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RESEARCH ARTICLE

Psychological Distress and Coping Strategies among Nurses during the COVID-19 Pandemic: A Cross-Sectional Online Survey

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Abstract:

Background:

The emergence of COVID-19 has a significant impact on nurse's overall health. The severity and magnitude of the COVID-19 pandemic means it is extremely likely that health-care professionals will experience psychological distress as a result of their direct contact with patients who have contracted the infection.

Objectives:

This study aimed to evaluate levels of psychological distress among nurses during the COVID-19 pandemic, determine the associated factors, and identify nurses' coping strategies.

Methods:

This study is a cross-sectional design. Overall, 130 nurses answered online questionnaires. The questionnaires measured sociodemographic characteristics, Fear of COVID-19 Scale, the Depression, Anxiety, and Stress Scale, and the Brief Coping Inventory.

Results:

Nurses have a moderate level of fear (mean score: 24.34 ± 13.43) and depression (43.8% of the sample), and severe anxiety (73.8%) and stress (45.4%). Anxiety and fear were positively correlated ($r = .675, p < .001$). Independent *t*-tests revealed that female nurses had higher psychological distress and fear than male nurses ($p = 0.015$ and $p = 0.038$, respectively). Nurses who cared for patients who had tested positive for coronavirus disease 2019 and those who had a friend or family member who had tested positive had higher fear and psychological distress than their respective counterparts ($p < .001$ and $p = .010$, respectively). Working more hours was moderately correlated with fear and anxiety ($p = 0.016$). Nurses were found to generally adopt maladaptive coping styles.

Conclusion:

Through careful study of the factors determined through this research to be associated with psychological distress among nurses, the health-care community can better prepare to mitigate nurses' emotional and psychological toll in future pandemic situations. Working with patients who have tested positive for COVID-2019 causes psychological distress for nurses.

Keywords: Anxiety, Coping, Coronavirus, Depression, Nurses, Psychological distress, Stress.

Article History

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1. INTRODUCTION

The World Health Organization (WHO) declared the emergence of the severe respiratory distress Coronavirus Disease 2019 (COVID-19) as a Pandemic on 11th of March [1]. China had identified SARS-COV-2 as the pneumonia outbreak

source in December 2019 [2]. The Jordanian National Epidemic Committee and the Ministry of Health undertook actions and established protocols to treat and prevent the spread of respiratory disease [3]. The Jordanian Ministry of Health followed the recommendation and opened five hospitals located in different areas in the country that were designated for treating patients with COVID-19. These hospitals were equipped with ventilators, Personal Protective Equipment (PPE), and trained infectious disease medical staff. By the

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month of May, most hospitals in the country were admitting patients who tested COVID-19 positive with symptoms [4]. During the pandemic, nurses were instructed to wear PPE, including disposable gowns, masks, gloves, and face-shields [4].

The COVID-19 pandemic has negatively impacted nurses' psychological well-being as it has created a severe burden on health care systems and the workforce [5]. Health care providers are at a high risk of developing adverse psychiatric effects during the pandemic [6]. Nurses have played a critical role in fighting COVID-19 than other health professionals [7]. During the pandemic, nurses showed exceptional dedication to their profession and patients by risking their lives in the emergency room, infection control units, intensive care units, and COVID-19 units [8]. In the current pandemic, nurses are concerned about the risk of exposure and infection by COVID-19. Yet, they are not adequately prepared to deal with excessive workload and stress, leading to some physiological problems [5].

The effects of the COVID-19 pandemic on nurses' psychological health have been studied severally. Risk factors responsible for nurses' psychological distress include uncertainty regarding patient infections, inadequate personal protective equipment (PPE), and testing, making nurses feel unsafe. Increased workload and the need to regularly make difficult ethical and moral decisions regarding patient allocation can also influence nurses' psychological distress during the COVID-19 pandemic [7].

Literature shows that COVID-19 pandemic healthcare workers (HCW) experienced adverse psychological distress [7]. In Wuhan, nurses reported that stress and fear increased with time. The nurses also experienced burnout and exhibited insomnia and depressive symptoms [7]. Badahdah et al. surveyed 509 physicians and nurses and found that the participants had extreme anxiety and high stress; 25.9% and 56.4%, respectively. Another study reported nurses spend more time with patients than doctors and, most of the time, develop emotional bonds with them [9]. Nurses are more likely to have anxiety when caring for the critically ill, stressed, or bereaved [5].

