Depression and anxiety prevalence in nursing staff during the COVID-19 pandemic

By Jan Serrano, DNP, MHA, RN; Sameer Hassamal, MD; Sunita Hassamal, MD; Fanglong Dong, PhD; and Michael Neeki, DO, MS

The World Health Organization declared COVID-19 a pandemic on March 11, 2020, as the novel virus spread rapidly across the globe. As the number of COVID-19 cases grew, the US experienced a parallel increase in mental health crisis, with rates of depression and anxiety tripling. Recent studies suggest that healthcare workers are at a higher risk for experiencing depression and anxiety. Currently, nurses make up more than half of the world’s healthcare workers. Nurses are at the front lines providing care and support, yet are vulnerable to fear, depression, and anxiety.

Increased rates of depression and anxiety among nurses working in the COVID-19 environment isn’t unexpected because the clinical trajectory of COVID-19 still isn’t well understood and the risks are unclear. Psychological stressors contributing to mental health distress have ranged extensively during the pandemic, including shortages of personal protective equipment (PPE), limited access to COVID-19 testing supplies, fear of disease transmission at work, fear of lack of employer support if COVID-19 is contracted, depression when patients succumb to the virus, ethical decisions regarding care rationing, and drastic changes in workplace practice. Additionally, nurses chose to limit fluid intake to reduce toileting needs and
worked longer periods of time in an exposed area to reduce the number of PPE changes. This group has also assumed added responsibilities, performing ancillary roles to minimize staff exposures. Persistent exposure increases the risk of fatigue and anxiety. Furthermore, the frequency and duration of nurses’ exposure to COVID-19 is correlated with their fear level.

In addition, organizational policies have frequently changed as new knowledge of disease transmission and treatment options emerge. Frequent policy changes on prevention strategies and treatment plans, and poor communication of changes or accessibility of information, negatively affect nurses’ mental health. An editorial from China reported increased nurse suicides resulting from the psychological pressure of caring for COVID-19 patients.

The aims of this study were to determine the effects of COVID-19 on the prevalence of depression and anxiety in nurses and to identify potential strategies that nurse leaders can implement to reduce depression and anxiety in their staff.

**Methods**

This study is part of a larger study that was conducted at Arrowhead Regional Medical Center (ARMC) to determine the prevalence of depression and anxiety and elucidate associations between sociodemographic variables, depression, and anxiety. ARMC is a 456-bed university-affiliated teaching public hospital that serves as a safety net hospital for the uninsured and underserved population in San Bernardino County, Calif. The Patient Health Questionnaire 9 (PHQ-9) was used to measure self-reported levels of depression. The PHQ-9 consists of nine questions to measure the frequency of depressive symptoms over the past 2 weeks on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Scores are interpreted as 0 to 4, normal; 5 to 9, mild; 10 to 14, moderate; 15 to 19, moderately severe; and 20 to 27, severe. PHQ-9 scores were categorized into two groups: <10 and ≥10. A PHQ-9 score ≥10 is categorized as major depression and is 88% sensitive and specific.

The General Anxiety Disorder 7 (GAD-7) scales were used to measure self-reported levels of anxiety. The GAD-7 consists of a seven-item questionnaire to measure the level of anxiety symptoms over the past 2 weeks using a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). The scores are interpreted as 0 to 4, normal; 5 to 9, mild; 10 to 14, moderate; 15 to 19, moderately severe; and 20 to 27, severe. GAD-7 scores were divided into two groups: <8 and ≥8.
≥8. The GAD-7 is a validated tool used to diagnose generalized anxiety disorder. A GAD-7 score of ≥8 is 77% sensitive and 82% specific for a diagnosis of panic disorder, social phobia, and post-traumatic stress disorder (PTSD).

Data collected from staff included sex, age, occupation, years in current position, contact with a patient suspected of having or confirmed as having COVID-19, and feeling overwhelmed by COVID-19. Participants were classified into four groups: CA/SNs, LVNs, RNs, and APNs. These groups were further divided in two categories: staff providing direct care for suspected or confirmed COVID-19 patients and staff not exposed or not providing direct care for suspected or confirmed COVID-19 patients. Questions included, “Have you been in contact with a patient either suspected to have COVID-19 or confirmed to have COVID-19?” Staff members who answered “yes” were classified as providing direct care for suspected or confirmed COVID-19 patients and those who answered “no” were classified as not providing direct care for suspected or confirmed COVID-19 patients. The question “Have you been overwhelmed by the stress of the COVID-19 pandemic?” was asked to determine perceived stress measurement. Studies have validated that perceptions of stress can be measured by asking individuals how overwhelmed they are by a situation.

