhujaili (2), Basel Abdulaziz Alsubaie (3), Shahad Bandar Alyoubi (3), Iman Mohamad Wahbi (4)

1) *Department of Surgery, Division of Ophthalmology, Faculty of Medicine in Rabigh, King Abdulaziz University, Jeddah, Saudi Arabia.*
2) *Department of Medicine, Division of Psychiatry, Faculty of Medicine in Rabigh, King Abdulaziz University, Jeddah, Saudi Arabia.*
3) *Medical Intern, King Abdulaziz University, Rabigh, Saudi Arabia*.
4) *Department of Community Medicine, Faculty of Medicine in Rabigh, King Abdulaziz University, Jeddah, Saudi Arabia.*

Received 15/10/2023; revised 17/11/2023; accepted 2/12/2023

*Corresponding author

Abstract

Introduction: Physicians are the frontline warriors in the battle against the pandemic. Therefore, it is crucial to investigate the impact of this health crisis on healthcare professionals and their families. This study aims to examine the prevalence and factors influencing depression, anxiety, and stress among doctors and their family members during the COVID-19 pandemic.

Methods: This is a cross-sectional study recruited doctors (or their family members) who work in the Faculty of Medicine, Rabigh, Saudi Arabia. A self-administered questionnaire containing Depression, Anxiety and Stress Scale - 21 Items (DASS-21) was used to collect participant data using an online link. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. Descriptive statistics were computed based on variable types. Quantitative variables were summarized using means and Standard Deviation (SD), while qualitative variables were presented as frequencies and proportions. Univariate analysis with Chi-square was employed to assess goodness of fit at a significance level of 0.05. Regression models were utilized to identify potential predictors for each dimension of depression, anxiety, and stress.

Results: A total of 143 participants were included in this study. Of them, 60.8% were doctors affiliated to Rabigh College, while 39.2% were relatives of doctors. Regarding depression, 46.2%.8% had depression with different degrees; 11.2% and 6.3 had "Severe" and "Extremely severe" depression, respectively. Similarly, 41.3% had abnormal anxiety levels, 11.2% had severe or extremely severe anxiety, and 30.1% experienced stress in different severity levels. Patients' characteristics such as gender, nationality, marital status and occupation were found to be associated with different psychological problems.

Conclusions: The study's findings revealed that a substantial proportion of the doctors and their family members had moderate to extreme levels of depression, anxiety and depression during the COVID-19 pandemic. These findings highlight the importance of considering cultural and contextual factors when assessing and addressing mental well-being within specific populations.

Keywords: Depression, Anxiety, Stress, Burnout, Corona, COVID-19, Pandemic.

Introduction

From 2019 to 2021, the global community faced the emergence of a seriously contagious disease, COVID-19, transmitted from person to person [1]. Initially identified in Wuhan, China, this novel virus even affected medical professionals [2]. The COVID-19 pandemic can profoundly impact physicians' mental well-being, potentially leading to conditions like depression and anxiety [3]. This is attributed to the escalating workload, intense pressure, physical exhaustion from direct patient care, an increased risk of contracting the virus, and the constant fear of transmitting it to their families. Moreover, isolation and the loss of social support can further erode their resilience [3].

In a previous study conducted in Saudi Arabia in 2020 concerning the well-being of physicians, it was discovered that a significant portion experienced worry (67.5%), isolation (56.9%), and fear (49.7%) [4]. Interestingly, physicians over 60 were less likely to report feelings of isolation [4]. Mosheva et al. conducted research revealing that a higher proportion of physicians expressed anxiety about potentially infecting their family members rather than being infected (52.8% versus 20.9%) [5]. In another study by Elbay et al., they found that among 442 participants, 64.7% exhibited symptoms of depression, 51.6% reported anxiety, and 41.2% experienced stress [1]. Factors such as being female, young, single, having less work experience, and working on the frontline were associated with higher scores in these domains [1]. In the research conducted by Zhu et al., it was observed that 11.4% of doctors and 45.6% of doctors reported symptoms of anxiety and depression, respectively. Additionally, 27.9% of nurses experienced anxiety symptoms, while 43.0% of nurses reported symptoms of depression [6]. Lu et al. identified a discrepancy in fear levels between medical and administrative staff, with the medical staff group exhibiting a higher proportion of moderate to severe fear (70.6% versus 58.4%) [7]. Moreover, 22.6% of medical staff showed mild to moderate anxiety, while about 3% were severe; the corresponding proportions of administrative staff were 17.1% and 2.9% [7]. Furthermore, among medical staff, 11.8% exhibited mild to moderate depression, while only 0.3% experienced severe depression. Du et al. conducted a study and identified a prevalence of at least moderate depressive and anxiety symptoms (BDI-II scores ≥ 14 and BAI scores ≥ 8) in 12.7% and 20.1% of healthcare workers (HCWs), respectively [8]. Additionally, a significant majority (59.0%) reported moderate to extreme levels of perceived stress (PSS scores ≥ 14). These symptoms were more frequently observed among women, HCWs from Wuhan, those who were less psychologically prepared, lacked family support, and individuals with poor sleep quality [8].

