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Research Article

Dynamics of Work Stress and Job Satisfaction Among Nurses During the COVID-19 Outbreak

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ABSTRACT

Introduction: The COVID-19 pandemic has dramatically increased the number of patients needing hospitalization, placing significant stress on hospital administrators and nurses. Due to the high demand for patient care, more nurses are required on duty, often working longer shifts and overtime. As a result, many healthcare organizations now view work stress and job satisfaction as critical workplace issues.

This study examines work stress among nurses caring for COVID-19 patients and explores the relationship between their stress levels and job satisfaction.

Method: A cross-sectional survey was conducted using an online questionnaire, with 196 nurses participating. The data collection tools included sociodemographic information, the Perceived Stress Scale (PSS), and the Job Satisfaction Survey (JSS).

Results: There was a significant difference in PSS scores between nurses who worked with COVID-19 patients and those who did not. Among the 196 participants, 90% of the nurses working with COVID-19 patients reported moderate to high stress levels.

Conclusion: This study's findings underscore the importance of addressing work stress and its impact on job satisfaction among nurses, particularly during a crisis like the COVID-19 pandemic. High levels of stress not only affect nurses' well-being but can also lead to burnout, reduced productivity, and a higher turnover rate, which in turn compromises the quality of patient care.

Keywords: Work Stress, Job Satisfaction, COVID-19 and Nurses, Pandemic Impact, Healthcare Workforce.

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INTRODUCTION

In December 2019, cases of pneumonia of unknown origin were reported in Wuhan, China[1]. Shortly after that, the World Health Organization (WHO) identified the causative agent as SARS-CoV-2, now widely known as Coronavirus Disease 2019 (COVID-19). The WHO subsequently declared the outbreak a pandemic, recognizing it as an unprecedented threat to global public health[2]. By August 2021, COVID-19 had spread to 221 countries and territories, including all regions of Saudi Arabia, with 544,225 confirmed cases and 8,539 deaths reported [3]. The surge in cases requiring hospitalization has posed significant challenges to healthcare systems worldwide. Nurses, particularly, have faced enormous pressures as they have had to quickly adapt to the evolving demands of healthcare services. Those managing severe and complex cases of COVID-19 have been deeply involved in continuous infection control efforts, facing a heightened risk of infection as frontline healthcare workers. Consequently, they are disproportionately susceptible to symptoms of anxiety and stress [4].

The substantial influx of patients requiring hospitalization has placed considerable pressure on hospitals and nursing staff. This situation necessitates an increase in the number of staff nurses on duty and extended shift hours, reflecting the pre-existing high demand for nursing services even prior to the pandemic [5]. Consequently, organizations increasingly recognize work stress and employee job satisfaction as critical workplace concerns. Exposure to both physical and psychosocial hazards in the workplace is linked to heightened anxiety, which, in turn, contributes to increased work-related stress [6]. Job satisfaction is conceptualized as a psychological state influenced by individuals' enjoyment or dissatisfaction with their work and their ability to fulfill job-related responsibilities [7]. Empirical evidence demonstrates a significant correlation between work stress and job satisfaction, with low job satisfaction often associated with high levels of work stress. Moreover, job stressors are predictive of job dissatisfaction and may elevate the likelihood of employees leaving the profession[8].

Stress can originate from emotional, physical, and social sources of distress. It represents a natural response to novel experiences, changes, or challenges requiring adaptation [9]. The phenomenon of work stress is well-documented, with substantial scholarly attention devoted to its analysis. In 1936, Selye conceptualized stress as the perception of threat, which manifests as anxiety, discomfort, emotional tension, and difficulties in adaptation. Consequently, work stress is characterized by a detrimental emotional response that employees struggle to manage, leading to adverse psychological and physical health outcomes [10]. Therefore, work stress is a harmful emotional response that employees face and cannot cope with, leading to poor psychological and physical health.

Individuals exposed to or in contact with COVID-19 patients frequently have experienced heightened levels of anxiety, stress, and concern. In the early stage of the pandemic, the novel virus generated fear due to its unfamiliarity, leading to apprehensions about illness, severe health consequences, and potential mortality. In response, governments have implemented isolation and quarantine protocols for both uninfected individuals and those who tested positive. Nurses on the front lines must navigate the complexities of their professional duties amidst the uncertainty surrounding self-protection measures and treatment procedures for COVID-19 [11]. The escalating demands on the healthcare system are likely to exacerbate work-related stress and adversely impact job satisfaction. The health and well-being of nurses are particularly compromised under the strain of high work demands. The shortage of nursing staff combined with the surge in hospitalized patients during the COVID-19 pandemic has resulted in extended shifts and diminished rest periods for healthcare providers, particularly nurses.