Despite the COVID-19 pandemic, few studies have discussed nurses' maladaptive strategies during the pandemic. Emotional and psychological distress affects nurses' cognitive function and clinical decision-making, increasing the risk of harm [10]. Cognitive emotion regulation helps regulate emotions or modify the event to manage feelings and prevent an individual from being overwhelmed by a stressful occurrence [5]. There are four maladaptive coping strategies which include rumination, blaming others, self-blame, and catastrophizing. Self-blame is where an individual blames themselves for undergoing a particular event that intensifies anxiety and depression. In rumination, an individual thinks about feelings and thoughts related to an event. In rumination, the individuals have sad thoughts continuously. Rumination is harmful to the mental health of an individual as it intensifies depression. Catastrophizing involves overemphasis on the terror of experiences, leading to depression due to the lack of acceptance of difficult situations [11]. There are five adaptive strategies: refocusing on planning, acceptance, positive

reappraisal, acceptance, and putting into perspective. Acceptance of one's experiences and what has happened is essential in cognitive emotion regulation. Positive refocus helps an individual think of happy and enjoyable things instead of the actual events. In refocus on planning, practical steps are considered to solve adverse events. When an individual practices positive reappraisal, they give constructive meaning to stressful events. An individual downplays the seriousness of events [11]. According to meta-analysis, maladaptive coping strategies are linked to anxiety and depression [12]. Acceptance of one's experiences and what has happened is essential in cognitive emotion regulation. Since COVID-19 is a catastrophic event, nurses who are habitual of using maladaptive cognitive regulation have higher chances of showing adverse emotional symptoms. However, it is not clear which cognitive emotion control technique is linked to anxiety and depression during the pandemic [12].

Coping strategies are thoughts and actions that individuals use to address stressful events [13]. Coping strategies have been used as an effective means of protecting people from developing psychological distress [14]. Researchers have identified two general types of coping strategies, which include emotional focus and problem focus. Emotional focus aims at reducing the severity of emotions fostered by a stressful event. Problem focus involves attempting to solve or reduce the stress-causing problem [15]. Coping responses can be adaptive or problematic [16]. However, Lazarus and Folkman argue that there are no "good" or "bad" coping processes or strategies; instead, they suggest that the adaptive qualities of the coping effort should be evaluated within the context of the specific situation in which it occurs [15].

To date, knowledge of the psychological health problems experienced by nurses working with patients diagnosed with COVID-19, as well as the associated factors and coping strategies employed, is limited. Such data are vital for developing strategies to reduce psychological symptoms among nurses during the pandemic. The specific aims of this study were to assess the psychological distress (fear, depression, anxiety, and stress) among nurses during the COVID-19 pandemic, to identify factors associated with these psychological effects, and to assess nurses' coping strategies.

2. METHODS

2.1. Study Design and Participants

A cross-sectional online survey of nurses was conducted during COVID-19 pandemic in Amman, Jordan, between October 18th and 25th, 2020, five months after the World Health Organization announced that COVID-19 was a pandemic. The participants, who were recruited using convenience sampling, comprised 130 nurses. Information regarding the study was distributed through social media (WhatsApp, text messaging, and emails), and the participating nurses completed an online questionnaire through Google Forms.

Sample size of 105 had been determined by using Cohen's table, where margin of error (.05), power 95% and effect size 50% respondent needed [17]. The data collections were stopped after seven days due to the collection of sufficient responses and on day seven, zero response was received.

2.2. Participant Recruitment

The study announcement included information related to the study, such as the aim and importance of the study, confidentiality assurances, and the email addresses and phone numbers of the researchers, should the participants wish to contact them. Initially, researchers, using their own direct networks, contacted a group of 46 nurses who had been working in hospitals. Through phone calls, the researchers informed the group of the purpose and the procedure of the study. The researchers then asked the participants if they knew of other nurses who meet the inclusion criteria if they could ask them to participate in this research.

Information sheets were sent to groups of nurses through emails and text messages. The groups forwarded the information sheets to other nurses through emails or text messages and other forms of social media. The research team personally contacted those who were interested in participating through text messages, phone calls, or emails, and any questions or concerns were addressed. The link to the Google Forms questionnaire was sent by text message or email to nurses who electronically signed consent forms, which indicated their willingness to participate in the study.

2.3. Inclusion and Exclusion Criteria

The following inclusion criteria were applied: 1) residing in Jordan, 2) having provided care for patients who had tested positive for COVID-19, who were suspected of having COVID-19, or who were not confirmed as having COVID-19, and 3) working in hospitals located in the Amman area. The exclusion criterion was nurses who were tested COVID-19 positive.

2.4. Data Collection

2.4.1. The e-survey

The Checklist for Reporting Results of Internet E-Surveys (commonly abbreviated to "CHERRIES") was completed following the administration of the e-survey [18]. Google Forms was used to develop the online questionnaires and provided a means of quickly gathering responses from participants. Answers to the survey items were collected automatically and exported to an excel spreadsheet for data analysis. To determine the face validity of the tools included in the survey (the Fear of COVID-19 Scale (FCV-19S) [19], the Depression, Anxiety, and Stress Scales (DASS) [20]; and Brief-COPE scale [16], (described in section 2.5), and the practicability of administering the questionnaires, a pilot study was conducted in which a group of 16 nurses was invited to answer the questionnaires; none of these nurses were included in the sample for the main study. The Cronbach's alphas determined through the pilot study were as follows: 0.94 for the FCV-19S, 0.92, 0.95, and 0.91 for the depression, anxiety, and stress subscales, respectively, of the DASS, and 0.860 for the Brief COPE after adjusting item numbers 4 and 11.