In a study by Zhang et al., a substantial portion of participants reached cutoff levels indicating anxiety (28.0%), depression (30.6%), and distress (20.1%). Notably, women were found to be more vulnerable to infection, accounting for 58.6% of cases, and the average age of infection was 35 years old [9]. Furthermore, Lai et al. reported findings from a study involving 1830 healthcare workers, revealing that 50.4% experienced symptoms of depression, 44.6% reported anxiety, 34.0% suffered from insomnia, and 71.5% experienced distress [10]. Furthermore, Chew et al. found that a number of the 906 healthcare people who participated in the survey, 48 (5.3%) screened advantageous for moderate to very-excessive depression, 79 (8.7%) for moderate to extremely severe anxiety, 20 (2.2%) for moderate to extremely-intense stress, and 34 (3.8%) for moderate to excessive ranges of mental distress [11]. The most typical

suggested symptom changed into a headache (32.3%), with many participants (33.4%) reporting more than four signs and symptoms. Zhang et al. found that compared to non-medical health workers. Medical health workers had a higher prevalence of insomnia (38.4 vs. 30.5%), anxiety (13.0 vs. 8.5%), depression (12.2 vs. 9.5%), somatization (1.6 vs. 0.4%), and obsessive-compulsive symptoms (5.3 vs. 2.2%). Living in rural areas, being female, and being at risk of contact with COVID-19 patients were the most common risk factors for these psychological problems [12]. The physicians are the frontline fighters against this pandemic. Therefore, exploring how this pandemic influences healthcare physicians and their family members is pertinent. To assess the prevalence and determinants of depression, anxiety and stress among doctors or their family members during the COVID-19 pandemic.

Methods

This study recruited doctors (or their family members) who work in the Faculty of Medicine, Rabigh, Saudi Arabia. A self-administered questionnaire was used to collect data from the participants using an online link sent to the participants' mobile phones. The questionnaire has two parts: the first has a few demographic questions, and the second consists of Depression, Anxiety and Stress Scale - 21 Items (DASS-21). The three DASS-21 scales contain seven items, divided into subscales with similar content [13]. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable / over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items. Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score and then categorized into five categories, including normal, mild, moderate, severe, and extremely severe.

The data were coded in Google form and will entered into Statistical Package of Social Science (SPSS) software, version 26. The data were described and cleaned before analysis. The descriptive statistics were calculated according to the type of variables, with the quantitative variables described in means and Standard Deviation (SD), while qualitative variables were described in frequency and proportions. Univariate analysis with Chi-square was used to assess the goodness of fit at a 0.05 significance level. Regression models were used to identify the potential predictors of depression, anxiety, and stress dimensions. Participants were provided with information about the study's background, rationale, and the complete anonymity of their responses before data collection. They were assured that no personal identification details or information about their identity were necessary. Written consent was obtained from the patients, as the data collected was entirely anonymous. Ethical approval for this study was granted by the ethics committee of King Abdulaziz University, Saudi Arabia, with Reference number 58-21, dated 3-4-2023.

Results

A total of 143 participants were included in this study; of them, 60.8% were doctors affiliated with Rabigh College, while 39.2% were relatives of doctors. Table (1) provides a snapshot of the demographic characteristics of the respondents in a survey. The data reveals several significant trends. Firstly, in terms of gender, there is a near-even distribution, with 48.3% being male and 51.7% female. Regarding age groups, the data shows that the largest group falls in the 26-35 age range (38.5%), followed by those aged over 55 (16.8%). This suggests that the survey primarily captures responses from adults, indicating a focus on mature individuals' opinions and experiences. Furthermore, the majority of respondents are Saudi nationals (62.2%), and the majority of the respondents are married (79.7%). The dominance of respondents from a governmental job (76.2%) highlights the participation of individuals who likely have stable employment and income. Lastly, the high proportion of respondents with an income of more than 10,000 riyals (84.6%) may indicate a relatively high economic

Table (1): Demographic characteristics of the respondents

Characteristics	*Frequency*	*(%)*
Gender		
Male	69	48.3
Female	74	51.7
Age group		
<25	11	7.7
26-35	55	38.5
36-45	30	21.0
46-55	23	16.1
>55	24	16.8
Nationality		
Saudi	89	62.2
Non-Saudi	54	37.8
Marital status		
Married	114	79.7
Single	24	16.8
Divorced	4	2.8
Widower	1	0.7
Occupation		
Governmental job	109	76.2
Private job	4	2.8
Own business	1	0.7
Housewife	10	7.0
Student	11	7.7
Unemployed	8	5.6
Income		
From 3,000 to 5,000 riyals	7	4.9
From 5,000 to 10,000 riyals	15	10.5
More than 10,000 riyals	121	84.6
Smoking		
Yes	15	10.5
No	128	89.5
Who is answering the questionnaire?		
A doctor affiliated to Rabigh College	87	60.8
One of his/her relatives	56	39.2

status among the respondents. Additionally, the majority of respondents do not smoke (89.5%), which could be a relevant factor if the survey pertains to health or lifestyle choices. Table 2 provides valuable insights into the distribution of respondents' experiences related to depression based on the DASS-21 questionnaire. Several important trends can clearly be observed. Firstly, when examining the items related to depressive symptoms, it is evident that a substantial portion of respondents reported experiencing these symptoms to some degree. The table lists seven different depressive symptoms respondents were asked to rate based on their experiences. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia and inertia. A considerable proportion of respondents reported experiencing various depressive symptoms, with "having nothing to look forward to" being the most prevalent (60.8% experienced this symptom differently). Feeling that they could not seem to experience any positive feeling at all was less common (53.1% experienced this symptom in different degrees). Feeling worthless or meaningless was the least experienced symptom, with 34.3% and 35% experiencing this symptom differently, respectively. Variations in the severity of depressive symptoms among respondents suggest that depression is a complex condition with different facets, and interventions should be tailored accordingly.

