

## ORIGINAL ARTICLE

# THE IMPACT OF COVID-19 PANDEMIC ON THE DEPRESSIVE SYMPTOMS AND QUALITY OF LIFE AMONG HEALTH WORKERS IN SAUDI ARABIA

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### Summary

**Background:** During coronavirus disease 2019 (COVID-19) pandemic, workers in the healthcare sector are experiencing high workload, making them susceptible to psychological illness.

**Purpose:** This study aimed to explore the influence of COVID-19 outbreak on the depressive symptoms and quality of life among health workers (HWs) in Saudi Arabia.

**Methods:** In this cross-sectional study, the psychological impact and quality of life were assessed using Patient Health Questionnaire-9 (PHQ-9) and Quality-of-Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q).

**Results:** A total of 151 HWs participated in the study, from which 80 participants completed the survey (response rate: 53%). Females (85.5%) were predominantly higher than males (14.5%). Minimal to mild depressive symptoms were observed in about 47%, whereas only 11.25% of health workers had severe depressive symptoms. Females had lower PHQ-9 scores compared to males. The occurrence of moderately severe to severe depression in medical HWs was more than two folds compared to non-medical workers (26.5% and 12.9%, respectively). Around 73% of HWs had a Q-LES-Q score above 50%, which indicates moderate to high quality of life. The younger participants had a lower quality of life. Similar scores of Q-LES-Q were reported in both females and males.

**Conclusion:** Throughout the pandemics, mental status and quality of life of workers in the healthcare sector can be affected. During COVID-19 outbreak, moderately severe to severe depressive symptoms were seen in 21.3% of HWs in Saudi Arabia. Additionally, 27.5% had lower quality of life. Longitudinal studies are needed to determine variable changes over time. Recognizing the psychological impact of COVID-19 pandemic can guide policymakers to tailor interventions that support the most vulnerable workers.

*Key words: COVID-19; Pandemic; PHQ-9; Q-LES-Q; Depression; Quality of life; Health workers*

## 1. Introduction

Lower respiratory tract infections are considered a leading cause of morbidity and mortality globally (1). In December 2019, national authorities in China reported pneumonia cases to the World Health Organization (WHO).

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Eventually, a novel coronavirus was identified. In March 2020, the WHO announced coronavirus disease 2019 (COVID-19) as a pandemic (2). Coronavirus has affected a considerable number of people and according to the WHO, as of July 1, 2020, there have been 10,321,689 confirmed cases worldwide, with 507,435 deaths (3). In Saudi Arabia, 194,225 cases have been confirmed on July 1, 2020, resulting in 1,698 deaths (4). The healthcare system is experiencing a higher workload than before (5). Health workers (HWs) are becoming ill with the increasing number of cases. In some countries, up to 10% of HWs are infected with coronavirus (6). This pandemic can affect HWs in different aspects of their lives. There is a need to assess the mental health and quality of life which are considered important domains so interventions can be formulated accordingly.

There are several tools that have been developed and used to evaluate mental health (7). Patient Health Questionnaire-9 (PHQ-9) is one of the most used instruments in different populations and settings (8-15). It is a valid and reliable instrument for multiple purposes, including screening and measuring depression severity. The nine items of the questionnaire are based on the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) for depression (16).

The quality of life is defined by the WHO as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment" (17). The Quality-of-Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) and its short form are used to evaluate the overall level of enjoyment and satisfaction. They are among the commonly used measures in psychiatric research (18). Their validity and reliability have been established in several settings and populations (19-27).

During the COVID-19 crisis, high rates of depression and anxiety were estimated to be at least 20% among health professionals in China. Female HWs and nurses show higher rates than other staff. Around 40% of HWs had sleeping difficulties and/or insomnia (28). A considerable proportion of mental health issues were reported, especially in women and frontline HWs (29-31).

