The Mental Well-Being of Frontline Physicians Working in Civil Wars Under Coronavirus Disease 2019 Pandemic Conditions

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Background and Objective: Emergency medical physicians are regarded as essential frontline staff in combating the coronavirus disease 2019 (COVID-19) pandemic. These health-care workers are faced with significant stressors in addition to the usual stress felt in their regular work. Therefore, this study aimed to examine the prevalence of anxiety, depression, and burnout among emergency physicians on the frontline of the COVID-19 pandemic.

Method: Using a cross-sectional study methodology, we surveyed physicians active on April 2020 to study depression and anxiety [using Hospital Anxiety and Depression Scale (HADS)] and burnout [using the Abbreviated Maslach Burnout Inventory (aMBI) scale].

Results: A total of 154 emergency physicians completed the survey. We found that about 65.6% of patients were experiencing anxiety (based on a HADS score ≥ 11), and 73.4% were displaying depressive symptoms. For burnout, three subscales indicated that 67.5% endured emotional exhaustion, and 48.1% experienced depersonalization (defined as a score of ≥ 10 on aMBI). A total of 21.4% of respondents perceived a sense of personal underachievement, defined as a score of < 10 via aMBI.

Conclusion: Physicians’ psychological status is crucial and plays a major role in their well-being, affecting their work satisfaction. Therefore, implementing strategies aimed at decreasing the impact of stressful events is crucial to alleviate the distress experienced by physicians on the frontline of the COVID-19 pandemic.

Keywords: COVID-19, depression, anxiety, burnout, pandemic, pandemic (COVID-19)

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified in late 2019 in Wuhan, China, as the cause of numerous severe viral pneumonia cases (1). On February 11, 2020, the World Health Organization (WHO) designated the name “COVID-19” (coronavirus disease 2019) for the viral pneumonia caused by SARS-CoV-2 (2). In the wake of the announcement, the virus reached pandemic levels, resulting in more than 54 million cases worldwide and more than 1,300,000 deaths by November 15, 2020 (3).
Emergency medical physicians are regarded as frontline staff in combating the COVID-19 pandemic. They are the first contact point for any patients who display signs and symptoms of COVID-19 infection. This is in addition to the usual stress felt by emergency physicians during their work (4).

Previous studies have reported that burnout (a state of emotional exhaustion resulting in the loss of enthusiasm for one’s work) and depersonalization (a feeling of cynicism accompanied by a low sense of personal accomplishment) are signs of mental health deterioration. This deterioration has negative consequences for a physician’s ability to judge, diagnose, and deliver satisfactory health-care services for their patients (5–7). Furthermore, it has been reported that burnout and high emotional pressure can increase the rates of both medical error and substance abuse; the literature has even indicated an increase in risk of suicide (7–11).

Several studies have investigated the prevalence of psychological distress experienced by health-care workers during the COVID-19 pandemic. However, none have focused on emergency physicians, although they are the first line (12–18), and no studies have been conducted in African regions.

Therefore, understanding the causes and effects of stress and its consequences is critical for the well-being of emergency doctors, as stress and emotional pressure can have negative and deleterious consequences on physicians’ well-being and their ability to deliver appropriate health-care services to their patients (19, 20).

Libya, like a number of other countries, is suffering from civil war and financial crises, increasing the risk of mental dysfunction and mental disorders such as depression, anxiety, and burnout (21–23).

Furthermore, the scientific literature lacks data concerning the rate of burnout among emergency physicians, especially those deployed during the COVID-19 pandemic. Including our present knowledge of the state of the literature, there is no recent study concerning emergency physicians’ mental status as impacted by the COVID-19 pandemic and foregrounded by civil war. Therefore, in this study, we aimed to examine the prevalence of anxiety, depression, and burnout among emergency physicians dealing with the COVID-19 pandemic on the frontlines.

### MATERIALS AND METHODS

#### Study Design and Setting

This study employed a cross-sectional study methodology.