2.5. Research Instruments

2.5.1. Socio-Demographic Information and COVID-19-Related Variables

Data regarding gender, age, years of nursing experience,

education level, working unit (e.g., intensive care unit), marital status, and workplace were collected from the participants.

Further, we also determined, for each participant, whether he/she had provided care for a patient who had tested positive for COVID-19 or was suspected of having the virus, the number of hours worked per week, whether he/she had a family member or friend who had tested positive for COVID-19, and whether he/she intended to change his/her job as a result of the COVID-19 Pandemic (Table 1).

2.5.2. Psychological Distress

The FCV-19S was used to investigate the nurses' level of fear of COVID-19 [19]. The FCV-19S is a seven-item, reliable and valid scale that measures fear of COVID-19 among the general population. Answers to items are given using a five-point Likert scale (1 = "strongly disagree," 2 = "disagree," 3 = "neither agree nor disagree," 4 = "agree," and 5 = "strongly agree"). The total score is determined by summing the scores for the seven items; thus, total scores range from seven to 35. Higher scores indicate greater fear of COVID-19. The FCV-19S scale has acceptable concurrent validity with the Hospital Anxiety and Depression Scale and the Perceived Vulnerability to Disease Scale. Cronbach's alpha for the original scale was 0.82, and the test-retest reliability was 0.72. For the present study, Cronbach's alpha was 0.810.

The DASS was used to measure participants' depression, anxiety, and stress over the seven days preceding the survey [20]. The scale comprises three self-reported subscales and has a total of 42 items. Each subscale contains 14 items divided into subscales of 2–5 items that have similar domains. Items are rated using a four-point Likert-scale (0 = "not at all" 1 = "a considerable degree, or some of the time," 2 = "most of the time," and 3 = "all of the time"). Respective scores for the depression, anxiety, and stress subscales are calculated, and the overall severity of the respondent's distress is determined using an index comprising "normal," "mild," "moderate," "severe," and "extremely severe," respectively. For the original scale, the Cronbach's alpha for the depression subscale was 0.91, that for the anxiety subscale was 0.84, and that for the stress subscale was 0.90 [20]. For the present study, the Cronbach's alphas were 0.895, 0.863, and 0.870 for the depression, anxiety, and stress subscales, respectively.

2.5.3. Coping Strategies

We used the Brief Coping Inventory (Brief-COPE) to assess the nurses' coping strategies during the COVID-19 pandemic. The Brief-COPE [16] is a shortened edition of the original COPE inventory [21]. The Brief-COPE contains 28 items and measures 14 different coping responses; two items are devoted to each coping response. The tool is designed to assess and predict the coping responses respondents adopt when experiencing stressful situations. The Brief-COPE assesses strategies that have been determined in previous research to be adaptive (active coping, use of emotional support, use of instrumental support, positive reframing, planning, humor, acceptance, and religion), and strategies that have been found to be maladaptive or problematic (self-distraction, denial, substance use, behavioral disengagement, venting, and self-blame).

Table 1. The participants’ sociodemographic characteristics and distribution across the COVID-19-related variables (N = 130).

Variables	Number (%)
Gender	
Male	53 (40.8)
Female	77 (59.2)
Marital Status	
Married	90 (69.2)
Single	40 (30.8)
Age Groups (years)	
< 30	35 (26.9)
30–40	52 (40.0)
> 40	43 (33.1)
Years of Nursing Experience	
< 5	43 (33.1)
5–9	11 (8.5)
10–14	66 (50.8)
> 15	10 (7.7)
Education Level	
Diploma in Nursing	29 (22.3)
Bachelor’s Degree in Nursing	101 (77.3)
Unit	
Emergency room	45 (34.7)
Critical care	85 (65.3)
Provided care for patients who had tested positive for COVID-19	108 (83)
Provided care for patients who were suspected of being COVID-19-positive	47 (36)
Hours Worked Per Week	
< 24	42 (32.3)
24–36	26 (20)
> 36	62 (47.7)
Had a Family Member/Friend who Tested Positive for COVID-19	
Yes	84 (64.6)
No	46 (35.4)
Intention to Leave Work as a Result of the COVID-19 Pandemic	
Yes	72 (55.4)
No	58 (44.6)

COVID-19: Coronavirus disease 2019.

Individuals complete the measures through utilizing a four-point Likert scale (1 = “I have not been doing this at all,” 2 = “I have been doing this a little bit,” 3 = “I have been doing this a medium amount,” and 4 = “I have been doing this a lot”) to report the degree to which they perform the action described in each item when experiencing a stressful situation. As two items are devoted to each type of coping response, possible scores for each coping response range from two to eight. Higher scores indicate that the respondent is more likely to show the corresponding coping style. The internal consistency for the 14 subscales, as measured using Cronbach’s alpha, ranges from 0.50 to 0.92 [16].