This paper aims to assess work-related stress among nurses and examine the relationship between stress and job satisfaction at Prince Mohammad bin Abdelaziz Hospital in Madinah during the COVID-19 pandemic. This study seeks to identify relevant influencing factors to inform the development of interventions and strategies that enhance the management of stress experienced by frontline nurses during emergencies. This study offers essential insights for nursing leadership, facilitating a better understanding of the factors impacting nurses' performance and well-being during outbreaks and crises. It aims to generate effective solutions to mitigate stress associated with the increased demand for nursing services. While existing research predominantly focuses on aspects such as epidemiological testing, definitions, diagnostics, prevention protocols, and treatment related to the COVID-19 pandemic, there remains a notable gap in the literature concerning the psychological challenges, mental health, stress, and burnout experienced by healthcare providers during health crisis [12].

The study findings may enhance nursing senior managers' understanding of the impact of a pandemic on frontline nurses, thereby aiding the development of effective strategies to address traumatic stress before it leads to severe complications. Chronic job stress can adversely affect both the physical and mental health [8]. By identifying these risks, managers can be prompted to support frontline nurses through targeted training in stress management and coping strategies. Consequently, this research presents a valuable opportunity to refine efforts directed at frontline nursing staff and to encourage nurse managers to improve the work environment. A proactive response to the needs of employees, addressing work-related stressors, and fostering a supportive environment can contribute to maintaining employee well-being and preserving job satisfaction among frontline nurses.

MATERIALS AND METHODS

Study Design and Settings

The study employed a descriptive cross-sectional comparative design to assess levels of work stress and job satisfaction among nurses during the COVID-19

pandemic. The target population included nurses who provided care to COVID-19 patients and those who did not. The sample was obtained from nurses at a single hospital that handled both COVID-19 and non-COVID-19 cases. A convenience sampling method was used, and participants were invited to complete an online survey. All registered nurses working at Prince Mohammad Hospital were included in the study, except those involved in administrative duties or on leave during the survey.

The study was conducted at a secondary government hospital in Almadinah Almunawarah, Saudi Arabia. The hospital has a total bed capacity of 336 beds and employs 462 registered nurses. It includes outpatient clinics, inpatient units, and isolation units. The isolation unit consists of 59 beds, including a 12-bed isolation ICU and 27 negative pressure rooms. Of these, 20 rooms are designed to accommodate two patients each, while 7 are single rooms. The remaining inpatient units include 181 beds, covering critical care areas, the medical-surgical unit, pediatric unit, obstetrics-gynecology unit, and labor and delivery unit. Additionally, the hospital provides ambulatory services, hemodialysis, and emergency care.

Measurement Tools

Participants were invited to complete a structured questionnaire comprising three sections via an online platform. The first section collected sociodemographic data, including gender, age, marital status, years of work experience, education level, and job role. The second section utilized the Perceived Stress Scale (PSS), a widely recognized instrument developed in 1983 to assess individual stress levels.[13] The PSS is a 10-item Likert scale, with responses ranging from 1 (Never) to 5 (Very Often), yielding a total score between 0 and 40. A score of 27–40 indicates high perceived stress, 14–26 indicates moderate stress, and 0–13 indicates low stress. The third section was related to the Job Satisfaction Survey (JSS). The JSS is a 36-item facet scale designed to assess employee perceptions of the work environment. Each of the nine dimensions—pay, promotion, supervision, fringe benefits, contingent rewards, operating procedures, coworkers, the nature of the work, and communication—is measured by four items, with a total score derived from all items combined. The survey uses a six-point Likert scale ranging from "strongly disagree" to "strongly agree." Items are phrased both positively and negatively, with approximately half of the responses reverse-scored. The JSS has been widely validated for evaluating job satisfaction across various settings [14].

Data Collection and Procedures

The survey was designed using Google Forms, a widely used platform for creating and distributing online questionnaires. The nursing department facilitated the distribution of the survey link to all nurses within the hospital, ensuring broad accessibility and encouraging participation across different departments. Upon clicking the link, participants were first directed to a detailed consent form that outlined the study's purpose, procedures, potential risks, and benefits. Participants had to provide their informed consent by agreeing to the terms before accessing the survey.