#### Selection of Participants

Between April 18 and 28, 2020, we recruited health-care workers from Libyan hospitals. We only included emergency physicians working during the COVID-19 pandemic. Emergency physicians in Libya are responsible frontline health-care workers for many diseases and conditions such as acute care, urgent toxicological and psychiatric cases, and trauma triage; severe respiratory and cardiovascular disease patients who usually present to the emergency department initially; and suspected COVID-19 patients who have typical COVID-19 symptoms. Therefore, they are at increased risk of contracting a COVID-19 infection and have a higher risk of complex disease. Along with their life risk, as they treat injured and severely disabled war victims and militias, they are usually at higher risk of abuse by militias or their relatives. Our exclusionary criteria comprised those health-care workers who were either retired or on leave during this period, so that they were not involved in the care of patients during the COVID-19 pandemic. We also excluded those with a preexisting mental illness or who failed to complete the psychological data.

#### Measurements

Data were collected via a specially designed questionnaire distributed by paper, mobile messaging, and email. The questionnaire consisted of the following categories: demographic and socioeconomic data, mental health assessment, risk of civil war assessment of violence, and assessment of depression and anxiety. Several relevant questions were also chosen to address the prevalence of violent acts enacted against health-care workers and whether such acts were associated with an increase in the risk of depression and anxiety.

#### Outcomes and Definition of Outcomes

The Hospital Anxiety and Depression Scale (HADS) was used to measure the prevalence of anxiety and depression among health-care workers (24). The HADS was validated in a previous study as having a mean of 0.83 (Cronbach’s alpha) across several languages and different settings, with a sensitivity and specificity of 0.8 (25). The HADS’s corresponding questionnaire consists of 14 self-reported items: seven questions concerning anxiety and seven concerning depression. According to Zigmond and Snaith, a score of <7 is considered normal, a score of 8–10 indicates borderline or doubtful cases, and a score of ≥11 indicates definite cases (26).

The second section employed the Abbreviated Maslach Burnout Inventory (aMBI), a nine-item scale used to assess the level of burnout among physicians (27–30). The inventory has three subscales: emotional exhaustion (EE—emotional depletion due to the demands of the job and continuous work-related stress), depersonalization (DP—an impersonal response toward service recipients), and personal accomplishment (PA—the degree of personal competence, achievement, and satisfaction with one’s work). The three elements of the subscale were assessed, along with the three items. A seven-point Likert scale ranging from never (0) to every day (6) was used for each item. Therefore, the cumulative score of each subscale ranges from a minimum of 0 to a maximum of 18, which is calculated for each health-care worker surveyed.

For emotional exhaustion and depersonalization, higher scores indicate greater levels of burnout; for personal achievement, the scale is inversed. The internal reliability of each subscale was calculated using Cronbach’s alpha coefficient (31, 32). For EE and DP, a subscale score of 0–9 is categorized as “no to low burnout,” whereas a subscale score of 10–18 is regarded as “moderate to severe burnout”; for PA, the scale is inversed.
The reporting of the study follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (33). See flowchart in Figure 1.

Statistical analysis was performed using IBM’s SPSS Statistics package for Windows (Version 25.0). Frequency, means, and standard deviations were used to describe the data. Chi-square tests were used to compare the categorical variables, while independent t-tests were used to compare continuous variables. Ethical approval for this study was obtained from the Bioethics Committee at the Biotechnology Research Center in Libya.

RESULTS

Characteristics of Study Subjects
A total of 154 out of 200 emergency physicians completed the survey, resulting in an estimated 77% response rate; 53.2% of respondents were female. The mean age of emergency physicians surveyed was 31.66 ± 5.97, with ~92.2% of respondents falling below the age of 40 years. About half (51.9%) of the respondents were emergency doctor residents working only within government departments. The majority (69.5%) had < 5 years of clinical experience. In terms of the length of their work week, we found that participants worked an approximate mean of 52.95 ± 9.71 h/week, with a mean of 3.68 ± 0.685 night shifts per month for emergency physicians. Table 1 provides an overview of the basic characteristics of emergency medicine physicians who participated in the study.

Main Results
With respect to the prevalence of anxiety and depression, our data based on the HADS indicated that ~65.6% of subjects (n = 101) were experiencing anxiety (those who received a score ≥ 11), and about 73.4% of subjects (n = 113) were experiencing depressive symptoms (those who received a score ≥ 11). Our data demonstrated that 67.5% (n = 104) of subjects suffered from emotional exhaustion, while 48.1% (n = 74) experienced depersonalization (both derived from scores of ≥10 out of 18 on the aMBI). However, for low personal accomplishment (PA), only 21.4% (n = 33) scored <10 (indicating burnout for this category).