We conducted a pilot study on 16 nurses to ensure the tools’ clarity and feasibility (FCV-19S, DASS, and Brief-COPE). During the pilot study, the participants highlighted item 4 (“I’ve been using alcohol or other drugs to make myself feel better”) and item 11 (“I’ve been using alcohol or other drugs to help me get through”) of Brief-COPE. Many people in Jordan use cigarettes; consequently, we added references to

cigarettes and similar products to these two items. Specifically, item 4 was changed to “I’ve been using cigarettes, vaping, hookah, alcohol, or other drugs to make myself feel better”, and 11 was changed to “I’ve been using vaping, hookah, alcohol, or other drugs to help me get through.” The questionnaires underwent a review by six experts to ensure that the items would be clearly understood by respondents. The questions were assessed in terms of clarity, relevance, appropriateness and length by six expert faculty members of PhD holders with a specialty in mental health, medical surgical and community. Acceptance was based on the agreement of at least four out of six experts (80%). The reliability of the questionnaire was examined after data collection using Cronbach’s Alpha coefficient. Alpha value was 0.840, indicating acceptable internal consistency. After subsequent modifications, a second pilot study was conducted on another 16 nurses. There was a marked improvement in the nurses’ understanding of the items, as evidenced by a decrease in requests for clarifications regarding item meanings and how the

data would be analyzed.

Subsequently, a final pilot test was conducted on the instruments using 18 nurses who had provided care for patients who had tested positive for COVID-19; these nurses were not included as respondents in the main study. The Cronbach’s alphas were as follows: FCV-19S = 0.840, DASS = 0.880, and COPE = 0.840.

2.6. Ethical Considerations

Prior to data collection, approval was obtained from the Human Subjects Review Board of Al-Ahliyya Amman University (ID number: 2020-2019/14/5), and the study complied with the Declaration of Helsinki 2013. Participants were assured of the confidentiality and anonymity of their data. Written informed consent was obtained electronically. The main author ensured the data were securely stored on her personal computer.

2.7. Statistical Analysis

Data were analyzed using SPSS version 21. There were no missing values since the authors suggested putting asterisks on each question of e-survey that the participants couldn't move to the following question without answering the previous question. Initially, descriptive statistics were conducted on the variables of interest included in this study (Table 1). This consisted of the construction of a frequency table for the categorical sociodemographic information and related COVID-19 variables. The internal consistency reliability was tested by calculating Cronbach’s alphas for each scale and subscale, with values of 0.70 or above indicating acceptable reliability [22]. Pearson product-moment correlation was used to identify the association between psychological distress (DASS) and fear (FCV-19S). Spearman rho correlation was used to evaluate the relationship between anxiety, fear, and sociodemographic factors. Independent t-tests were conducted on psychological distress, sociodemographic information, and fear of COVID-19. Independent t-tests and one-way analyses of variance (ANOVAs) were used to test the coping strategies and sociodemographic variables. The significance level was set at $p < 0.05$.

3. RESULTS

3.1. Sociodemographic Information and COVID-19-Related Variables

The participants’ sociodemographic information and their distribution across the COVID-19-related factors are outlined in Table 1. Among the 130 nurses enrolled in this study, 77 (59.2%) were female and 53 (40.8%) were male. Regarding age, the most-represented age group was 30–40 years (52 participants; 40%); most of the participants (66; 50.8%) had 10–14 years of experience working in health care; 101 (77.3)

had a Bachelor of Science in Nursing; and over half of the sample were working in critical units (85; 65.4%). Most participants were married (90; 69.2%). Overall, 108 (83.0%) nurses worked with patients who had tested positive for COVID-19. Moreover, 62 (47.7%) participants worked more than 36 hours/week, representing the largest group in this regard, and 84 (64.6%) had a family member or friend who had tested positive for COVID-19. Finally, 72 (55.4%) nurses reported an intention to change their jobs as a result of the COVID-19 pandemic.

3.2. Psychological Distress and the Distribution of the Scored for the Fear of COVID-19 Scale and the Depression, Anxiety, and Stress Scale

The severity of the nurses’ psychological distress (determined by analyzing their depression, anxiety, and stress, respectively) was calculated by summing the scores for the relevant items. Scores were then categorized as “normal,” “mild,” “moderate,” “severe,” or “extremely severe,” respectively. Based on this questionnaire-scoring system, 57 (43.8%) of the participants had a moderate level of depression, 96 (73.8%) had extremely severe anxiety, and 59 (45.4%) had a severe level of stress. The sample’s overall mean score for the FCV-19S was 24.34 ± 13.43 (minimum = 11.0, maximum = 33.0); this was higher than the middle level, indicating a prominent fear of the COVID-19 pandemic. The mean DASS score was 71.16 ± 13.42 (minimum = 42.0, maximum = 93.0) (Table 2).

3.3. Correlations between the Scores for the Fear of COVID-19 Scale and the Depression, Anxiety, and Stress Scale

Pearson product-moment correlation was used to identify the association between psychological distress and fear of COVID-19. A statistically significant positive correlation between DASS score and FCV-19 score was consequently found ($r = .675, N = 130, p < .001$).