In Saudi Arabia, the psychological burden of COVID-19 on healthcare workers and the general population has been explored using different instruments (32-39). PHQ-9 was widely used in several studies. The studies were conducted across various regions. About 23-55% of HWs experienced depressive symptoms (32-34). To our knowledge, Q-LES-Q was not used to evaluate the quality of life of HWs during the pandemic. In this study, we aim to assess the impact of COVID-19 pandemic on the depressive symptoms and quality of life among HWs in Saudi Arabia.

## **2. Materials and methods**

### **2.1 Study design and setting**

In this cross-sectional study, the psychological impact of COVID-19 pandemic on HWs was evaluated using a self-administered questionnaire. It was generated in Arabic and English languages. Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at Princess Nourah Bint Abdulrahman University. REDCap is a secure, web-based software platform designed to support data capture for research studies. From July 5, 2020, to March 9, 2021, the study was carried out among HWs in private and governmental sectors across Saudi Arabia. It included primary, secondary, and tertiary healthcare settings as well as the ministry of health. We included HWs from medical and non-medical fields. Social media applications were used to distribute the questionnaire. In addition to the physical distribution that was limited to the Riyadh.

### **2.2 Study procedure**

According to the Statistical Yearbook, the healthcare sector in Saudi Arabia had 467,650 employees in 2019 (40). Raosoft software was used to calculate the sample size. With a confidence level of 95% and 50% response distribution, the minimum recommended sample size was estimated to be 384.

## 2.3 Data collection

The participants were requested to complete three sections composed of sociodemographic data, PHQ-9, and Q-LES-Q-SF. The sociodemographic section included age, gender, marital status, nationality, job, employment status, monthly income, and region. Moreover, they were asked if they have been tested positive for COVID-19. The second section assessed the depressive symptoms over the past two weeks using PHQ-9. The nine items of the questionnaire are based on the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition (DSM-IV) for depression (7). Based on the frequency of symptoms, the points range from 0 (not at all) to 3 (nearly every day). The total score is out of 27, which indicates the severity of depressive symptoms. It is subdivided into five categories: minimal or none (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), and severe (20-27). The last part was Q-LES-Q-SF which captures the enjoyment and satisfaction over the past week. It is a 16-item questionnaire that is identical to the general activities subscale of the Q-LES-Q instrument. Responses to each item is rated on a 5-point scale ranging from 1 (very poor) to 5 (very good). The points of the first 14 items are added together and reported as a percentage maximum possible score or raw total score. The raw total score ranged from 14 to 70, and a higher score indicates better quality of life. The last two items are stand-alone and not included in the total score. The validated Arabic and English versions for both instruments were used.

## 2.4 Statistical Analysis

All analyses were performed using IBM SPSS software 23.0 (IBM Co., Armonk, NY, USA). Continuous variables were presented as mean  $\pm$  standard deviation. Categorical variables were expressed as numbers (percentages). We compared data using t-test, Mann-Whitney U, Chi Squared or Fisher's Exact tests as appropriate. All statistical tests were two-sided, and P values  $< 0.05$  were considered statistically significant.

## 4. Results

### 4.1 Demographics

A total of 151 HWs participated in the study, from which eighty participants had a complete response. The mean age was 35.9 with a standard deviation of 9.5. Fifty three percent were above the age of 30, and more than half were married (59.8%). Eighty-eight percent of the participants were Saudi, and females (85.5%) were predominantly higher than males (14.5%). Medical workers accounted for about 48%. Of which 16.2% were physicians, 8.5% were nurses, and 6.8% were pharmacists. Nearly 60% of the respondents were working in the Central region and 59% were full-time workers. A monthly income between 5,000 to 10,000 SAR was reported by around 19% of the participants. About 70% of the participants were not infected with COVID-19 (**Table 1**).