The PHQ-9 and GAD-7 measurements were used to measure depression and anxiety symptomatology.

All statistical analyses were conducted using statistical software. Descriptive statistics were presented as means and standard deviations for continuous variables, and frequencies and proportions for categorical variables. Chi-square statistics were conducted comparing whether nurses were overwhelmed by the stress of COVID-19 between various sociodemographic factors and scores on the PHQ-9 and GAD-7. Logistic regression analyses were conducted.

Table 1: Demographic summary

| Variable                           | n  | %   |
|------------------------------------|----|-----|
| Sex                                |    |     |
| Female                             | 418| 88.6|
| Male                               | 54 | 11.4|
| Occupation                         |    |     |
| CA/SN and LVN                      | 148| 31.4|
| RN and APN                         | 324| 68.6|
| Overwhelmed by COVID-19?           |    |     |
| No                                 | 239| 51.3|
| Yes                                | 227| 48.7|
| Missing response = 6               |    |     |
| In contact with a patient either suspected to have COVID-19 (COVID rule out) or confirmed to have COVID-19? | | |
| No                                 | 196| 42.2|
| Yes                                | 269| 57.9|
| Missing response = 7               |    |     |
| PHQ-9 score                        |    |     |
| <10                                | 366| 81.0|
| ≥10                                | 86 | 19.0|
| Missing response = 20              |    |     |
| GAD-7 score                        |    |     |
| <8                                 | 309| 68.4|
| ≥8                                 | 143| 31.6|
| Missing response = 20              |    |     |
| Age                                |    |     |
| 20–39                              | 189| 41.6|
| 40–55                              | 184| 40.5|
| 56–75                              | 81 | 17.8|
| Missing response = 18              |    |     |
| Years in current position          |    |     |
| 0–5                                | 203| 43.3|
| 6–9                                | 75 | 16.0|
| 10+                                | 191| 40.7|
| Missing response = 3               |    |     |
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Conducted to examine predictors for a PHQ-9 score ≥10 and a GAD-7 score ≥8. These predictors included occupation, age, sex, years in current position, being overwhelmed by COVID-19, and being in contact with a patient either suspected to have COVID-19 or confirmed to have COVID-19. All statistical analyses were two-sided. The P value of ≤0.05 was considered statistically significant.

Results

A total of 472 nurse participants responded to the survey and were included in the final analysis (survey response rate = 29.5%). The majority of the participants were female (88.6%, n = 418) and the average age was 42.9 (SD = 11.6). More than two-thirds of participants were RNs or APNs (68.6%, n = 324). Overall, 48.7% (n = 227) of participants were overwhelmed by COVID-19. (See Table 1.)

An analysis was conducted to compare those who were stressed by COVID-19 and those who weren’t stressed. LVNs, CAs, and SNs had a statistically significant higher percentage (60.3%) of self-reported stress due to COVID-19 than RNs or APNs (43.4%, P = .0007). Participants who didn’t have contact with suspected or confirmed COVID-19 patients (P = .0344) had higher PHQ-9 scores (≥10, P = <.0001) and higher GAD-7 scores (≥8, P = .0001), which was associated with a higher chance of being stressed by COVID-19. (See Table 1.)

The first logistic analysis was to examine predictors for participants who had a PHQ-9 score ≥10. Those who self-reported that they were overwhelmed by COVID-19 were associated with 4.06 times increased odds (95% CI = [2.56, 6.56]) of having moderate-to-severe depression. (See Table 2.)