The survey was administered in English, reflecting the professional language proficiency expected within the nursing staff. The estimated time for completion was between 15 to 20 minutes, allowing participants to thoroughly respond to each item without significant disruption to their duties. The survey was carefully structured to maintain the anonymity of the participants, with no personal identifiers or information that could link responses to individual nurses being collected. This approach ensured that all data remained confidential, fostering an environment where participants could provide honest and accurate responses. The ethical considerations surrounding participant privacy and data security were rigorously upheld throughout the study following standard research protocols.

Statistical Methods

For the data analysis, IBM SPSS Statistics software version 26 was utilized. Descriptive statistics were computed to summarize socio-demographic and work-related variables, including mean, median, standard deviation, range, and percentage. Inferential statistics were applied using an independent samples t-test to assess differences in work stress and job satisfaction levels between nurses who cared for COVID-19 patients and those who did not. A p-value of ≤ 0.05 was set as the threshold for statistical significance, indicating that any results meeting this criterion would be considered statistically significant.

RESULTS

Demographic Statistics

A total of 196 nurses participated in the survey, comprising 34 males (17.3%) and 162 females (82.7%). The age distribution of the participants revealed that 35 nurses (17.9%) were aged 20–30 years, 119 nurses (60.7%) were aged 31–40 years, 33 nurses (16.8%) were aged 41–50 years, and 9 nurses (4.6%) were over 50 years old. Most respondents were married (74.5%), with 118 females and 28 males in this category. Among the remaining participants, 21.9% were single (6 males and 37 females), 3.1% were divorced, and 0.5% were widowed, all of whom were female.

Regarding professional experience, 75% of the respondents had more than 6 years of experience in their field, while the remaining 25% had less than 6 years of experience. The respondents were distributed across various departments, with 30.6% working in outpatient services, 26% in General Wards, 21.9% in Operating Rooms, 15.3% in the Critical Care Unit (CCU), and 6.1% in the Emergency Room. Participant characteristics are detailed in Figure 1.

Statistics of Stress Level and Job Satisfaction

Of the 196 participants, 62.8% were working with COVID-19 patients, while the remaining 37.2% were not working with COVID–19 patients. More than 76% of the respondents reported moderate stress, 13.8% reported low stress, and only 9.7% mentioned high stress due to COVID-19. Among the 19 participants who reported high stress, married individuals constituted the

majority, with 13 married respondents experiencing high stress compared to 6 single respondents. This suggests a potential association between marital status and the perception of stress. Furthermore, of the 19 participants with high stress, 15 were engaged in the care of COVID-19 patients, whereas only 4 participants who did not work with COVID-19 patients reported high-stress levels. Additionally, a comparison based on living arrangements revealed that 12 respondents not living with their families reported high stress, compared to 7 respondents living with their families. This indicates that living situations may influence stress levels.

Regarding professional experience, those with more extensive experience reported higher stress levels, whereas those with less experience reported lower stress levels. This could reflect the increased burden and challenges faced by more experienced staff in managing high-stress situations or, conversely, the relative inexperience of less experienced staff in dealing with such pressures. Tables 1 and 2 provide detailed breakdowns of stress levels by work area and working conditions, offering further insight into the factors contributing to stress among healthcare professionals.

Female nurses who were not living with their families showed a high stress rate of 9.3%, which was consistent with those living with a family (9.1%). However, male nurses not living with their families exhibited higher stress (16.7%) than those living with their families (9.1%). This could indicate a more significant relative impact of living arrangements on males' stress levels. Refer to Table 3 for more details.

The statistical analysis yielded a mean Perceived Stress Scale (PSS) score of 19.923 with a standard deviation of 6.18. The median score was 21, and the skewness of -0.61 indicates a slightly negatively skewed distribution of PSS scores. A graphical examination of the PSS data confirmed an approximately normal, unimodal distribution. Similarly, the Job Satisfaction Score analysis revealed a mean of 128.51, a standard deviation of 21.92, and a median of 128. The close alignment of the mean and median, coupled with a slight positive skewness of 0.177, suggests that the Job Satisfaction scores are also approximately normally distributed.

The demographic analysis of survey participants prompted an investigation into whether significant differences in work stress levels existed between nurses who cared for COVID-19 patients and those who did not. To examine this, a two-sample t-test was conducted to determine if there was a difference in the mean PSS scores between these two groups. As shown in Table 4, the results revealed a statistically significant difference in PSS scores between nurses who dealt with COVID-19 patients and those who did not, $t(194) = 2.3$, $p = .022$. Specifically, the average PSS score for nurses who cared for COVID-19 patients ($M = 20.70$, $SD = 5.84$) was significantly higher than the average PSS score for those who did not care for COVID-19 patients ($M = 18.62$, $SD = 6.55$).