3.4. Association of Psychological Distress and fear of COVID-19 with Sociodemographic Characteristics and COVID-19-Related Variables

Spearman rho correlation was used to evaluate the relationship among anxiety, fear, and sociodemographic factors. The analysis revealed statistically significant relationships in regard to the number of hours spent at work during the pandemic; specifically, moderate positive correlations with both anxiety ($r = .558, N = 130, p < 0.001$) and fear ($r = .521, N = 130, p < .001$) were found.

Table 3 shows the results of independent samples t-tests used to measure the differences in mean scores for the DASS and FCV-19S across sociodemographic factors.

Table 2. Participants’ level of fear of COVID-19 and psychological distress, and distribution of the DASS and FCV-19S scores.

Variables	Number (%) / $M \pm SD$
DASS severity	

(Table 4) contd....

Variables	Number (%) / $M \pm SD$
Moderate level of depression	57 (43.8%)
Extremely severe level of anxiety	96 (73.8%)
Severe level of stress	59 (45.4%)
Level of fear of COVID-19 and psychological distress	
FCV-19S	24.34 \pm 13.43
DASS	71.16 \pm 13.42

COVID-19: Coronavirus disease 2019; DASS: Depression, Anxiety, and Stress Scales; FCV-19S: Fear of COVID-19 Scale.

Table 3. Results of independent t-tests of psychological distress, fear of COVID-19, and sociodemographic characteristics.

Variables	DASS					FCV-19S			
	n	M (SD)	t-value	df	p-value	M (SD)	t	df	p-value
Gender									
Male	53	67.55 (13.51)	2.466	128	.015	23.49 (5.48)	2.009	128	.038
Female	77	73.60 (13.90)				25.56 (5.60)			
Provided care for patients who had tested positive for COVID-19	63	72.45 (13.42)	4.864	128	.000	26.45 (5.72)	3.146	128	.002
Provided care for patients who were suspected of being COVID-19-positive	67	61.22 (12.90)				23.19 (6.07)			
Had a family member/friend who tested positive for COVID-19									
Yes	84	73.39 (12.36)	2.618	128	.010	25.07 (5.52)	2.040	128	.043
No	46	67.08 (14.44)				23.00 (5.56)			

COVID-19: Coronavirus disease 2019; DASS: Depression, Anxiety, and Stress Scales; FCV-19S: Fear of COVID-19 Scale

An independent t-test showed that there was a statistically significant mean difference between genders for the DASS score, with the mean DASS score for female nurses ($M = 73.60, SD = 13.90$) being higher than that for male nurses ($M = 67.55, SD = 13.51$), $t(128) 2.466, p = 0.015$. A statistically significant mean difference between genders was also noted for the FCV-19S score, with the female nurses having a higher mean score for fear of COVID-19 ($M = 25.56, SD = 5.60$) when compared to the male nurses ($M = 23.49, SD = 5.48$), $t(128) 2.009, p = 0.038$.

An independent t-test also showed that there was a statistically significant mean difference in DASS score between nurses who provided care for patients with COVID-19 and those who provided care for patients suspected of having COVID-19 ($M = 72.45, SD = 13.42$ and $M = 61.22, SD = 12.90$, respectively), $t(128) 4.864, p < .001$; nurses who provided care for patients with COVID-19 had a higher mean score. A statistically significant mean difference was also noted between these groups in regard to FCV-19S score. The nurses who were providing care for patients with COVID-19 had a higher mean score for fear of COVID-19 than did the nurses who were providing care for patients suspected of having COVID-19 ($M = 26.45, SD = 5.72$ and $M = 23.19, SD = 6.07$, respectively), $t(128) 3.146, p = 0.002$.

An independent t-test showed that there was a statistically significant mean difference in DASS score between nurses who had family members or friends who had contracted a

COVID-19 infection and those who did not; the former showed a higher mean score ($M = 73.39, SD = 12.36$) than the latter ($M = 67.08, SD = 14.44$), $t(128) 2.168, p = .010$. Also, a statistically significant mean difference was noted between these groups in regard to mean FCV-19S score, with the nurses who had a family member or friend who had contracted a COVID-19 infection having a higher mean fear score ($M = 25.07, SD = 5.52$) when compared to the nurses who did not have a family member or friend who was infected with COVID-19 ($M = 23.0, SD = 5.56$), $t(128) 2.040, p = .043$

An independent t-test showed that there were statistically significant mean differences between genders for self-distraction and self-blaming scores, respectively, with females having higher mean scores than males in both cases ($p < .001$). Meanwhile, male nurses showed statistically significantly higher mean scores than females for both emotional support and acceptance ($p < 0.001$).

An independent t-test showed that there were statistically significant mean differences for self-distraction and behavioral disengagement scores, respectively, between nurses who were providing care for patients who had tested positive for COVID-19 and those who were providing care for patients who were suspected of having a COVID-19 infection. In both cases, the former group had higher mean scores than the latter group (self-distraction $p = .008$, behavioral disengagement $p = .004$). Meanwhile, the latter group showed a higher mean score than the former group in regard to the use of planning coping strategies ($p < .016$).