Table 3 provides an overview of respondents' experiences related to anxiety, as measured by the DASS-21 questionnaire. Several notable trends can be observed in the data among symptoms, such as autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. Firstly, when looking at specific anxiety symptoms, it is clear that a considerable portion of respondents reported experiencing various anxiety-related sensations to some degree. For example, a substantial number of respondents (40.6%) indicated that they were aware of dryness in their mouth to some extent with different degrees of awareness, while 31.5% reported experiencing breathing difficulties at some level. This suggests that a considerable proportion of the surveyed population experiences anxiety-related physical symptoms. Secondly, examining the overall distribution across different anxiety-related symptoms, it becomes apparent that some were more prevalent than others. Notably, the symptom of feeling scared without any good reason was the most prevalent

Table (2): Distribution of the items related to depression based on DASS-21 among the respondents

Items	Frequency	Percent (%)
I couldn't seem to experience any positive feeling at all		
Did not apply to me at all	67	46.9
Applied to me to some degree, or some of the time	48	33.6
Applied to me to a considerable degree, or a good part of time	25	17.5
Applied to me very much, or most of the time	3	2.1
I found it difficult to work up the initiative to do things		
Did not apply to me at all	56	39.2
Applied to me to some degree, or some of the time	50	35.0
Applied to me to a considerable degree, or a good part of time	32	22.4
Applied to me very much, or most of the time	5	3.5
I felt that I had nothing to look forward to		
Did not apply to me at all	83	58.0
Applied to me to some degree, or some of the time	41	28.7
Applied to me to a considerable degree, or a good part of time	16	11.2
Applied to me very much, or most of the time	3	2.1
I felt down-hearted and blue		
Did not apply to me at all	61	42.7
Applied to me to some degree, or some of the time	51	35.7
Applied to me to a considerable degree, or a good part of time	21	14.7
Applied to me very much, or most of the time	10	7.0
I was unable to become enthusiastic about anything		
Did not apply to me at all	70	49.0
Applied to me to some degree, or some of the time	43	30.1
Applied to me to a considerable degree, or a good part of time	23	16.1
Applied to me very much, or most of the time	7	4.9
I felt I wasn't worth much as a person		
Did not apply to me at all	94	65.7
Applied to me to some degree, or some of the time	38	26.6
Applied to me to a considerable degree, or a good part of time	9	6.3
Applied to me very much, or most of the time	2	1.4
I felt that life was meaningless		
Did not apply to me at all	93	65.0
Applied to me to some degree, or some of the time	27	18.9
Applied to me to a considerable degree, or a good part of time	16	11.2
Applied to me very much, or most of the time	7	4.9

among the respondents, with 44.8% reporting different degrees of feeling. On the other hand, worrying about situations in which they might panic and make a fool of themselves was common, too, with 43.4% experiencing it to some degree. This variation in the prevalence of anxiety symptoms suggests that respondents may have varying sensitivity levels to different anxiety triggers, and interventions should be tailored accordingly. Table 4 presents data on respondents' experiences related to stress, as measured by the DASS-21 questionnaire. The stress scale is to assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable / over-reactive and impatient. Firstly, when examining specific stress-related symptoms, it is evident that a significant portion of respondents reported experiencing these symptoms to varying degrees. For instance, most respondents (73.4%) found it hard to wind down sometimes or most of the time, and more than half of the respondents (56.6%) tended to overreact to situations. This suggests that a considerable portion of the surveyed population experiences stress-related challenges in winding down or responding to situations appropriately. A majority of respondents

(64.3%) found it difficult to relax, while others (57.6%) were intolerant of anything that kept them from getting on with what they were doing. This variation in the prevalence of different stress symptoms highlights that individuals may experience stress in diverse ways and have varying tolerance levels for interruptions or irritations in their daily lives.

Table 5 provides an overview of the distribution of respondents' overall scores for each dimension (Depression, Anxiety, and Stress) as measured by the DASS-21 questionnaire. This table allows us to identify key trends and compare the categories for these dimensions. Firstly, focusing on the depression dimension, it is notable that the majority of respondents (53.8%) fell into the "Normal" category, suggesting that a significant portion of the surveyed population did not exhibit significant depressive symptoms. However, a noteworthy proportion reported experiencing varying degrees of depression, with 11.2% percentage divided into the "Severe" (6.3%) and "Extremely severe" (4.9%) categories. This indicates a diverse range of experiences related to depression among the respondents, with a substantial

minority facing more severe symptoms. Secondly, in the anxiety dimension, a similar pattern emerges. A majority of respondents (58.7%) were categorized as "Normal" in terms of anxiety, suggesting that many did not exhibit significant anxiety symptoms. However, like depression, there was a considerable portion experiencing various levels of anxiety, with 8.4% classified as "Mild," 21.7% as "Moderate," and smaller percentages in the "Severe" (8.4%) and "Extremely severe" (2.8%) categories. Lastly, the stress dimension follows a similar pattern, with 69.9% of respondents categorized as "Normal." Nevertheless, a significant number of respondents are still experiencing stress, with 30.1% experiencing stress in different severity levels. This emphasizes the importance of recognizing and addressing the diversity of mental health experiences within a population and tailoring interventions accordingly. Table 6 presents the findings from a Poisson regression model examining predictors of the depression dimension among the respondents. Several important trends emerge from the results. Firstly, gender plays a significant role, with males being less likely to experience depression compared to males (RR= 0.78).