**Table 1.** Baseline characteristics.

Characteristics	Mean $\pm$ standard deviation
Age (years)	35.9 $\pm$ 9.5
Characteristics	Number (%)
Age group (years)	
18 - 25	9 (7.7)
26 - 30	23 (19.7)
31 - 40	31 (26.5)
> 40	31 (26.5)
Gender	
Female	100 (85.5)
Marital status	
Single	38 (32.5)
Married	70 (59.8)
Divorced	7 (6.0)
Widowed	2 (1.7)

Nationality	
Saudi	103 (88.0)
Job	
Medical Health Workers	56 (47.9)
Physician	19 (16.2)
Dentist	8 (6.8)
Surgeon	3 (2.6)
Nurse	10 (8.5)
Pharmacist	8 (6.8)
Physiotherapist	5 (4.3)
Psychiatrist	3 (2.6)
Non-Medical Health Workers	53 (45.3)
IT	1 (0.9)
Assistant	2 (1.7)
Receptionist	4 (3.4)
Secretary	1 (0.9)
Other	45 (38.5)
Employment status	
Full time	69 (59.0)
Part time	10 (8.5)
Unemployed	18 (15.4)
Retired	5 (4.3)
Other	5 (4.3)
Region	
Center	70 (59.8)
West	16 (13.7)
East	11 (9.4)
South	6 (5.1)
North	1(0.9)
Monthly income	
Less than 5,000 SAR	23(19.7)
From 5,000 to 10,000 SAR	22(18.8)
From 11,000 to 15,000 SAR	17(14.5)
From 16,000 to 20,000 SAR	22(18.8)
More than 20,000 SAR	14(12.0)
Infected with coronavirus	
Yes	7(6.0)
No	81(69.2)

#### 4.2 Severity of Depressive Symptoms and Associated Factors

**Table 2** reveals the severity of depressive symptoms and associated factors. The PHQ-9 scores showed that 47.2% had minimal to mild depressive symptoms, whereas only 11.25% experienced severe depressive symptoms. Moderate to severe depressive symptoms were seen in around 50% of the 18-25 age group, which is similar to the 26-30 age group. Females had lower PHQ-9 scores compared to males. About 52% of the female respondents experienced minimal and mild levels of depression (33.3% and 18.8%, respectively). Moderately severe to severe depression was observed more in single HWs, representing 30% of them. The prevalence of moderately severe to severe depression in medical HWs was higher than non-medical workers (26.5% and 12.9%, respectively). HWs living in the Eastern and Western regions showed comparable scores of depression, with 40% and 41.7% having minimal depression, respectively. Moderately severe to severe depression was reported in nearly 22% of the participants who were not infected with coronavirus. Finally, HWs who had a monthly income of more than 20,000 SAR had the lowest scores of depression.