About 46.1% (n = 71) of respondents had encountered at least one episode of verbal abuse, while 12.3% (n = 19) had experienced physical abuse.

Tables 2–4 depict the association between the basic characteristics and occurrences of anxiety, depression, and burnout among emergency physicians. With the use of a univariate analysis, a comparison between the groups of physicians experiencing anxiety (HADS anxiety ≥ 11) and depression (HADS depression ≥ 11) demonstrated the following...
TABLE 1 | Basic characteristics of emergency medicine physicians (n = 154).

| Variables                  | Counts n = 154 | Proportions (%) |
|----------------------------|----------------|-----------------|
| Age range                  |                |                 |
| - <40                      | 142            | 92.2            |
| - >40                      | 12             | 7.8             |
| Gender                     |                |                 |
| - Male                     | 72             | 46.8            |
| - Female                   | 82             | 53.2            |
| Marital status             |                |                 |
| - Married                  | 59             | 38.3            |
| - Not married              | 95             | 61.7            |
| (including single, divorced, and widowed) |            |                 |
| Residency                  |                |                 |
| - Live with family         | 100            | 64.9            |
| - Live alone               | 54             | 35.1            |
| Employment sector          |                |                 |
| - Governmental only        | 80             | 51.9            |
| - Private only             | 21             | 13.6            |
| - Both                     | 53             | 34.4            |
| Years of experience        |                |                 |
| - <3 years                 | 73             | 48.1            |
| - 3–5 years                | 33             | 21.4            |
| - 5–15                     | 38             | 24.7            |
| - >15 years                | 9              | 5.8             |
| Smoking                    |                |                 |
| - Yes                      | 27             | 17.5            |
| - No                       | 127            | 82.5            |
| Illicit drug use           |                |                 |
| - Yes                      | 8              | 5.2             |
| - No                       | 146            | 94.8            |
| Internally displaced       |                |                 |
| - Yes                      | 46             | 29.9            |
| - No                       | 108            | 70.1            |
| Transport issues           |                |                 |
| - Yes                      | 57             | 37              |
| - No                       | 97             | 63              |
| Verbal abuse               |                |                 |
| - Yes                      | 71             | 46.1            |
| - No                       | 83             | 53.9            |
| Physical abuse             |                |                 |
| - Yes                      | 19             | 12.3            |
| - No                       | 135            | 87.7            |

TABLE 2 | Summary of anxiety, depression, and burnout among emergency medicine physicians (n = 154).

| Category                          | Grade | Mean ± SD | Count | Percent |
|-----------------------------------|-------|-----------|-------|---------|
| Depression                        | Total  | 12.39 ± 2.95 | 154  | 100.0   |
| - Normal (0–7)                    |       | 7         | 4.5   |         |
| - Borderline abnormal (8–10)      |       | 34        | 22.1  |         |
| - Abnormal depressive case (11–21)|       | 113       | 73.4  |         |
| Anxiety                           | Total  | 11.91 ± 3.81 | 154  | 100.0   |
| - Normal (0–7)                    |       | 21        | 13.6  |         |
| - Borderline abnormal (8–10)      |       | 32        | 20.8  |         |
| - Abnormal anxiety case (11–21)   |       | 101       | 65.6  |         |
| Burnout                           | Emotional exhaustion(EE) ≥ 10 | 11.2 ± 5.15 | 104  | 67.5   |
|                                   | Depersonalization (DP) ≥ 10 | 8.55 ± 5.08 | 74   | 48.1   |
|                                   | Low personal accomplishment (PA) < 10 | 12.61 ± 3.89 | 33   | 21.4   |

However, lower personal accomplishment was statistically associated with respondents’ years of experience; those with <3 years had higher self-accomplishment, as compared with those with 3–5 years of experience, who perceived themselves as achieving less self-accomplishment. Table 4 demonstrates these differences.