Table 4. Results of independent t-test analyses of coping strategies.

Independent Variable	n	M (SD)	t	p	Dependent Variable
Male	77	3.90 (1.42)	5.18	.000	Self-distraction
Female	53	5.19 (1.38)			

(Table 6) contd....

Independent Variable	n	M (SD)	t	p	Dependent Variable
Male	77	3.69 (1.06)	7.48	.000	Self-blaming
Female	53	5.09 (1.04)			
Male	77	5.37 (1.14)	5.84	.000	Emotional support
Female	53	4.12 (1.24)			
Male	77	5.30 (1.11)	4.43	.000	Acceptance
Female	53	4.39 (1.18)			
Provided care for patients who had tested positive for COVID-19	109	5.14 (1.35)	2.68	.008	Self-distraction
Provided care for patients who were suspected of being COVID-19-positive	21	4.30 (1.11)			
Provided care for patients who had tested positive for COVID-19	109	5.01 (1.17)	2.89	.004	Behavioral disengagement
Provided care for patients who were suspected of being COVID-19-positive	21	4.20 (1.20)			
Provided care for patients who had tested positive for COVID-19	109	4.55 (1.44)	2.44	.016	Planning
Provided care for patients who were suspected of being COVID-19-positive	21	5.38 (1.35)			

COVID-19: Coronavirus disease 2019.

Table 5. ANOVA results for coping strategies, with the independent variable of hours worked per week during the pandemic.

Dependent Variable	Sum of Squares		df	F	p-value
Active coping	Between groups	12.069	2	4.259	0.016
	Within groups	179.962	127		
Self-distraction	Between groups	14.192	2	4.459	0.013
	Within groups	202.115	127		

ANOVA: Analysis of variance.

A one-way ANOVA revealed that hours worked per week during the pandemic was associated with a statistically significant mean difference for mean active coping score, $F(2,127) = 4.259, p = 0.016$. Post-hoc analyses using the Scheffé post hoc criterion for significance revealed a statistically significant mean difference in this regard between the 24-hr group and the 36-hr group ($4.63 \pm 1.08; 5.46 \pm 1.33, p = .017$), with nurses who worked 24 hrs per week having a higher mean score for active coping than those who worked 36 hrs. Meanwhile, no statistically significant differences were noted between the 24-hr group and the > 36-hrs group or between the 36-hr group and the > 36-hrs group, respectively ($p = 0.089$ and $p = .713$, respectively) (Table 4).

Table 5 presents a one-way ANOVA that revealed that hours worked during the pandemic was also associated with a statistically significant mean difference in mean self-distraction score, $F(2,127) = 4.459, p = .013$. Post-hoc analyses using the Scheffé post hoc criterion for significance revealed a statistically significant mean difference in this regard between the 24-hrs group and the > 36-hrs group (5.12 ± 1.25 and 5.86 ± 1.26 , respectively, $p = .033$), with nurses who worked more than 36 hrs per week having a higher mean self-distraction score than those who worked 24 hrs. Meanwhile, no statistically significant differences were noted between the 24-hrs group and the 36-hrs group or between the 36-hrs group and the > 36-hrs group, respectively ($p = .982$ and $p = 0.067$, respectively).

4. DISCUSSION

The current study aimed to assess the psychological distress (fear, depression, anxiety, and stress) among nurses during the COVID-19 pandemic, identifying factors associated with these psychological symptoms, and evaluating the coping

strategies used by such nurses. Our findings, obtained from a sample of nurses who worked during the COVID-19 pandemic in Jordan, indicate that nurses have high levels of psychological distress and fear, and adopt maladaptive coping measures; we also observed a positive correlation between DASS scores and level of fear of COVID-19. These results accord with the findings of Vagni *et al.*, who concluded that a collective increase in anxiety, depression, and stress leads to increased fear [23]. Our study findings aid understanding of the implications of fear, anxiety, depression, and stress for nurses, as well as the coping strategies that are commonly adopted.

The study results were similar to those of previous research studies that have also examined the psychological impact of the COVID-19 pandemic. For example, Shaukat *et al.* observed high levels of psychological distress among health-care workers during the pandemic [24]; moreover, another study reported that nurses tend to experience more psychological stress as a result of their tense working environments, fear of infection, physical discomfort from protective gear, and unfamiliarity with new specialized working environments [25]. Our findings indicated that there are several causative factors for this high level of fear and psychological distress. The number of hours spent at work during the pandemic was associated with levels of fear and anxiety, and over one-half of the nurses in our sample had extremely severe anxiety. Further, having family members or friends who had been infected with COVID-19 significantly increased nurses' fear and psychological distress. Additionally, fear and psychological distress were not limited to female nurses, as male nurses also showed these symptoms. The circumstances surrounding the COVID-19 pandemic, including the lack of a vaccine, the need to wait several days to receive a test result, limitations regarding medical equipment, and anxiety among people in the community, represent notable stressors for health and welfare

workers [26], and there is a risk that the observed trends reflect a serious, long-term spike in psychological distress among such workers.