Furthermore, the analysis also revealed a strong negative correlation between PSS scores and most subscales of Job Satisfaction. Specifically, significant negative correlations were found between PSS and the following subscales: Nature of Work ($r = -0.381$, $p < 0.01$), Communication ($r = -0.543$, $p < 0.01$), Contingent Rewards ($r = -0.418$, $p < 0.01$), Coworkers ($r = -0.507$, $p < 0.01$), Fringe Benefits ($r = -0.401$, $p < 0.01$), Operating Conditions ($r = -0.473$, $p < 0.01$), Pay ($r = -0.472$, $p < 0.01$), and Supervision ($r = -0.367$, $p < 0.01$). However, the Promotion subscale ($r = -0.077$, $p < 0.01$) did not significantly correlate with PSS.

Factor Analysis of the PSS Score Construct

Factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity ($p < 0.05$). The results indicated a KMO value of 0.876 and a Bartlett's Test of Sphericity result of 0.000, which is below the significance level of $\alpha = 0.05$. These findings support the appropriateness of factor analysis for this dataset. The analysis identified two factors that together accounted for 68.53% of the cumulative variance in the model.

This analysis suggests that the PSS score construct captured participants' responses across two distinct factors. Specifically, questions 1, 2, 3, 6, 9, and 10 assessed responses related to one dimension, while questions 4, 5, 7, and 8 pertaining to a second dimension. Upon further examination, the first set of questions (Factor 1) was primarily associated with negative emotions, lack of control, stress, and anger. In contrast, the second set of questions (Factor 2) related more to controllability, confidence, and a sense of achievement. Consequently, the two factors identified in the PSS score construct can be defined as outlined in *supplementary data 1*.

Factor Analysis of the Job Satisfaction Construct

Factor analysis of the job satisfaction construct was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity ($p < 0.05$). The results showed a KMO value of 0.818 and a Bartlett's Test of Sphericity result of 0.000, which is below the significance level of $\alpha = 0.05$. These findings confirm the appropriateness of applying factor analysis to this dataset. The analysis identified nine factors that together accounted for 64.902% of the cumulative variance in the model. These nine factors were consistent with the nine subscales of the original Job Satisfaction construct.

The analysis revealed that three variables—Question 5 and Question 32, related to Contingent Rewards, and Question 24, related to Operating Conditions—were cross-loaded on more than two factors. Rather than removing these items from the construct, they were retained due to their relevance. Each of these items was assigned to their respective factors based on their relationships with other constructs within their specific subscales, details of which can be obtained from *supplementary data 2*.

The analysis revealed that contrary to the assumptions made in the original construct, not all variables were aligned with their respective subscale constructs. The only exception was the "Supervisor" subscale, where all four questions remained within their intended construct. For the subscales "Nature of Work," "Operating

Conditions," and "Coworkers," three questions were correctly grouped within their respective constructs. The other subscales had at least two questions that remained aligned with their intended constructs.

Table 1: Work Area with Respondents' Stress Level

Working Area	High Stress	Moderate Stress	Low Stress	Total
Critical Care Units	5	20	5	30
Emergency Room	2	10	0	12
General Wards	2	39	10	51
Operating Room	5	37	1	43
Out - Patients Services	5	44	11	60
Total	19	150	27	196

Table 2: Working Condition with Stress Level of Respondents

Working with COVID-19 Patients	High Stress	Moderate Stress	Low Stress	Total
No	12	87	20	119
Yes	7	63	7	77
Total	19	150	27	196