Moreover, nationality is another significant predictor, with Saudi individuals having a lower risk of experiencing depression compared to non-Saudis (RR=0.82). This suggests that socioeconomic factors related to nationality may influence the prevalence of depression among respondents. Additionally, marital status, occupation, age, and monthly household income all have significant associations with depression risk. For example, married individuals have a lower risk of depression than non-married respondents. All occupation categories exhibited a substantially lower risk for depression when compared to the unemployed. Age is negatively associated with depression risk, with each one-year increase corresponding to a 1% reduction in the risk of depression. Although not statistically significant, a trend indicates that individuals in higher income levels may have a lower risk of depression compared to those in lower income categories. Overall, these findings provide valuable insights into the factors associated with depression among the surveyed population. Table 7 presents the findings of a Poisson regression model for predictors of the anxiety dimension among the respondents. Several important trends were observed, comparing statistically significant categories. Firstly, gender played a significant role (p-value < 0.001) in predicting anxiety levels. Males were found to have a lower risk of experiencing anxiety compared to females, as indicated by a risk ratio of 0.76. This suggests that gender differences are influential factors in the prevalence of anxiety within the surveyed population. Secondly, nationality was also a statistically significant predictor (p-value < 0.001). Non-Saudi individuals had a lower risk of experiencing anxiety compared to Saudis, with a risk ratio of 0.73. Additionally, smoking status was marginally significant (p-value = 0.048) in predicting anxiety, with smokers having a lower risk compared to non-smokers. The category for who was answering the questionnaire was also significant (p-value < 0.001), with doctors having a lower risk of anxiety compared

to relatives. However, marital status, occupation, age, and monthly household income did not significantly correlate with anxiety risk statistically. Table 8 presents the findings of a Poisson regression model for predictors of the stress dimension among the respondents, highlighting significant trends among the statistically significant categories. Gender exhibited a statistically significant impact (p-value < 0.001) on predicting stress levels. Males were found to have a lower risk of experiencing stress compared to males, indicated by a risk ratio of 0.79. Moreover, non-Saudi individuals had a lower risk of experiencing stress compared to Saudis, with a risk ratio of 0.68. Furthermore, the category of who was answering the questionnaire showed significant differences. Specifically, doctors had a lower risk of stress compared to relatives. Regarding occupation, housewives had a significantly lower risk of developing stress when compared to the unemployed. In addition to these significant predictors, other factors such as age and monthly household income showed statistically significant associations with stress within the respondents.

Discussion

The COVID-19 pandemic has brought unprecedented challenges for healthcare professionals, including doctors and their family members. This study aimed to assess the prevalence and determinants of depression, anxiety, and stress among doctors or their family members during the COVID-19 pandemic in the Faculty of Medicine, Rabigh, Saudi Arabia. Data for this study were collected using a self-administered questionnaire distributed via an online link sent to the participants' mobile phones. Regarding depression prevalence that was found in the present study, a noteworthy proportion reported experiencing varying degrees of depression. Of concern, 11.2% of respondents reported severe (6.3%) or extremely severe (4.9%) symptoms. These findings suggest a diverse range of experiences and highlight the considerable impact of depression on a substantial minority of doctors and their family members during the pandemic. Several studies conducted in different countries have explored the prevalence of depression among healthcare professionals during the COVID-19 pandemic. In their research, 38 studies were identified that documented the mental health challenges faced by healthcare workers during the COVID-19 pandemic. The distribution of healthcare professionals analyzed in this review encompassed 27.9% doctors, 43.7% nurses, and 7.0% allied health workers. When all the data was synthesized, it was revealed that approximately 49% of these individuals were contending with mental health issues, including post-traumatic stress disorder, anxiety, depression, and distress [14]. The findings of the study indicate that in the dimension of anxiety, a notable trend emerges among the respondents. A majority, accounting for 58.7% of the participants, fell under the "Normal" category in terms of anxiety levels, implying that a significant portion did not display substantial anxiety symptoms. However, mirroring the pattern observed for depression, a substantial segment of the respondents exhibited varying degrees of anxiety. Specifically, 21.7% were classified as "Moderate," with some participants falling into the "Severe" (8.4%) and "Extremely severe" (2.8%) categories. In comparison to these findings, other studies have shown wide variability in the global prevalence of anxiety disorders and the identification of factors influencing anxiety levels.