Of the sample for the current study, one-third of the nurses worked in emergency room units, and one-half were assigned to critical care. Nurses who work in emergency departments and critical care units are among the first contacts with ill patients, which represents a stressor; this group is also at risk of other stressors, including compassion fatigue, burnout [27], moral distress resulting from a perceived inability to provide adequate care, the burden of making treatment decisions based on limited resources, and concern regarding a lack of testing for nurses [28]. Such stressors can have negative effects for health-care providers, consequently hampering their abilities to perform their roles [29]. Thus, there is a growing need to provide nurses with the therapeutic support structures necessary to maintain their psychological health.

The DASS scores indicated that over one-half of the nurses from the study sample were experiencing extremely severe anxiety. The outcome can be explained by the high infection rate of the COVID-19 virus and the difficulty in determining whether a patient is infected or not. According to the World Health Organization, if the patient is infected, whether they display the symptoms of COVID-19 or not is irrelevant; they are still capable of infecting others. This uncertainty of the unknown may contribute significantly to the nurses' psychological anxiety and fear [30]. In addition, there is a relationship between nurses' sociodemographic factors and their levels of fear and anxiety. The time nurses spend providing care for patients with or suspected of being infected with COVID-19 has been found to be associated with increased anxiety and fear. Nadanovsky *et al.* found that the more time health-care providers spend with COVID-19 patients, the more likely they are to develop higher levels of anxiety and/or a fear of contracting the infection [31]. The current data suggest that ≥ 15 minutes of close contact with an infected person increases infection probability [32]. Therefore, nurses must exercise extreme caution, even while attending to asymptomatic patients.

The psychological stress levels among the nurses evaluated in this study were also concerning. The results showed that 45.4% of the nurses had severe stress, while 43.8% had moderate levels of depression. Directing more resources towards addressing the rising number of COVID-19 cases may help to lower the uncertainty many nurses experience while providing care for patients who are potentially infected [29]. Further, to safely meet the varying health needs of patients with different levels of infection, nurses require significant financial support from governments and non-governmental and international organizations [23]. Such resource input could help to reduce the uncertainty that causes nurses to experience severe stress and depression.

Currently, there are no longitudinal studies available to compare nurses' mental health before, during, and after the COVID-19 pandemic with the current study's result. The most available published studies are cross-sectional design studies, the data collected at a single point in time [33]. A recent study measured nurses' psychological distress using depression,

anxiety, and stress scales before the COVID-19 pandemic in Australia. The study found the depressive symptoms were 30% [34]. In 2019, one-third of midwives in the United Kingdom reported moderate/severe/extreme levels of depression (33%), anxiety (38%), and stress (36.7%) [35]. The overall prevalence of Swedish midwives moderate/severe/very severe symptoms of depressive symptoms were (12%), anxiety (8.6%), and stress (7.2%) [36]. Midwives aged under 40 and less than 10 years of experience reported higher depressive symptoms, anxiety, and depression [36]. The studies mentioned above demonstrated the presence of psychological distress before the pandemic. However, due to the COVID-19 pandemic, nurses have encountered a unique and challenging situation. Comparing the results of this study with similar studies conducted before the pandemic may not reflect a real nurses' psychological distress since the psychological distress indicators may be attributed to different factors. Moreover, our study covered nurses' psychological distress during the pandemic and before the vaccine was available.

The nature of a stressful event can affect the type of coping strategies utilized. A previous study among patients with cancer found emotional support and acceptance-based coping strategies to be associated with better quality of life and mood, and self-blame to be associated with worse quality of life and mood [37]. The present study findings indicate that male nurses generally utilize emotional support and acceptance, implying that male nurses are more likely to cope with the psychological distress, fears, and overall uncertainty associated with the pandemic in healthier ways than female nurses [31], who tend to focus away from the stress and/or criticize themselves or their inability to control the situation. These two types of coping strategies can lead to maladaptive coping [16]. Notably, the male nurses generally reported utilizing emotional support and acceptance, which can be described as adaptive coping [16]. The most common coping mechanisms are approach (adaptive) and avoidance (maladaptive) coping, respectively. The former is associated with helpful responses to adversity and includes practical adaptive adjustment [24]; meanwhile, the latter, avoidance, is characterized by denial, self-blame, substance abuse, and behavioral disengagement [38].

The results of the current study showed that the nurses who provided care to patients suspected of having a COVID-19 infection utilized planning coping strategies, while nurses who cared for patients who had tested positive for COVID-19 tended to use self-distraction and behavioral distancing/disengagement. Further, the nurses who worked > 36 hours per week utilized self-distraction, which is considered a maladaptive coping strategy, while the nurses who worked 24 hours per week utilized active coping. Active coping and planning coping strategies may predict less psychological stress and adaptive coping during the pandemic; thus, these coping types should be encouraged by health officials.