LIMITATIONS

This study has several limitations. First, the sample size allows the study to focus only on one war-torn country, which may have several additional and unique factors that may contribute to high levels of mental distress. These aspects may, in turn, aggravate the effects of the COVID-19 pandemic. Furthermore, interviewer bias may be present, as some respondents may opt to hide or alter their responses out of a fear of stigmatization, despite the anonymous nature of the survey. Additionally, due to the cross-sectional study design, a lower causation and linkage ability may be apparent. In light of these limitations, further studies are required to account for the potential impact of such factors. Moreover, we used self-report evaluation questionnaires that could provide for the level of symptoms; however, they are not used for psychiatric diagnoses and evaluations, which require specific instruments and proper diagnostic methods. To date, no previous studies have focused on emergency physicians residing in countries with civil wars and their mental status during the COVID-19 pandemic.

DISCUSSION

This study demonstrated higher than expected levels of anxiety, depression, and burnout among 154 emergency doctors from Libya who worked during the COVID-19 pandemic and civil war crisis. Of the respondents, 65.6% reached the cutoff score for anxiety, whereas more than 73% reached the cutoff score for depression. Regarding burnout,
### TABLE 3 | Association of depression and anxiety with other characteristics of participants.

| Variables                                      | Total | Anxiety (+) | Anxiety (–) | p-value | Depression (+) | Depression (–) | p-value |
|------------------------------------------------|-------|-------------|-------------|---------|----------------|----------------|---------|
| Total prevalence, n (%)                        | 154   | 101 (65.6)  | 53 (34.4)   | 0.014*  | 113 (73.4)     | 41 (26.6)      | 0.22    |
| Age range                                      |       |             |             |         |                |                |         |
| <40                                            | 142   | 97 (69)     | 45 (31)     | 0.014*  | 106 (73.8)     | 36 (26.2)      |         |
| ≥40                                            | 12    | 4 (33.3)    | 8 (66.7)    | 0.22    | 7 (5)          | 5 (25)         |         |
| Gender                                         |       |             |             |         |                |                |         |
| Male                                           | 82    | 46 (55.4)   | 26 (44.6)   | 0.678   | 52 (64)        | 20 (36)        | 0.761   |
| Female                                         | 72    | 56 (78.9)   | 16 (21.1)   | 0.22    | 61 (83.9)      | 12 (16.1)      |         |
| Working hours per week, mean ± SD              |       |             |             |         |                |                |         |
| <40                                            | 142   | 97 (69)     | 45 (31)     | 0.014*  | 106 (73.8)     | 36 (26.2)      |         |
| ≥40                                            | 12    | 4 (33.3)    | 8 (66.7)    | 0.22    | 7 (5)          | 5 (25)         |         |
| Gender                                         |       |             |             |         |                |                |         |
| Male                                           | 82    | 46 (55.4)   | 26 (44.6)   | 0.678   | 52 (64)        | 20 (36)        | 0.761   |
| Female                                         | 72    | 56 (78.9)   | 16 (21.1)   | 0.22    | 61 (83.9)      | 12 (16.1)      |         |
| Night shifts per month, mean ± SD              |       |             |             |         |                |                |         |
| <40                                            | 142   | 97 (69)     | 45 (31)     | 0.014*  | 106 (73.8)     | 36 (26.2)      |         |
| ≥40                                            | 12    | 4 (33.3)    | 8 (66.7)    | 0.22    | 7 (5)          | 5 (25)         |         |
| Gender                                         |       |             |             |         |                |                |         |
| Male                                           | 82    | 46 (55.4)   | 26 (44.6)   | 0.678   | 52 (64)        | 20 (36)        | 0.761   |
| Female                                         | 72    | 56 (78.9)   | 16 (21.1)   | 0.22    | 61 (83.9)      | 12 (16.1)      |         |
| Marital status                                 |       |             |             |         |                |                |         |