Even before the onset of the COVID-19 pandemic, numerous studies sought to estimate the prevalence of mental health conditions among the general population. One systematic review, which examined 87 studies from 44 different countries, discovered a striking range in the prevalence of anxiety, ranging from 0.9% in China to 28.3% in Afghanistan. Significant predictors for anxiety encompassed factors such as age, gender, culture, income, and the degree of modernization [15]. It's important to note that the substantial variation in prevalence rates across these studies was attributed mainly to methodological differences and cultural variability. The current study's findings revealed a similar pattern in the stress dimension, with a majority of respondents, comprising 69.9%, falling into the "Normal" category. Nevertheless, a significant portion of respondents, about 30.1%, reported experiencing stress at varying levels of severity. This underscores the critical importance of acknowledging and addressing various

Table (3): Distribution of the items related to anxiety based on DASS-21 among the respondents

Items	Frequency	(%)
I was aware of dryness of my mouth		
Did not apply to me at all	85	59.4
Applied to me to some degree, or some of the time	44	30.8
Applied to me to a considerable degree, or a good part of time	12	8.4
Applied to me very much, or most of the time	2	1.4
I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)		
Did not apply to me at all	98	68.5
Applied to me to some degree, or some of the time	35	24.5
Applied to me to a considerable degree, or a good part of time	9	6.3
Applied to me very much, or most of the time	1	0.7
I experienced trembling (eg, in the hands)		
Did not apply to me at all	118	82.5
Applied to me to some degree, or some of the time	18	12.6
Applied to me to a considerable degree, or a good part of time	7	4.9
Did not apply to me at all	118	82.5
I was worried about situations in which I might panic and make a fool of myself		
Did not apply to me at all	81	56.6
Applied to me to some degree, or some of the time	43	30.1
Applied to me to a considerable degree, or a good part of time	15	10.5
Applied to me very much, or most of the time	4	2.8
I felt I was close to panic		
Did not apply to me at all	92	64.3
Applied to me to some degree, or some of the time	42	29.4
Applied to me to a considerable degree, or a good part of time	6	4.2
Applied to me very much, or most of the time	3	2.1
I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)		
Did not apply to me at all	87	60.8
Applied to me to some degree, or some of the time	42	29.4
Applied to me to a considerable degree, or a good part of time	11	7.7
Applied to me very much, or most of the time	3	2.1
I felt scared without any good reason		
Did not apply to me at all	79	55.2
Applied to me to some degree, or some of the time	46	32.2
Applied to me to a considerable degree, or a good part of time	14	9.8
Applied to me very much, or most of the time	4	2.8

spectrum of mental health experiences within a population and tailoring interventions accordingly. These findings align with those of other studies, particularly in the context of healthcare workers. Stress is a prevalent condition among healthcare professionals, often attributed to the factors of work overload, poor communication, and insufficient resources. In a systematic review encompassing eight studies, the estimated prevalence of stress among healthcare workers was 62% [16]. Furthermore, on a global scale, a considerable treatment gap exists for anxiety and stress disorders, primarily due to insufficient awareness of their impact on health and overall well-being. A systematic review that analyzed data from 21 countries identified a prevalence of 9.8% for 12-month anxiety disorders. Alarmingly, only 28% of individuals with these disorders received any form of treatment, and a significant portion received inadequate treatment among those who did. Notably, lower-income countries exhibited lower levels of treatment accessibility compared to their high-income

counterparts [17]. Hence, these findings underscore the pressing need for targeted mental health effective interventions, particularly in the context of stress and anxiety, recognizing the diverse experiences within populations and addressing treatment gaps to promote the well-being of individuals, especially healthcare workers, who are often on the frontlines of stress-inducing environments.

The findings from Table 6 of the study provide valuable insights into the predictors of the depression dimension among the respondents. Several significant trends emerge from these results. Firstly, gender appears to play a crucial role, with males being less likely to experience depression compared to females (Relative Risk = 0.78). This gender difference underscores the importance of considering gender-specific factors in understanding and addressing depression risk. Moreover, nationality also emerges as a noteworthy predictor, with Saudi individuals having a lower risk of experiencing depression compared to non-Saudis (RR = 0.82). This finding suggests that socioeconomic factors associated with nationality may influence the prevalence of depression among the respondents. Additionally, marital status, occupation, age, and monthly household income exhibit significant associations with depression risk. For instance, married individuals have a lower risk of depression compared to their non-married counterparts, emphasizing the potential protective role of social support networks in mental health. Occupationally, all categories displayed a substantially lower risk for depression when compared to the unemployed, highlighting the potential psychological benefits of gainful employment. These findings resonate with another study conducted among healthcare professionals in a pandemic hospital in Turkey. In that study, a multivariable logistic regression model was used to explore the factors influencing turnover intention among healthcare workers, considering emotions such as anxiety, burnout, and depression. The COVID-19 pandemic was found to significantly increase turnover intention, particularly among doctors and nurses. Anxiety related to work pressure and burnout emerged as key emotional predictors of this intention, with higher levels of anxiety and severe burnout significantly increasing the likelihood of healthcare professionals considering quitting their jobs [18]. Together, these studies underscore the complex interplay of factors influencing mental health outcomes, including gender, nationality, marital status, occupation, and emotional well-being. They highlight the importance of tailored interventions and support systems to address mental health challenges among diverse populations, especially in high-stress environments like healthcare settings during a pandemic. The findings from our study shed light on the predictors of anxiety among the respondents and align with trends observed in other studies, collectively emphasizing the role of gender and nationality in anxiety levels. Firstly, our study revealed a significant gender difference (p-value < 0.001) in predicting anxiety levels. Males were found to have a lower risk of experiencing anxiety compared to females, with a risk ratio of 0.76. This gender disparity suggests that gender-specific factors play a substantial role in shaping the prevalence of anxiety within the surveyed population.