**Table 2.** Associations between depressive symptoms and demographic variables.

Characteristics	Total	Minimal or none	Mild	Moderate	Moderate severe	Severe
<b>N. (%)</b>	80	23 (28.7)	15 (18.5)	23 (28.7)	10 (12.5)	9 (11.25)
<b>Age group (years)</b>						
<b>18- 25</b>	6 7.6%	1 16.6%	2 33.3%	1 16.6%	1 16.6%	1 16.6%
<b>26- 30</b>	21 26.2%	7 33.3%	3 14.3%	8 38.1%	3 14.3%	0 0.0%
<b>31- 40</b>	26 32.5%	6 23.1%	4 15.38%	6 23.0%	5 19.0%	5 19.0%
<b>&gt; 40</b>	27 33.7%	12 44.4%	5 18.5%	8 29.6%	0 0.0%	2 7.4%
<b>Gender</b>						
<b>Female</b>	69 86.3%	23 33.3%	13 18.8%	19 27.5%	8 11.6%	6 8.7%
<b>Male</b>	11 13.8%	3 27.3%	1 9.1%	4 36.4%	1 9.1%	2 18.2%
<b>Marital status</b>						
<b>Single</b>	30 37.5%	10 33.3%	4 13.3%	7 23.3%	5 16.7%	4 13.3%
<b>Married</b>	45 56.3%	14 31.1%	10 22.2%	13 28.9%	4 8.9%	4 8.9%
<b>Divorced</b>	4 5%	1 25%	0 0.0%	3 75%	0 0.0%	0 0.0%
<b>Widowed</b>	1 1.3%	1 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
<b>Nationality</b>						
<b>Saudi</b>	71 88.8%	20 28.2%	13 18.3%	22 31%	9 12.7%	7 9.9%
<b>Non-Saudi</b>	9 11.2%	6 66.7%	1 11.1%	1 11.1%	0 0.0%	1 11.1%
<b>Job</b>						
<b>Medical</b>	49 61.3%	18 36.7%	5 10.2%	13 26.5%	6 12.2%	7 14.3%
<b>Non-medical</b>	31 38.8%	8 25.8%	9 29.0%	10 32.3%	3 9.7%	1 3.2%
<b>Employment</b>						
<b>Full time</b>	57 71.3%	18 31.6%	10 17.5%	14 24.6%	7 12.3%	8 14.0%
<b>Part time</b>	7 8.8%	4 57.1%	1 14.3%	2 28.6%	0 0.0%	0 0.0%
<b>Unemployed</b>	10 10.0%	3 25.0%	1 12.5%	5 50.0%	1 12.5%	0 0.0%
<b>Retired</b>	4 5.0%	1 25.0%	2 50.0%	1 25.0%	0 0.0%	0 0.0%
<b>Other</b>	2 2.5%	0 0.0%	0 0.0%	1 50.0%	1 50.0%	0 0.0%
<b>Region</b>						
<b>Center</b>	54 67.5%	15 27.8%	9 16.7%	17 31.5%	6 11.1%	7 13.0%
<b>West</b>	12 15.0%	5 41.7%	1 8.3%	4 33.3%	1 8.3%	1 8.3%
<b>East</b>	10 12.5%	4 40.0%	3 30.0%	1 10.0%	2 20.0%	0 0.0%
<b>North</b>	1 1.3%	0 0.0%	0 0.0%	1 100.0%	0 0.0%	0 0.0%
<b>South</b>	3 3.8%	2 66.7%	1 33.3%	0 0.0%	0 0.0%	0 0.0%
<b>Monthly income (SAR/Month)</b>						
<b>Less than 5,000</b>	12 15.0%	5 35.7%	3 21.4%	4 28.6%	2 14.3%	0 0.0%
<b>From 5,000 to 10,000</b>	18 22.5%	5 25.0%	4 20.0%	5 25.0%	4 20.0%	1 5.0%
<b>From 11,000 to 15,000</b>	15 18.8%	3 18.8%	2 12.5%	6 37.5%	2 12.5%	3 18.8%
<b>From 16,000 to 20,000</b>	21 26.2%	6 28.6%	3 14.3%	5 23.8%	2 9.5%	5 23.8%
<b>More than 20,000</b>	14 17.5%	8 57.1%	4 28.6%	2 14.3%	0 0.00%	0 0.0%
<b>Infected with coronavirus</b>						
<b>Yes</b>	6 7.5%	2 33.3%	0 0.0%	3 50.0%	0 0.0%	1 16.7%
<b>No</b>	74 92.5%	24 32.4%	14 18.9%	20 27.0%	9 12.2%	7 9.5%