| Married                                        | 95    | 39 (41)     | 20 (59)     | 0.835   | 41 (43)        | 18 (57)        | 0.39    |
| Not-married (including single, divorced, and widowed) | 59  | 62 (61.4)   | 33 (38.6)   | 0.835   | 72 (63.7)      | 23 (36.3)      |         |
| Residency                                      |       |             |             |         |                |                |         |
| Live with family                               | 100   | 36 (36)     | 35 (64)     | 0.835   | 74 (69)        | 36 (31)        | 0.906   |
| Live alone                                     | 54    | 65 (64.4)   | 19 (35.6)   | 0.835   | 39 (38)        | 15 (62)        |         |
| Employment sector                              |       |             |             |         |                |                |         |
| Governmental only                              | 80    | 53 (66.3)   | 27 (33.7)   | 0.929   | 59 (67)        | 21 (33)        | 0.976   |
| Private only                                   | 21    | 13 (76.7)   | 4 (23.3)    | 0.929   | 15 (61.5)      | 6 (38.5)       |         |
| Both                                           | 53    | 35 (66.0)   | 18 (34)     | 0.929   | 39 (73.6)      | 14 (26.4)      |         |
| Years of experience                            |       |             |             |         |                |                |         |
| <3 years                                       | 74    | 50 (67.6)   | 24 (32.4)   | 0.219   | 56 (69)        | 18 (31)        | 0.806   |
| 3–5 years                                      | 33    | 22 (66.7)   | 11 (33.3)   | 0.219   | 25 (75.8)      | 8 (24.2)       |         |
| 5–10 years                                     | 38    | 26 (68.4)   | 12 (31.6)   | 0.219   | 26 (68.4)      | 12 (31.6)      |         |
| >15 years                                      | 9     | 3 (33.3)    | 6 (66.7)    | 0.219   | 6 (66.7)       | 3 (33.3)       |         |
| Smoking                                        |       |             |             |         |                |                |         |
| Yes                                            | 27    | 18 (67)     | 12 (33)     | 0.227   | 17 (63)        | 10 (37)        | 0.178   |
| No                                             | 127   | 119 (92.5)  | 8 (7.5)     | 0.227   | 96 (75.4)      | 31 (24.6)      |         |
| Illicit drug use                               |       |             |             |         |                |                |         |
| Yes                                            | 8     | 5 (62.5)    | 3 (37.5)    | 0.85    | 6 (75)         | 2 (25)         | 0.915   |
| No                                             | 146   | 96 (65.9)   | 50 (34.1)   | 0.85    | 107 (73.1)     | 39 (26.9)      |         |
| Internally displaced                           |       |             |             |         |                |                |         |
| Yes                                            | 46    | 31 (67.4)   | 15 (32.6)   | 0.758   | 33 (73.9)      | 13 (26.1)      | 0.764   |
| No                                             | 108   | 70 (65.2)   | 38 (34.8)   | 0.758   | 80 (74.0)      | 28 (26.0)      |         |
| Transport issues                               |       |             |             |         |                |                |         |
| Yes                                            | 57    | 44 (77)     | 13 (23)     | 0.02    | 43 (79.3)      | 14 (20.7)      | 0.667   |
| No                                             | 97    | 53 (55)     | 44 (45)     | 0.02    | 70 (72.9)      | 27 (27.1)      | 0.487   |
| Verbal abuse                                   |       |             |             |         |                |                |         |
| Yes                                            | 71    | 50 (70.4)   | 21 (29.6)   | 0.242   | 54 (76.4)      | 17 (23.6)      | 0.557   |
| No                                             | 83    | 52 (62.7)   | 31 (37.3)   | 0.242   | 59 (71.7)      | 24 (28.3)      |         |
| Physical abuse                                 |       |             |             |         |                |                |         |
| Yes                                            | 19    | 14 (73.7)   | 5 (26.3)    | 0.427   | 15 (78.9)      | 4 (21.1)       | 0.557   |
| No                                             | 135   | 87 (64.5)   | 48 (35.5)   | 0.427   | 98 (72.7)      | 37 (27.3)      |         |

The definitive diagnosis of depression or depression was defined as a score of 11–21 on the HADS inventory.