These findings resonate with the results of other studies, particularly in the context of healthcare workers. For instance, one study found that female health workers had a significantly higher risk of developing moderate or higher anxiety levels compared to their male counterparts, with a reported odds ratio of 2.85 (p=0.017). Similar patterns were observed in Oman, where 28% of female health workers experienced significant anxiety, in contrast to 17% of males [19]. Furthermore, female frontline health workers in Egypt and Saudi Arabia were found to have a 2.68 times higher risk of being severely or very severely anxious [20]. In India, gender emerged as the sole significant predictor of anxiety among health workers, with an odds ratio of 2.2 [21]. The consistent findings across these studies highlight the vulnerability of female healthcare workers to higher anxiety levels compared to their male counterparts. This gender-based disparity may be influenced by various factors, including societal expectations, caregiving responsibilities, and coping mechanisms. Moreover, our study also highlighted the significance of nationality as a predictor of anxiety, with non-Saudi individuals having a lower risk of experiencing anxiety compared to Saudis, supported by a risk ratio of 0.73. This suggests that socioeconomic and cultural factors tied to nationality can impact anxiety levels

within the population. Therefore, these studies collectively underscore the importance of recognizing and addressing gender and nationality-based disparities in anxiety levels among various populations, especially among healthcare workers who are susceptible to heightened stress and anxiety, particularly during crises like the COVID-19 pandemic. Tailored interventions and support systems may be essential in mitigating these disparities and promoting mental well-being.

The findings from our study give valuable insights into the predictors of stress among the respondents, and they align with trends observed in other studies, emphasizing the significant role of gender in stress levels. Firstly, our study identified gender as a significant predictor of stress (p-value < 0.001). Males were found to have a lower risk of experiencing stress compared to males, as indicated by a risk ratio of 0.79. This gender-based disparity underscores the influence of gender-specific factors in shaping stress levels within the surveyed population. These findings align with results from other studies, particularly among healthcare workers. For instance, in Yemeni health workers, only gender was significantly associated with stress levels, with males having a 2.9 times lower risk of being moderately or highly stressed compared to females (p=0.012). Similarly, in Oman, a significantly higher proportion of female health workers, approximately 59%, reported high levels of stress compared to 47% of males [19]. Furthermore, female frontline health workers in Egypt and Saudi Arabia were found to be 2.39 times more likely to experience severe or very severe stress [20]. Indian female frontline health workers also exhibited a significant two times higher odds of stress compared to males [21]. Interestingly, gender emerged as the sole significant predictor of stress among Indian health workers, mirroring the findings of our study. The consistent gender-based disparities in stress levels across these studies suggest that gender-specific factors, such as societal expectations, caregiving responsibilities, and coping mechanisms, may contribute to variations in stress experiences among different populations, particularly within the healthcare sector. Additionally, our study highlighted the role of nationality and occupation as predictors of stress, with non-Saudi individuals and housewives having lower stress risks compared to Saudis and the unemployed, respectively. These findings emphasize the influence of socioeconomic and cultural factors on stress levels. Thus, these studies underscore the significance of gender as a key predictor of stress levels among various populations, including healthcare workers. Understanding and addressing gender-based disparities in stress can inform tailored interventions and support systems aimed at promoting mental well-being, particularly in high-stress environments like healthcare settings.

A limitation of this study is its cross-sectional design, which only allows for a snapshot of data at a specific point in time. As a result, it is difficult to establish causal relationships or determine the direction of associations between variables. Longitudinal studies would provide a more robust understanding of the prevalence and determinants of depression, anxiety, and stress among doctors and their family members during the COVID-19 pandemic. Moreover, the data collection method for this study involved a self-administered questionnaire distributed through an online link sent to participants' mobile phones. This reliance on self-reporting introduces the possibility of response and social desirability bias. This study recruited doctors or their family members working in the Faculty of Medicine, Rabigh, Saudi Arabia. While this selection may provide insight into healthcare professionals' experiences in this specific setting, it limits the generalizability of the findings to a broader population or other countries. Including participants from diverse healthcare settings and geographical locations would enhance the representativeness and external validity of the study.

Conclusions

The study's findings revealed that a substantial proportion of the doctors and their family members had moderate to extreme levels of depression, anxiety and depression. In many instances, females were found to be at a higher risk of experiencing these mental health challenges compared to their male counterparts. This suggests the need for gender-sensitive approaches in mental health interventions, taking into account societal expectations, caregiving

roles, and coping mechanisms that may disproportionately affect one gender over the other. Nationality and socioeconomic factors were also identified as influential predictors. These findings highlight the importance of considering cultural and contextual factors when assessing and addressing mental well-being within specific populations. Occupation and marital status played notable roles in predicting mental health outcomes. For instance, healthcare workers exhibited unique vulnerabilities to mental health challenges, particularly during the COVID-19 pandemic. Housewives and married individuals, on the other hand, often showed lower risks of mental health issues compared to unemployed or non-married individuals. These collective insights underscore the need for tailored interventions and support systems to mitigate mental health disparities among diverse populations. It is imperative to consider the interplay of gender, nationality, occupation, and other contextual factors when designing strategies to promote mental well-being. Addressing these disparities is crucial for individual health and the resilience and effectiveness of critical sectors such as healthcare, particularly in times of crisis.