### 4.3 Quality of Life Scores and Associated Factors

Around 41% of the participants had a quality-of-life percentage between 50% to 75%, while 31.3% had a score above 75%. **Table 3** shows that respondents with age above 30 years had a mean score of 50. Females and males had similar mean scores of 47. Likewise, HWs from medical and non-medical specialties had a mean score of 47. Retired HWs exhibited the highest score ( $54.50 \pm 6.75$ ). Single participants had the lowest mean score reported to be 45.73 with a standard deviation of 15.60. The mean score of HWs working in the Eastern and Western regions was around 50. Participants with a monthly income of less than 5,000 SAR had the lowest scores ( $42.85 \pm 14.36$ ). Q-LES-Q score of HWs who were infected with coronavirus resembles the score of the non-infected workers. **Table 4** displays the participants' responses to the 16 items of the Q-LES-Q. Responses to each item is rated on a 5-point scale ranging from 1 (very poor) to 5 (very good). The mean score of the total items reported to be around 3.3, which indicates fair satisfaction. Leisure time activities had the highest mean score ( $3.53 \pm 1.27$ ).

**Table 3.** Associations between quality of life and demographic variables.

Characteristics	Q-LES-Q raw score
<b>Age group (years)</b>	
18- 25	43.4 $\pm$ 7.8
26- 30	43.4 $\pm$ 17.0
31- 40	50.5 $\pm$ 10.0
> 40	50.2 $\pm$ 10.1
<b>Gender</b>	
Female	47.4 $\pm$ 14.1
Male	47.3 $\pm$ 8.9
<b>Marital status</b>	
Single	45.7 $\pm$ 15.6
Married	48.0 $\pm$ 12.2
Divorced	50.5 $\pm$ 8.5
Widowed	66.0
<b>Nationality</b>	
Saudi	46.9 $\pm$ 13.7
Non-Saudi	52.0 $\pm$ 11.1
<b>Job</b>	
Medical	47.6 $\pm$ 14.5
Non-medical	47.3 $\pm$ 11.9
<b>Employment status</b>	
Full time	47.4 $\pm$ 15.3
Part time	46.1 $\pm$ 7.98
Unemployed looking	45.1 $\pm$ 6.6
Not looking	47.5 $\pm$ 4.9
Retired	54.5 $\pm$ 6.7
<b>Region</b>	
Center	46.1 $\pm$ 12.9
West	49.9 $\pm$ 9.6
East	50.4 $\pm$ 20.2
North	35.0
South	56.0 $\pm$ 9.1
<b>Monthly income</b>	
Less than 5,000 SAR	42.8 $\pm$ 14.3
From 5,000 to 10,000 SAR	52.7 $\pm$ 8.9
From 11,000 to 15,000 SAR	47.7 $\pm$ 9.8
From 16,000 to 20,000 SAR	43.1 $\pm$ 18.8
More than 20,000 SAR	51.1 $\pm$ 9.7
<b>Infected with coronavirus</b>	
Yes	49.3 $\pm$ 9.7
No	47.3 $\pm$ 13.7

**Table 4.** Q-LES-Q-SF items mean score with standard deviation.

Item	Mean $\pm$ SD
Total items	3.31 $\pm$ 0.66
1. ...physical health?	3.40 $\pm$ 1.19
2. ...mood?	3.01 $\pm$ 1.07
3. ...work?	3.39 $\pm$ 1.16
4. ...household activities?	3.06 $\pm$ 0.95
5. ...social relationships?	3.50 $\pm$ 1.25
6. ...family relationships?	3.51 $\pm$ 1.19
7. ...leisure time activities?	3.53 $\pm$ 1.27
8. ...ability to function in daily life?	3.09 $\pm$ 1.00
9. ...sexual desire, interest, and/or performance?	3.06 $\pm$ 1.33
10. ...economic status?	3.23 $\pm$ 1.19
11. ...living/housing situation?	3.39 $\pm$ 1.10
12. ...ability to get around physically without being dizzy or unsteady or falling?	3.49 $\pm$ 1.25
13. ...your vision in terms of ability to do work or hobbies?	3.37 $\pm$ 1.24
14. ...overall sense of well-being?	3.29 $\pm$ 1.28
15. ...medications?	2.00 $\pm$ 1.46
16. ...contentment during the past week?	3.19 $\pm$ 1.10