*Significant at p < 0.05.

about two-thirds (67%) of subjects had emotional exhaustion, while about half (48%) experienced depersonalization, and about 21.4% perceived themselves as having a low level of personal/self-accomplishment. A higher prevalence and scores of anxiety, depression, and burnout were generally not statistically associated with demographic features. The wider distribution of depression, anxiety, and burnout, despite such differences, can carry...
### TABLE 4 | Association of burnout with other characteristics of participants.

| Variables                               | Total | EE (+) | EE (-) | p-value | D (+) | D (-) | p-value | PA (low) | PA (high) | p-value |
|-----------------------------------------|-------|--------|--------|---------|-------|-------|---------|----------|-----------|---------|
| Total prevalence, n (%)                 | 154   | 104 (67.5) | 50 (32.5) | 0.177   | 74 (48.1) | 80 (51.9) | 0.645   | 33 (21.4) | 121 (78.6) | 0.075   |
| Age range                               |       |         |        |         |       |       |         |          |           |         |
| - <40                                   | 142   | 98 (69.2) | 44 (30.8) | 0.075   | 69 (49.3) | 73 (50.7) | 0.284   | 85 (60.8) | 114 (39.2) | 0.942   |
| - ≥40                                   | 12    | 5 (4.2)  | 7 (5.8) | 0.075   | 5 (4.2)  | 7 (5.8) | 0.015   | 7 (5.8)  |           |         |
| Gender                                  |       |         |        |         |       |       |         |          |           |         |
| - Male                                  | 82    | 51 (63) | 21 (26) | 0.081   | 40 (51.2) | 32 (48.8) | 0.154   | 57 (68.2) | 45 (31.8) | 0.886   |
| - Female                                | 72    | 53 (74) | 19 (26) | 0.081   | 34 (47.9) | 48 (52.1) | 0.154   | 64 (86)  | 42 (14)   |         |
| Working hours per week, mean ± SD       |       |         |        |         |       |       |         |          |           |         |
| 52.95 ± 9.71                            | 53.53 ± 11.07 | 51.76 ± 5.92 | 0.001* | 53.89 ± 10.67 | 52.09 ± 8.27 | 0.087 | 53.36 ± 6.65 | 52.84 ± 10.42 | 0.102 |
| Night shifts per month, mean ± SD       |       |         |        |         |       |       |         |          |           |         |
| 3.68 ± 0.68                             | 3.70 ± 0.736 | 3.62 ± 0.56 | 0.012  | 3.68 ± 0.57 | 3.68 ± 0.77 | 0.125 | 3.73 ± 0.517 | 3.66 ± 0.72 | 0.089   |
| Marital status                          |       |         |        |         |       |       |         |          |           |         |
| - Married                                | 95    | 36 (38) | 23 (28) | 0.174   | 27 (28.6) | 32 (31) | 0.654   | 46 (48.9) | 46 (51.1) | 0.885   |
| - Not married (including single, divorced, and widowed) | 59    | 68 (54.6) | 27 (21) | 0.174   | 47 (63.5) | 48 (60) | 0.654   | 75 (62)  |           |         |
| Residency                               | 100   | 73 (70.2) | 27 (29.8) | 0.012  | 48 (64.9) | 52 (35) | 0.012  | 19 (19)  | 81 (81)  | 0.318   |
| - Live with family                      | 54    | 31 (59.2) | 23 (46) | 0.012  | 26 (48.1) | 28 (51) | 0.012  | 14 (26)  | 40 (38)  | 0.192   |
| Employment sector                       |       |         |        |         |       |       |         |          |           |         |
| - Governmental only                     | 80    | 52 (65) | 28 (35) | 0.719   | 33 (41.3) | 47 (58.7) | 0.15    | 21 (26.3) | 59 (73.8) | 0.192   |
| - Private only                          | 21    | 14 (66.7) | 7 (33.3) | 0.719   | 10 (47.6) | 11 (52.4) | 0.15    | 5 (23.8)  | 16 (76.2) | 0.192   |
| - Both                                  | 53    | 38 (72) | 15 (28) | 0.719   | 31 (58.5) | 22 (41.5) | 0.15    | 7 (13.2)  | 46 (86.8) | 0.192   |
| Years of experience                     |       |         |        |         |       |       |         |          |           |         |
| - <3 years                               | 74    | 54 (72.9) | 20 (27) | 0.039*  | 40 (54.1) | 34 (45.9) | 0.258   | 9 (12)   | 65 (88)  | 0.001*   |
| - 3–5 years                              | 33    | 17 (51.5) | 16 (48.5) | 0.039*  | 11 (33.3) | 22 (66.7) | 0.258   | 14 (42.4) | 19 (57.6) | 0.912   |
| - 5–15 years                             | 38    | 29 (76.3) | 9 (23.7) | 0.039*  | 19 (52.6) | 19 (47.4) | 0.258   | 6 (15.8)  | 32 (84.2) |         |
| - >15 years                              | 9     | 4 (44.4) | 5 (55.6) | 0.039*  | 4 (44.4) | 5 (55.6) | 0.258   | 4 (44.4) | 5 (55.6) |         |
| Smoking                                 |       |         |        |         |       |       |         |          |           |         |
| - Yes                                   | 27    | 20 (74) | 7 (26) | 0.424   | 15 (55.6) | 12 (44.4) | 0.39    | 6 (22.2)  | 21 (77.8) | 0.912   |
| - No                                    | 127   | 84 (66.2) | 43 (33.8) | 0.424   | 59 (46.7) | 68 (53.3) | 0.39    | 27 (21.4) | 100 (78.6) |         |
| Illicit drugs use                       |       |         |        |         |       |       |         |          |           |         |
| - Yes                                   | 8     | 6 (75) | 2 (25) | 0.643   | 4 (50) | 4 (50) | 0.91    | 2 (25) | 6 (75) | 0.8   |
| - No                                    | 146   | 98 (66.9) | 48 (33.1) | 0.643   | 70 (48.0) | 76 (52.0) | 0.91    | 31 (21.1) | 115 (78.9) |         |
| Internally displaced                     |       |         |        |         |       |       |         |          |           |         |
| - Yes                                   | 46    | 31 (67.4) | 15 (32.6) | 0.981   | 25 (54.3) | 21 (45.7) | 0.307   | 10 (21.7) | 36 (78.3) | 0.951   |
| - No                                    | 108   | 73 (67.9) | 35 (32.1) | 0.981   | 49 (45.3) | 59 (54.7) | 0.307   | 23 (21.1) | 85 (78.9) |         |