Conflict of interests

The authors declared no conflict of interests.

References

1. Elbay RY, Kurtulmuş A, Arpacıoğlu S, Karadere E: Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. Psychiatry research. 2020, 290:113130.

2. Huang Y, Zhao N: Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry research. 2020, 288:112954.

3. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P: Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. Brain, behavior, and immunity. 2020, 88:901-907.

4. Al Sulais E, Mosli M, AlAmeel T: The psychological impact of COVID-19 pandemic on physicians in Saudi Arabia: a cross-sectional study. Saudi journal of gastroenterology: official journal of the Saudi Gastroenterology Association. 2020, 26:249.

5. Mosheva M, Hertz-Palmor N, Dorman Ilan S, et al.: Anxiety, pandemic-related stress and resilience among physicians during the COVID-19 pandemic. Depression and anxiety. 2020, 37:965-971.

6. Zhu J, Sun L, Zhang L, et al.: Prevalence and influencing factors of anxiety and depression symptoms in the first-line medical staff fighting against COVID-19 in Gansu. Frontiers in psychiatry. 2020, 11:386.

7. Lu W, Wang H, Lin Y, Li L: Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. Psychiatry research. 2020, 288:112936.

8. Du J, Dong L, Wang T, et al.: Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. General hospital psychiatry. 2020, 67:144.

9. Zhang SX, Liu J, Jahanshahi AA, et al.: At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19. Brain, behavior, and immunity. 2020, 87:144-146.

10. Rossi R, Socci V, Jannini TB, et al.: Mental health outcomes among Italian health care workers during the COVID-19 pandemic. JAMA network open. 2021, 4:e2136143-e2136143.

11. Chew NW, Lee GK, Tan BY, et al.: A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain, behavior, and immunity. 2020, 88:559-565.

12. Zhang W-r, Wang K, Yin L, et al.: Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. Psychotherapy and psychosomatics. 2020, 89:242-250.

13. Coker AO, Coker O, Sanni D: Psychometric properties of the 21-item depression anxiety stress scale (DASS-21). African Research Review. 2018, 12:135-142.

14. Saragih ID, Tonapa SI, Saragih IS, et al.: Global prevalence of mental health problems among

healthcare workers during the Covid-19 pandemic: A systematic review and meta-analysis. International journal of nursing studies. 2021, 121:104002.

15. Baxter AJ, Scott K, Vos T, Whiteford H: Global prevalence of anxiety disorders: a systematic review and meta-regression. Psychological medicine. 2013, 43:897.

16. Onigbogi CB, Banerjee S: Prevalence of psychosocial stress and its risk factors among healthcare workers in Nigeria: A systematic review and meta-analysis. Nigerian medical journal: journal of the Nigeria Medical Association. 2019, 60:238.

17. Alonso J, Liu Z, Evans-Lacko S, et al.: Treatment gap for anxiety disorders is global: Results of the World Mental Health Surveys in 21 countries. Depression and anxiety. 2018, 35:195-208.

18. Tabur A, Elkefi S, Emhan A, Mengenci C, Bez Y, Asan O: Anxiety, burnout and depression, psychological well-being as predictor of healthcare professionals' turnover during the COVID-19 pandemic: study in a pandemic hospital. In Healthcare. Volume 10. MDPI; 2022:525.

19. Badahdah A, Khamis F, Al Mahyijari N, et al.: The mental health of health care workers in Oman during the COVID-19 pandemic. International journal of social psychiatry. 2020:0020764020939596.

20. Arafa A, Mohammed Z, Mahmoud O, Elshazley M, Ewis A: Depressed, anxious, and stressed: What have healthcare workers on the frontlines in Egypt and Saudi Arabia experienced during the COVID-19 pandemic? Journal of affective disorders. 2021, 278:365-371.

21. Wilson W, Raj JP, Rao S, et al.: Prevalence and predictors of stress, anxiety, and depression among healthcare workers managing COVID-19 pandemic in India: a nationwide observational study. Indian Journal of Psychological Medicine. 2020, 42:353-358.