The second logistic analysis was to examine predictors for participants who had a GAD-7 score of ≥8. LVNs, CAs, and SNs

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**Table 2: Analysis of factors associated with being overwhelmed by COVID-19**

| Variable | No | Yes | P value |
|----------|----|-----|---------|
| Occupation |    |     | .0007   |
| CA/SN and LVN | 58 (39.7%) | 88 (60.3%) |       |
| RN and APN  | 181 (56.6%) | 139 (43.4%) |       |
| Sex       |    |     | .1245   |
| Female    | 206 (50%) | 206 (50%) |       |
| Male      | 33 (61.1%) | 21 (38.9%) |       |
| Missing response = 6 |
| In contact with a patient either suspected to have COVID-19 (COVID rule out) or confirmed to have COVID-19 |    |     | .0344   |
| Yes | 112 (57.1%) | 84 (42.9%) |       |
| No  | 127 (47.2%) | 142 (52.8%) |       |
| Missing response = 7 |
| PHQ-9 score |    |     | <.0001 |
| <10 | 212 (57.9%) | 154 (42.1%) |       |
| ≥10 | 19 (22.1%) | 67 (77.9%) |       |
| Missing response = 20 |
| GAD-7 score |    |     | <.0001 |
| <8 | 202 (65.4%) | 107 (34.6%) |       |
| ≥8 | 29 (20.3%) | 114 (79.7%) |       |
| Missing response = 20 |
| Age |    |     | .5909 |
| 20–39 | 93 (49.5%) | 95 (50.5%) |       |
| 40–55 | 92 (50.8%) | 89 (49.2%) |       |
| 56–75 | 45 (56.3%) | 35 (43.8%) |       |
| Missing response = 23 |
| Years in current position |    |     | .9178 |
| 0–5 | 102 (50.3%) | 101 (49.8%) |       |
| 6–9 | 39 (52.7%) | 35 (47.3%) |       |
| 10+ | 98 (51.9%) | 91 (48.2%) |       |
| Missing response = 205 |
were associated with a 1.68 times higher rate of anxiety (95% CI = [1.02, 2.76]) compared with RNs and APNs. Additionally, those who self-reported that they were overwhelmed by COVID-19 were associated with 7.31 times higher rates (95% CI = [4.53, 12.13]) of moderate-to-severe anxiety. (See Table 4.) A statistically significant difference in occupation regarding anxiety was identified: CAs/SNs, 41.4% GAD-7 ≥ 8; LVNs, 45%; RNs, 27.1%; and APNs, 11.1%. (See Table 5.)

### Discussion

Before the COVID-19 pandemic, data regarding the effect of unprecedented high-pressure work environments on nurses’ mental health were limited.\(^{15}\) In this study, nurses reported heightened stress during the COVID-19 outbreak, resulting in substantially higher levels of depression and anxiety. Similar results were noted in a study by Mo and colleagues, which identified fear as the main cause of anxiety.\(^{5}\)

During the pandemic, nurses have worked under intense pressure, which can negatively affect their resilience.\(^{16}\) Long-term exposure to stressful conditions weakens nurses’ resilience, resulting in an increase in anxiety levels.\(^{5}\) In this study, 79.7% of nurses reported feeling anxious. The results of reported dysfunctional levels of anxiety were comparable with a study by Labrague and De Los Santos.\(^{17}\) Higher anxiety levels are associated with alcohol and drug use as coping mechanisms, impairment of bodily functions, stress, depression, and suicidal ideation.\(^{4,17}\) Nearly half of the nurses in the Labrague and De Los Santos study were unsure if they were prepared to care for COVID-19 patients, resulting in increased anxiety levels.\(^{17}\) Of these nurses, over half were unsure or unwilling to care for COVID-19 patients.\(^{17}\)

This study noted that female nurses were more likely to be distressed compared with male nurses and two times more likely to experience a greater psychological burden.\(^{18,19}\) These findings are consistent with previous reports.\(^{18,19}\) Limited studies have been conducted on gender-based anxiety; however, this isn’t currently well understood.\(^{20,21}\) Luxton, Skopp, and Maguen conducted a study on depression and PTSD after combat deployment and reported that female soldiers had higher rates of PTSD than male soldiers.\(^{21}\) Although the study participants weren’t nurses, the results may be applicable because both groups work