The results of the present study highlight the need to better understand psychological distress and coping strategies among those providing care to patients during the pandemic. Officials should establish a system to support nurses and monitor their psychological health. Future research should focus on developing interventions that educate nurses regarding how to

use specific coping strategies.

As a year has passed since writing this manuscript, it is worth mentioning that the state of the pandemic has changed. Perhaps the most significant change is the introduction of the vaccine. Up to September, 26th 2021, there were 3,681,961 fully vaccinated individuals in the Jordan's population (10 million), about 36% of the population [39]. The vaccine is available to all people aged 12 and who reside in Jordan. However, the turn-up rates are low as many people remain skeptical about the vaccine despite national campaigns to encourage vaccination. The government has established regulations to mandate people to be vaccinated. The new rules regarding vaccine regulations required that all people employed in both the government sector and the private sector, including HCW facilities to be vaccinated. The unvaccinated person must get a weekly negative Polymerase Chain Reaction (PCR) test for COVID-19, which is an expensive alternative since they must do it at their own cost. Healthcare workers, including nurses, were among the first to receive vaccines in Jordan, so many required a booster dose as recommended by some vaccine regimes.

Almost two years into the pandemic, psychological stress levels vary, maybe still be high or have gotten worse or decreased. The COVID-19 remains a pandemic with new variants developing all the time and the pandemic lasted much longer than anticipated. Two scenarios might have taken place with the vaccine being available, decreasing or increasing the psychological distress level. The first one is that the fear, anxiety, and depression levels amongst nurses have declined due to receiving the vaccine, and the feeling that the imminent danger posed by COVID-19 to nurses and families has been reduced. The second scenario, which we assume is more probable, is that fear, anxiety, and depression remain high. The reasons that make the latter scenario more likely are that the workload on nurses remains high and that while the country is opening up, deaths and severe illness due to COVID-19 have not ceased. Finally, many virus variants are developing and may not be covered entirely by the available vaccines.

5. STUDY LIMITATION

This study has some limitations. First, sample selection bias may be present. The nurses analyzed in this study worked in units where they were aware that the patients had either tested positive for COVID-19 or were suspected cases. Thus, this may have biased our finding that a large portion of the sample demonstrated a high level of psychological distress. Second, we used self-report instruments, meaning the responses, particularly those regarding symptoms of psychological distress and fear over the past seven days, may have been influenced by recall bias. Third, this study lacks a prior status assessment. It is, therefore, difficult to understand how much of the mental problems depend on COVID-19 and how pre-existing it is. The mental problems observed may pre-date the pandemic. Additionally, people with mental problems may have gotten worse from the pandemic. Fourth, a cross-sectional approach does not allow the determination of causal relationships and features a small sample size, meaning the generalizability of the results is limited. Fifth, the study was

conducted five months into the pandemic; thus, nurses who had more experience of working with patients who had tested positive for COVID-19 may have developed resilience or become traumatized.

CONCLUSION

The COVID-19 pandemic has affected nurses' psychological health. Nurses have a moderate level of depression, extremely severe anxiety, severe stress, and a moderate fear of COVID-19. The most utilized coping strategies were determined to be maladaptive. In contrast, the technique of actively coping with work-related uncertainties offers healthier outcomes for nurses. The insights gained in this study, through assessing nurses' psychological states amid a global pandemic, could help clinicians and policy-makers better comprehend health-care workers' coping needs.

RELEVANCE TO PRACTICE

This study shows the pandemic's effect on Jordanian nurses' psychological distress. The data presented herein can be used to help create support systems for improving nurses' (especially female nurses) psychological health during pandemic situations. In particular, male and female nurses should gather to address their fears and anxieties as a team of professionals.

These findings may also help Jordanian health-care professionals anticipate nurses' needs and identify those at risk of adopting maladaptive coping strategies and developing high levels of psychological distress. Nurses and health-care officials could collaborate to develop better coping strategies for both the circumstances of the COVID-19 pandemic and similar future events. As stressful events often affect the coping strategies nurses adopt, numerous approaches suited to a range of clinical settings should be devised.

Finally, additional resources are required to assess nurses' coping strategies and address their use of maladaptive coping strategies. Encouraging the use of adaptive coping strategies may benefit nurses in similar future situations.

LIST OF ABBREVIATIONS

COVID-19	=	Coronavirus Disease 2019
HCW	=	Health Care Workers
PPE	=	Personal Protective Equipment
WHO	=	World Health Organization

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Human Subjects Review Board of Al-Ahliyya Amman Univeristy, Amman, Jordan (ID number: 2020-2019/14/5).

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are base of this research. All the humans used were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

The participants read the informed consent form online and then signed it, indicating their agreement with the proposed objectives and willingness to participate in the study.

STANDARDS OF REPORTING

STROBE guidelines and methodologies were followed in this study.

AVAILABILITY OF THE DATA AND MATERIALS

The data sets analyzed in this study are available upon request.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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