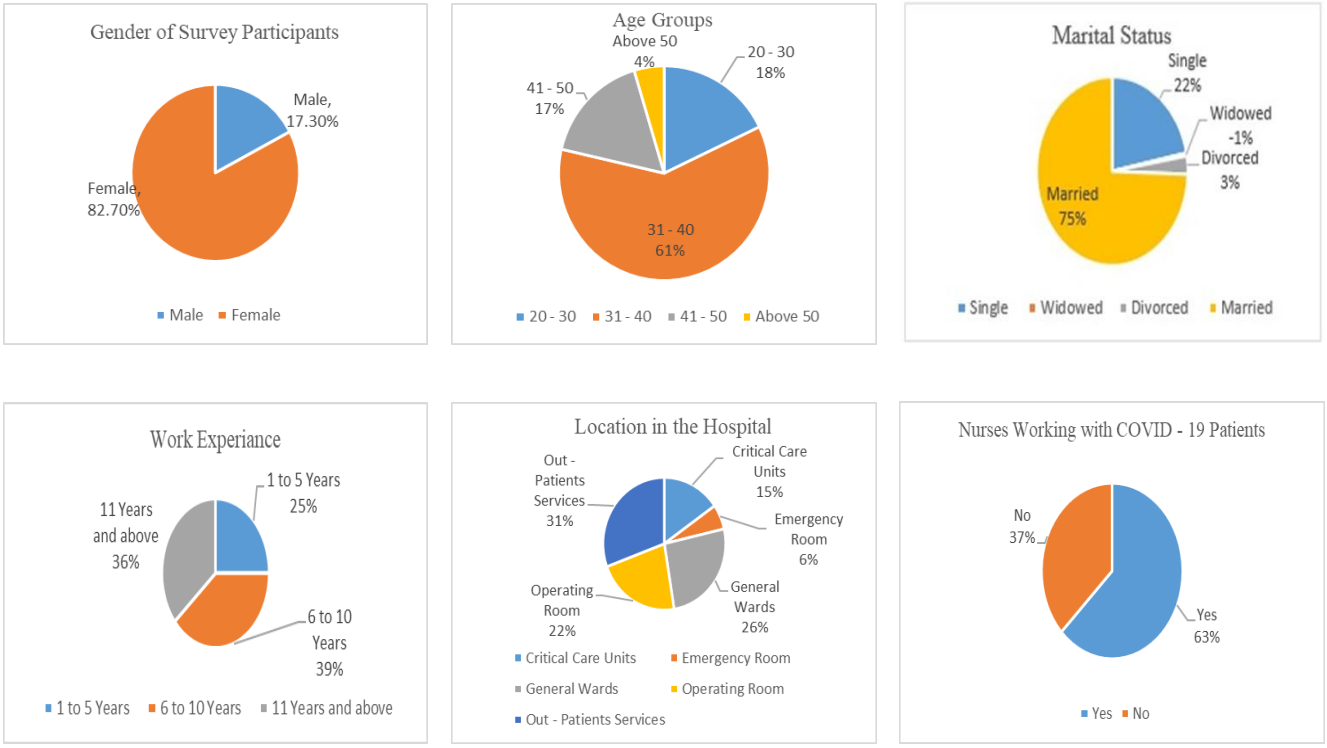
Table 3: Living Condition with Stress Level of Respondents

Gender	Living with Family	High Stress	Low Stress	Moderate Stress	Total
Females	No	10	19	78	107
	Yes	5	6	44	55
Males	No	2	1	9	12
	Yes	2	1	19	22
Total		19	27	150	196

Table 4: Group Statistics of the Two Sample Means

	Working with COVID-19 Patients	n (196)	Mean	Std. Deviation	*p*-value
PSS Score	Yes	123	20.70	5.841	*.022*
	No	73	18.62	6.546	

Figure 1. Participants characteristics



DISCUSSION

The correlation analysis revealed a statistically significant negative relationship between the Perceived Stress Scale (PSS) score and job satisfaction ($r = -0.612$, $p < 0.01$). This strong negative correlation suggests that individuals who experience higher job satisfaction generally report lower levels of perceived stress, as measured by the PSS. On the contrary, individuals with lower job satisfaction tend to report higher levels of perceived stress. These findings highlight an inverse relationship between stress levels and job satisfaction, indicating that reducing stress could potentially enhance employee job satisfaction.

Further examination of the job satisfaction sub-scales provided additional insights into specific factors influencing job satisfaction. Notably, perceptions of fairness in promotion opportunities were positively correlated with job satisfaction levels. This suggests that when employees perceive promotional opportunities as fair and attainable, their overall job satisfaction will likely increase. In contrast, a lack of perceived fairness in promotions can negatively impact job satisfaction, potentially leading to lower morale and higher turnover rates. The analysis also uncovered strong positive correlations between job satisfaction and factors related to coworker relationships and communication within the workplace. This finding underscores the importance of a supportive work environment, where positive interactions and open communication channels among colleagues significantly enhance overall job satisfaction. These interpersonal relationships are crucial as they promote a sense of belonging and teamwork, which are vital for maintaining a high level of job satisfaction.