## 5. Discussion

HWs have a significant role during pandemics and can experience a heavier workload, making them susceptible to anxiety and depression (32-39). In our study, PHQ-9 was used as a depression screening tool. We found that moderate to severe depressive symptoms accounted for about 52% of the HWs, which is higher compared to Al Ammari *et al.* (23% with moderate to severe depression) and AlAteeq *et al.* (30.3% with moderate to severe depression). The lowest prevalence of moderate to severe depressive symptoms was observed in HWs above the age of 40 and this is similar to Al Ammari *et al.* findings. Moreover, our results aligned with Al Ammari *et al.* study, which found that about 66% of HWs aged between 26 to 30 years had depressive symptoms ranging from mild to severe. Contrary to other studies, we found that male HWs had more depressive symptoms than females (32-34). Moderately severe to severe depression was more observed in medical HWs than non-medical workers. However, the difference was not statistically significant. The Central region had the highest rate of severe depression among Saudi Arabia regions. The largest proportion (57.1%) of HWs earning more than 20,000 SAR/month had minimal depressive symptoms. Participants who were not infected with coronavirus had higher depression scores, with nearly 22% of them having moderately severe to severe depression.

Outbreaks can influence HWs' quality of life; we used Q-LES-Q SF to assess this aspect. Around 73% of HWs showed a score above 50%. We observed a relationship between age group and quality of life. The older participants were more likely to have a better quality of life. Participants above 30 years exhibited a mean raw score of 50, while those aged between 18 to 30 years reported a mean raw score of 43. Quality of life did not seem to be affected by gender or job field. A total score of 47 was observed in both females and males in medical and non-medical fields. The total result of quality of life for single and married HWs was similar. In comparison to Saudis, non-Saudi respondents had a better quality of life (46.90 and 52.00, respectively). The highest score among different employment status of HWs was seen in the retired participants. Participants from the Southern region reported a score of 56, which is considered the highest in comparison to other Saudi Arabia regions. HWs who had a monthly income between 5,000 and 10,000 SAR showed a comparable score to participants receiving more than 20,000 SAR per month. Our findings revealed that satisfaction in "family and social relationships" and "leisure time activities" was higher. On the contrary, "mood", "ability to function in daily life", and "sexual desire, interest, and/or performance" domains demonstrated lower satisfaction degrees.



The study has a number of limitations. We used convenience sampling which may have introduced selection bias. As the study design is cross-sectional, we were unable to make a causal inference in depression severity and quality of life. The small sample size due to the low response rate can affect the validity of the results. Several surveys were previously distributed evaluating similar aspect, and that could be attributed to the low response rate. In addition to the work overload that HWs had during the pandemic. Most of the participants were from the Central region, which can limit our ability to generalize our findings to other regions.

Despite the limitations, our study covers two aspects that can be influenced by the pandemic and provides an insight into how the COVID-19 pandemic has affected HWs' mental status and quality of life. We included HWs from medical and non-medical specialties working in different healthcare settings. HWs from different regions of Saudi Arabia participated. Validated scales have been used to assess depressive symptoms and quality of life in Arabic and English languages, and the participants can choose to complete the survey based on their language preference.

## **Conclusion**

Throughout the pandemics, mental status and quality of life of workers in the healthcare sector can be affected. During COVID-19 outbreak, moderately severe to severe depressive symptoms were observed in around 24% of HWs in Saudi Arabia. Additionally, 27.5% had lower quality of life. Longitudinal studies are needed to determine variable changes over time. Recognizing the psychological impact of COVID-19 pandemic can guide policymakers to tailor interventions that support the most vulnerable workers.

## **Conflict of Interest Statement**

The authors declare no conflict of interest.

## **Adherence to Ethical Standards**

The study was approved by the Institutional Review Board (IRB) of Princess Nourah Bint Abdulrahman University (PNU), Riyadh, Saudi Arabia (No.29-0270).

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