| Table 3: Odds ratio and corresponding 95% confidence interval for predicting PHQ-9 ≥10 |
|---------------------------------|------------------|-----------------|------------------|-----------------|
| Unadjusted                      | Adjusted         |
|---------------------------------|------------------|-----------------|------------------|-----------------|
| Variable                        | OR with 95% CI   | P value         | OR with 95% CI   | P value         |
| CA/SN and LVN                   | 1.83 (1.12,2.96) | .0154           | 1.42 (.82,2.46)  | .2123           |
| RN and APN                      | Reference        | Reference       | Reference        | Reference       |
| Age 20–39                       | 1.41 (.72,2.02)  | .3181           | .95 (.41,1.25)   | .9025           |
| Age 40–55                       | .99 (.49,2.08)   | .9739           | .84 (.41,1.64)   | .652            |
| Age 56–75                       | Reference        | Reference       | Reference        | Reference       |
| Female vs. male                 | 1.04 (.52,2.27)  | .919            | .86 (.41,1.98)   | .7119           |
| In current position 0–5 years   | 1.22 (.72,2.02)  | .4604           | 1.31 (.66,2.60)  | .4434           |
| In current position 6–9 years   | 1.78 (.93,3.43)  | .0945           | 2.05 (.94,4.42)  | .0714           |
| In current position 10+ years   | Reference        | Reference       | Reference        | Reference       |
| Overwhelmed by COVID-19?        | Reference        | Reference       | Reference        | Reference       |
| Yes vs. no                      | 4.85 (2.85,8.62) | <.0001          | 4.6 (2.63,8.41)  | <.0001          |
| In contact with a patient either suspected to have COVID-19 (COVID rule out) or confirmed to have COVID-19? Yes vs. no | 1.61 (.99,2.67) | .0562           | 1.36 (.79,2.36)  | .2672           |

OR = odds ratio; CI = confidence interval
Depression and anxiety prevalence in nursing in high-intensity environments and crisis situations.

A possible explanation for the disparity in depression and anxiety rates is that historically women report more honest responses to questions regarding anxiety.²¹ The ability to recall events, interpret, and self-report varies between men and women.²² Mo and colleagues also reported that female nurses who were only children had higher stress loads due to the internal conflict of working in the COVID-19 environment and being the only social support for older family members.⁵ Nurses with children or those who cared for older family members also had higher anxiety levels.²³

An unexpected finding in this study was that nurses who didn’t provide direct patient care for suspected or confirmed COVID-19 patients had statistically significant higher reported depression and anxiety scores. Literature is scant on the various nursing roles, scope of practice, and prevalence rates of depression and anxiety during a pandemic. This study found that CAs/SNs and LVNs reported higher levels of depression and anxiety than RNs or APNs. These results are consistent with previous studies that also reported an association between nursing practice roles and increased depression and anxiety.²⁴,²⁵ However, these studies weren’t exclusive to the nursing occupation. In contrast, Pouralizadeh and colleagues reported no statistically significant correlation between nurses’ practice roles and anxiety.²⁶

Potential causes of increased depression and anxiety in CAs/SNs and LVNs reported higher levels of stress and anxiety than RNs or APNs. These results are consistent with previous studies that also reported an association between nursing practice roles and increased depression and anxiety.²⁴,²⁵ However, these studies weren’t exclusive to the nursing occupation. In contrast, Pouralizadeh and colleagues reported no statistically significant correlation between nurses’ practice roles and anxiety.²⁶

Table 4: Odds ratio and corresponding 95% confidence interval for predicting GAD-7 ≥8

| Variable                              | Unadjusted OR with 95% CI | P value | Adjusted OR with 95% CI | P value |
|---------------------------------------|---------------------------|---------|--------------------------|---------|
| CA/SN and LVN                         | 2.03 (1.34,3.07)          | .0009   | 1.68 (1.02,2.76)         | .042    |
| RN and APN                            | Reference                 |         | Reference                |         |
| Age 20–39                             | 1.58 (.89,2.87)           | .1222   | 1.48 (.73,2.2)           | .3074   |
| Age 40–55                             | 1.14 (.64,2.1)            | .6649   | 1.11 (.57,2.2)           | .7548   |
| Age 56–75                             | Reference                 |         | Reference                |         |
| Female vs. male                       | 1.11 (.61,2.12)           | .734    | 0.93 (.46,1.95)          | .8524   |
| In current position 0–5 years         | 1.01 (.66,1.56)           | .9504   | 0.79 (.44,1.43)          | .4402   |
| In current position 6–9 years         | 1 (5.41,1.79)             | .9886   | 0.85 (4.1,1.73)          | .649    |
| In current position 10+ years         | Reference                 |         | Reference                |         |
| Overwhelmed by COVID-19? Yes vs. no   | 7.42 (4.69,12.05)         | <.0001  | 7.31 (4.53,12.13)        | <.0001  |
| In contact with a patient either suspected to have COVID-19 (COVID rule out) or confirmed to have COVID-19? Yes vs. no | 1.57 (1.04,2.38) | .0305 | 1.37 (0.85,2.22) | .194 |