(Continued)
dangerous risks related to mental status deterioration, substance abuse, low self-esteem, lower patient care, job dropout or attrition from training, lower sleep quality, a decrease in work satisfaction, and suicidal risks (34–38). Abuse, either verbal or physical, was not significantly different between the groups, as they were exposed to similar risks. The number of working hours per week, however, was associated with emotional exhaustion (as an element of burnout) and anxiety (p < 0.05).

This study reveals a very demanding image of the mental health status of emergency physicians working as frontline staff during the COVID-19 pandemic, as foregrounded by civil war (39). It uncovers the prevalence of major mental health disorders, such as anxiety, depression, and burnout, among frontline staff. The female gender was strongly associated with a higher risk of major mental disorders, including general anxiety disorder or mood disorders and post-traumatic stress disorders, mainly in contexts characterized by civil war conflict. However, we found that women with higher degrees of burnout and depressive and anxiety symptoms were not statistically significant. Nevertheless, higher rates of mental disorders were usually associated with women, and there is a high demand for further studies on both health-care workers and the general population in Libya, with an emphasis on other indicators such as post-traumatic stress disorders and severe depressive and anxiety disorders (40, 41).

According to a previous systemic review and meta-analysis of more than 54 studies, the prevalence of depression (between 20.9 and 43.2%) was noted among the studies, based on the characteristics and tools used in depression screening (42). However, our study suggests a 73.4% prevalence of depression, which is higher than in previous studies. Various causes may explain this, such as the public health situation in Libya, which is lacking in social and psychiatric support, and the permeation of civil war and financial crisis in the country, which places a greater burden on physicians who must care for their families while risking death or injury in the war.

In terms of the current COVID-19 situation, the following are some potential reasons for the increase in observed depression: the risk of contamination of health-care workers, the risk of transmitting the infection to family members, a shortage of personal protective equipment (reported as a possible cause of distress), and the lack of adequate training and treatment for COVID-19 management. These are all major stressors that can put physicians at a higher risk for mental distress and produce higher rates of depression, anxiety, and, possibly, burnout syndrome (43–46). Moreover, health-care workers are experiencing additional stressors specific to their jobs, such as work-related stress (e.g., task-specific stressors), working hours, family pressures, the need for specialty training, and a large number of shifts (47).