Table (4): Distribution of the items related to stress based on DASS-21 among the respondents

Items	*Frequency*	*Percent (%)*
I found it hard to wind down		
Did not apply to me at all	38	26.6
Applied to me to some degree, or some of the time	63	44.1
Applied to me to a considerable degree, or a good part of time	32	22.4
Applied to me very much, or most of the time	10	7.0
I tended to over-react to situation		
Did not apply to me at all	62	43.4
Applied to me to some degree, or some of the time	55	38.5
Applied to me to a considerable degree, or a good part of time	18	12.6
Applied to me very much, or most of the time	8	5.6
I felt that I was using a lot of nervous energy		
Did not apply to me at all	63	44.1
Applied to me to some degree, or some of the time	52	36.4
Applied to me to a considerable degree, or a good part of time	22	15.4
Applied to me very much, or most of the time	6	4.2
I found myself getting agitated		
Did not apply to me at all	61	42.7
Applied to me to some degree, or some of the time	53	37.1
Applied to me to a considerable degree, or a good part of time	21	14.7
Applied to me very much, or most of the time	8	5.6
I found it difficult to relax		
Did not apply to me at all	51	35.7
Applied to me to some degree, or some of the time	64	44.8
Applied to me to a considerable degree, or a good part of time	19	13.3
Applied to me very much, or most of the time	9	6.3
I was intolerant of anything that kept me from getting on with what I was doing		
Did not apply to me at all	75	52.4
Applied to me to some degree, or some of the time	42	29.4
Applied to me to a considerable degree, or a good part of time	18	12.6
Applied to me very much, or most of the time	8	5.6
I felt that I was rather touchy		
Did not apply to me at all	73	51.0
Applied to me to some degree, or some of the time	50	35.0
Applied to me to a considerable degree, or a good part of time	13	9.1
Applied to me very much, or most of the time	7	4.9

Table (5): Distribution of the overall score for each dimension of DAS-21 among the respondents

Items	*Frequency*	*Percent (%)*
Depression		
Normal	77	53.8
Mild	22	15.4
Moderate	28	19.6
Severe	9	6.3
Extremely severe	7	4.9
Anxiety		
Normal	84	58.7
Mild	12	8.4
Moderate	31	21.7
Severe	12	8.4
Extremely severe	4	2.8
Stress		
Normal	100	69.9
Mild	14	9.8
Moderate	15	10.5
Severe	8	5.6
Extremely severe	6	4.2

Table (6): Findings of Poisson regression model for predictors of depression dimension among the respondents

Predictors	Categories	Reference group	P value	Risk Ratio	Lower limit (95% C.I)	Upper limit (95% C.I)
Gender	Male	Female	**<0.001***	0.78	0.69	0.89
Nationality	Saudi	Non-Saudi	**0.009***	0.82	0.71	0.95
Smoking	Yes	No	0.684	0.96	0.79	1.17
Who is answering the questionnaire?	Doctor	Relatives	0.156	0.89	0.76	1.04
Marital status	Married	Others	**0.001***	0.66	0.51	0.85
	Single	Others	0.060	0.75	0.56	1.01
Occupation	Governmental	Unemployed	**0.015***	0.74	0.58	0.94
	Private job or business	Unemployed	**0.004***	0.59	0.41	0.84
	Housewife	Unemployed	**<0.001***	0.36	0.26	0.50
	Student	Unemployed	**0.026***	0.73	0.55	0.96
Age	Age now	One year before	**0.007***	0.99	0.98	1.00
Monthly household income	Lower income level	Higher income level	0.098	0.90	0.79	1.02

Table (7): Findings of Poisson regression model for predictors of anxiety dimension among the respondents

Predictors	Categories	Reference group	P value	Risk Ratio	Lower limit (95% C.I)	Upper limit (95% C.I)
Gender	Male	Female	**<0.001***	0.76	0.65	0.89
Nationality	Saudi	Non-Saudi	**<0.001***	0.73	0.62	0.87
Smoking	Yes	No	**0.048***	0.77	0.59	1.00
Who is answering the questionnaire?	Doctor	Relatives	**<0.001***	0.73	0.60	0.88
Marital status	Married	Others	0.164	1.32	0.89	1.94
	Single	Others	0.131	1.40	0.90	2.17
Occupation	Governmental	Unemployed	0.505	1.11	0.81	1.53
	Private job or business	Unemployed	0.591	1.12	0.74	1.70
	Housewife	Unemployed	0.100	0.73	0.50	1.06
	Student	Unemployed	0.924	1.02	0.71	1.46
Age	Age now	One year before	0.083	0.99	0.99	1.00
Monthly household income	Lower income level	Higher income level	**0.023***	0.84	0.72	0.98

Table (8): Findings of Poisson regression model for predictors of stress dimension among the respondents

Predictors	Categories	Reference group	P value	Risk Ratio	Lower limit (95% C.I)	Upper limit (95% C.I)
Gender	Male	Female	**<0.001***	0.79	0.70	0.88
Nationality	Saudi	Non-Saudi	**<0.001***	0.68	0.60	0.78
Smoking	Yes	No	0.888	0.99	0.82	1.18
Who is answering the questionnaire?	Doctor	Relatives	**<0.001***	0.73	0.64	0.84
Marital status	Married	Others	0.666	0.95	0.73	1.22
	Single	Others	0.387	1.14	0.85	1.52
Occupation	Governmental	Unemployed	0.113	1.21	0.96	1.52
	Private job or business	Unemployed	0.476	0.89	0.64	1.23
	Housewife	Unemployed	**0.003***	0.65	0.48	0.86
	Student	Unemployed	0.053	0.76	0.58	1.00
Age	Age now	One year before	**0.002***	0.99	0.98	1.00
Monthly household income	Lower income level	Higher income level	**0.004***	0.84	0.75	0.95


Emerging Sources Citation Index (ESCI)
Clarivate
Analytics
WEB OF SCIENCE
THOMSON
REUTERS