OR = odds ratio; CI = confidence interval

Table 5: Occupations

| Occupation | GAD-7 score <8 | GAD-7 score ≥8 | P value |
|------------|----------------|----------------|---------|
| CA/SN      | 61 (58.7%)     | 43 (41.4%)     | .0060   |
| LVN        | 22 (55%)       | 18 (45%)       |         |
| RN         | 218 (72.9%)    | 81 (27.1%)     |         |
| APN        | 8 (88.9%)      | 1 (11.1%)      |         |

Frequency missing = 20
ful environment and working conditions may also be contributing factors.

**Limitations**
This study had several limitations. Causality can’t be established due to the cross-sectional nature of the study. The voluntary web-based survey may have created a selection bias. There were more female participants than male participants, which may have caused a self-selection bias. The results may not be generalizable due to the study taking place at only one organization.

Future research should focus on gathering a larger sample size of nurse participants, recruiting more male nurses, and participating in a multicenter study to validate reported findings. In addition, future studies should aim to investigate factors that correlate nursing roles and scope of practice with depression and anxiety prevalence. Additionally, factors that affect and improve nurses’ resilience to reduce depression and anxiety should be investigated.

**Implications for nurse leaders**
The COVID-19 pandemic has highlighted a gap in the mental health needs of nurses during extended high-intensity conditions. Nurse leaders play an important role in reducing adversity and stress in nurses by creating an environment that nurtures personal resilience and social and organizational support. An emphasis for nurse leaders is to develop intervention programs to mitigate adverse mental health consequences. Positive outcomes are associated with early identification and organizational intervention. Although few evidence-based practice interventions exist at this time, several strategies to implement during epidemic/pandemic situations have been identified.

These strategies can be divided into professional and personal environment needs. Professional environment needs include clear communication regarding updates on the infectious disease, use and management of PPE, patient flow, and policy changes. Providing easily accessible training and care protocols may reduce anxiety associated with unfamiliarity and feelings of lack of control. Information may be provided through daily huddles, concise and easy-to-read written communication, or using audiovisual tools. Personal environment needs include scheduled availability of mental health and spiritual professionals during both work and off-work hours. Consider providing an area dedicated to meditation or relaxation and implementing a 30-second “stretch and flex” session every 4 hours. The physical therapy department can assist in designing a short, realistic workout specific to staff needs. Also encourage staff members to vent their feelings through verbal or written methods.

Preplanning and implementation of mental health action plans are essential to enhance psychological resilience and strengthen the healthcare system and nursing workforce. Early recognition of symptoms and organizational and social support can improve personal resilience and reduce compassion fatigue, burnout, depression, and anxiety.

**Support and strengthen**
This study noted that depression and anxiety were prevalent among all levels of nursing staff, although CAs, SNs, and LVNs were particularly vulnerable to variable negative mental health outcomes. Moreover, elevated stress levels were associated with clinically significant depression and anxiety. If left untreated, psychological distress can have long-term negative consequences that lead to burnout and poor patient care. Therefore, it’s imperative that hospital systems develop supportive plans for nurses that are tailored to strengthen their mental health as part of disaster preparedness.

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At Arrowhead Regional Medical Center in Colton, Calif., Jan Serrano is a nurse scientist, Sameer Hassamal is a consultation and liaison psychiatrist, Sunita Hassamal is internal medicine residency faculty, and Michael Neeki is core faculty and director of research. At Western University of Health Sciences in Pomona, Calif., Fanglong Dong is an associate professor.

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