Moreover, financial aspects such as pay, fringe benefits, and contingent rewards were found to be major contributors to job satisfaction, as evidenced by their strong correlation coefficients. This implies that adequate compensation, along with additional benefits and rewards contingent on performance, play a critical role in determining employee satisfaction. Employees who feel adequately compensated and rewarded for their work are more likely to experience higher job satisfaction levels.

Additionally, the quality of the supervisory relationship emerged as a significant factor affecting job satisfaction. Good relationships with supervisors, characterized by support, guidance, and effective communication, were associated with higher levels of job satisfaction. On the other hand, respondents who reported low scores on the supervision sub-scale—indicative of poor supervisory relationships—tended to exhibit lower job satisfaction. This finding suggests that managerial practices prioritizing positive supervisor-employee relationships could significantly enhance job satisfaction. Overall, these findings emphasize the multifaceted nature of job satisfaction, highlighting the importance of both interpersonal relationships and material rewards in promoting a positive work environment. Addressing these factors may help organizations improve employee satisfaction, reduce stress, and enhance overall productivity.

Numerous studies have demonstrated the adverse effects of personal stress on job satisfaction among healthcare workers, particularly in high-stress environments such as those experienced during the COVID-19 pandemic [15,8,16,17,18]. This study's findings are consistent with the existing literature, confirming that personal stress can detrimentally impact work performance, leading to decreased job satisfaction among healthcare professionals. Frontline nurses continue to experience psychological impacts even after the crisis period, such as during the COVID-19 pandemic, has subsided [19]. For example, research found that online psychological crisis intervention programs helped reduce anxiety, depression, and somatic symptoms among frontline nurses, but psychological effects remained notable [20]. Sustained psychological distress and burnout among nurses after intense crisis periods such as COVID-19 indicated long-term effects on mental health [21].

This study revealed that nurses dealing with COVID-19 patients could experience low-stress levels if they reported high job satisfaction. However, some nurses not involved with COVID-19 patients also exhibited high-stress scores, suggesting that the pandemic may not be the only significant stressor. Other stress factors, such as relocation and separation from family, contribute significantly to stress levels [22], as most nurses in Saudi Arabia are foreigners. The absence of family support was linked to greater psychological distress compared to nurses who resided with family members and received emotional support. Evidence showed that nurses, particularly, are at a higher risk of work-related stress than other healthcare professionals [23].

In conclusion, COVID-19 represents a major global public health challenge. This study underscores the need for incentives and support for nurses during such crises. Significant statistical differences were observed between nurses who treated COVID-19 patients and those who did not. Correlation analysis demonstrated a strong negative relationship between work stress and job satisfaction, indicating that nurses with higher job satisfaction experienced lower levels of perceived stress. In comparison, those with lower job satisfaction reported higher stress levels. To address work-related stress during the COVID-19 pandemic, nurse leaders must focus on enhancing job satisfaction. Additionally, the involvement of nurse managers in guiding and training nurses to manage their psychological well-being is essential for reducing stress.

Limitations and Strengths

Several limitations of this study should be noted. First, the research focused merely on nurses at Prince Mohammad Hospital in the Madinah region, limiting the generalizability of the findings to all nurses in Saudi Arabia. Replicating this study in other hospitals within Madinah or across Saudi Arabia would provide a broader perspective. Second, the study assessed stress levels only one year after the onset of the COVID-19 pandemic, which may need to fully capture the immediate impact of the pandemic or provide a comprehensive understanding of stress levels. Lastly, other influencing factors may affect the study's

outcomes. Therefore, future research with a larger sample size from different hospitals is recommended to address some of these limitations. However, this cross-sectional study has several advantages, including data collected on multiple variables simultaneously, which helps understand relationships between different factors. The factor analysis implemented in this study validated the constructs for measuring both PSS score and job satisfaction, confirming that the survey instruments used are reliable and valid for assessing these psychological and workplace constructs. This robust internal consistency across multiple dimensions further reinforces the utility of these tools in research and organizational settings.

Ethical Statement

Participants were thoroughly informed about the study's objectives, and their consent was implied by their decision to proceed with the survey. To maintain ethical standards, strict measures were taken to ensure the confidentiality of the data and to protect the anonymity of the nurses who voluntarily participated in the study.

Ethical Approval Statement

The study was approved by the Institutional Review Board (IRB) under approval number MAD-21-059648-31843,
granted by the hospital administration within the Ministry of National Guard–Health Affairs.

Supplementary data

Supplementary data are submitted to the Journal website.

Conflict of Interest:

No conflict of interest is to be declared.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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