A study conducted in China by Lai et al. (13) found a 50.4% prevalence of depressive symptoms and a 44.6% prevalence of anxiety using the Patient Health Questionnaire-9 (PHQ-9) tool during the early weeks of the COVID-19 pandemic. Another study conducted by (48) of health-care workers in Spain found a 55.89% prevalence for depressive symptoms and a 67.55% prevalence for anxiety symptoms using the 21-item version of the Depression Anxiety Stress Scales. Their results were similar...
to our results. Another large study among 5,062 health workers in China found 13.5% depressive symptoms and 24.1% anxiety symptoms using both PHQ-9 and Generalized Anxiety Disorder-7 (GAD-7); the study included 1,004 physicians, 3,417 nurses, and 641 technicians from different specialties (49). However, most of the recently published studies in the literature have focused on general health-care workers, without a specific focus on emergency physicians, who are regarded as frontline physicians during the COVID-19 pandemic.

Our study displayed higher rates of anxiety, depression, and burnout prevalence compared with previously published literature. A study of emergency physicians in Libya before the COVID-19 pandemic found that 45.4% had anxiety symptoms, and the same percentage had depressive symptoms (50). However, we found a higher prevalence in our current study, with anxiety symptoms in 65.6% of patients and depressive symptoms in 73.4%, which may be attributed to the COVID-19 pandemic and an increase in the rate of civil war conflict in early 2020. Another study conducted among physicians of many specialties in Libya found that 56.3% of the participants had depressive symptoms and 46.7% had anxiety symptoms (50). These results show that emergency physicians are at a higher risk of depressive and anxiety symptoms than other medical specialties during the COVID-19 pandemic.

The high prevalence of depression, anxiety, and burnout is a major concern for physicians' well-being and career progress. Several studies have suggested that depression and burnout can carry further risk, progressing chronically throughout a physician's life (51–53). It should also be emphasized that psychological distress and mental fatigue can affect a person's work performance, increasing the risk of medical error, which not only affects physicians but also has adverse effects on the quality of care for patients. This presents a potentially catastrophic effect on the health-care system, increasing the risk for patients as physicians attempt to decrease their working hours or change careers to find less stressful employment (54–56). Burnout affects physicians' and patients' personal lives and has many negative consequences for healthcare-related issues, such as physicians becoming less interested in their work and experiencing mental fatigue, which increases the probability of diagnostic errors, leads to unsafe patient environments, and puts physicians at higher risk of psychological trauma (56).

Several interventions have been suggested as means to decrease the distress experienced by physicians at work, such as the following: use of technology as a reminder to initiate meditation to reduce burnout (57); use of the positive and negative reinforcement strategy outlined by Ratliff et al. which describes the effect of praise on reducing a part of burnout (58); and art therapy, as described by King et al. (59), whereby physicians paint or decorate artistic images, potentially decreasing stress and burnout by focusing on creative outlets. Another interesting approach that could decrease stress is the use of exergame-based rehabilitative interventions that have been proven effective in improving health-related quality of life in chronic diseases (60). Organizational well-being has been proposed as a new method of promoting the psychosomatic health of workers, whereby mental health services are provided in the workplace to health-care workers, based on health system management plans (61).

**CONCLUSION**

Our study indicates that the prevalence of depression, anxiety, and burnout is higher than that reported in previous studies. Physicians' psychological status is crucial and plays a major and influential role in the well-being of health-care workers. An emergency physician's psychological status can affect their work satisfaction; therefore, implementing strategies aimed at decreasing stressful events is crucial in alleviating the distress experienced by physicians on the frontline of the COVID-19 pandemic. These issues will continue to affect those who are on the frontline; therefore, it is essential to work on mental support and services to alleviate their manifestations in the current situation, which is worsening in the country as a result of the ongoing civil war.

**DATA AVAILABILITY STATEMENT**

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

**ETHICS STATEMENT**

The studies involving human participants were reviewed and approved by the Biotechnology Research Center in Libya. The patients/participants provided their written informed consent to participate in this study.

**AUTHOR CONTRIBUTIONS**

ME, AM, and ME analyzed and interpreted the patient data. ME supervised the project. ME wrote the first draft of the manuscript. All authors contributed to the study design, data collection, read, and approved the final manuscript.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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