

Perceived stress and coping strategies among ICU nurses in government tertiary hospitals in Saudi Arabia: a cross-sectional study

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BACKGROUND: No study has examined the stress level and coping strategies among critical care nurses in Saudi Arabia.

OBJECTIVES: Examine perceived stress and coping behaviors among nurses in intensive care units in Saudi Arabia, and the influence of coping mechanisms on stress.

DESIGN: Descriptive cross-sectional.

SETTING: Two tertiary training hospitals in Riyadh, Saudi Arabia.

SUBJECTS AND METHODS: Nurses from cardiac, surgery and pediatric intensive care units responded to an online survey. Perceived Stress Scale-10 (PSS-10) and the Brief COPE Inventory were used as primary research tools. Multivariate methods were used to analyze the data.

MAIN OUTCOME MEASURES: Stress levels, coping strategies, and associated factors.

SAMPLE SIZE: 154 nurses.

RESULTS: The majority of the respondents reported a moderate level of stress in the past month (87.0%). Mean (SD) scores for nurses working in the cardiac ICU indicated significantly higher levels of stress compared to surgical ICU (18.18 [3.88] vs 6.17 [3.21], $P=.025$). Belief in religion was the most common coping behavior while the use of substances was the lowest (mean scores [SD] 6.70 [1.72] vs 2.22 [0.81]). In the multivariate analysis, behavioral disengagement ($P=.016$) and self-blame ($P<.001$) intensified the PSS-10 score, whereas acceptance ($P=.048$) reduced the PSS-10 score.

CONCLUSION: The additional knowledge that behavioral disengagement and blaming aggravate stress can serve as the basis in formulating work-related stress reduction strategies among nurses caring for critical patients.

LIMITATIONS: The use of self-reports, convenience sampling, and selected demographic factors may have limited the scope and generalizability of the findings and induced social desirability bias.

CONFLICT OF INTEREST: None.

Stress is defined as any discomfort perceived by the individual that is stimulated by activities perceived as too intense and frequent, which exceed a person's coping capabilities and resources to manage. Successful management or minimization of stress depends on the individual's ability to identify and adapt using coping strategies.¹ The purpose of coping is to maintain psychological health and inhibit manifestations of stress-associated symptoms. Badger defined coping as the person's response to a stressful situation perceived as exceeding to the person's resources.²

Studies have shown that healthcare professionals (HCPs) are more susceptible to psychological distress compared to others. Poor psychosocial work environment, poor social support, and difficulties with uncooperative patients were associated to burnout among mental health nurses in Jordan.³ ICU nurses experience more stress than nurses in other units.⁴ Other HCPs also suffer from stress. Burnout and depressive symptoms, which elevates the risk of depression, were common among medical students.⁵ Among resident physicians in Saudi Arabia, Hamed and colleagues reported a very high degree of burnout, which affects well-being and patient safety.⁶

Badger reported that ICU nurses use a variety of coping strategies to deal with stress. These strategies have been categorized as cognitive, affective, and behavioral. Cognitive strategies include learning from experience, verbalizing to others, and having group sessions while behavior strategies include avoidance. Affective coping strategies include having faith and mutual support.² However, Hampel and Petermann categorized coping into adaptive (effective) and maladaptive (ineffective) coping strategies.⁷ Adaptive behavior includes talking it out, whereas maladaptive behaviors include avoidance, withdrawal, coming in late, calling in sick, and denial. Adaptive coping strategies are significantly associated with less perceived stress.^{1,2} Maladaptive behavior includes self-blame, rumination, escape, or avoidance, which is associated with negative health consequences.^{1,7}

Baigent and Baiget recommended that resolving burnout is a shared responsibility wherein workplace improvement should be integrated with the individual's own strategies.⁸ Improving the workplace environment and developing culturally relevant resilience building programs for HCPs in Arab countries is one of the strategic steps in stress reduction.⁹

Internal (personal) and external factors play a crucial role in determining coping strategies and the consequences of stress. Personal factors include beliefs, values, age, and experience, while external factors in-

clude financial and social support.^{1,10,11} Other studies have pointed out that establishing an environment that is healthy and well-managed can potentially resolve stress and enhance work performance.

Although perceived stress and coping behaviors among ICU nurses has been examined extensively in the literature, few were conducted in Saudi Arabia. Therefore, the purpose of this study was to examine perceived stress and coping behaviors among ICU nurses in Saudi Arabia. Specifically, this study aims to (1) assess the perceived stress among ICU nurses; (2) identify coping behaviors used to deal with stress; and (3) examine the association between perceived stress and the respondents' demographics.

SUBJECTS AND METHODS

We conducted a cross-sectional survey in two of the major tertiary government hospitals in Saudi Arabia. Cardiac, surgery and pediatric ICUs were selected because they represent the most common types of ICUs in the country. Convenience sampling was used to select survey respondents who had to be practicing ICU nurses with at least 6 months experience. The sample size was calculated using the online sample size calculator Survey Monkey (<https://www.surveymonkey.com/mp/sample-size-calculator/>). The population size was 300 and the confidence level and margin of error were 95% and 5%, respectively. The calculated size was 167.

After gaining ethical clearance and approval to conduct the study, an official request was sent to the head nurses. The nurses were briefed on the purpose, significance, inclusion criteria, and provided a web address linked to the online survey (Qualtrics survey). Internet-based surveys secure participant anonymity and increase recruitment of hard-to-reach samples.¹² ICU nurses who met the inclusion criteria were requested to complete the survey questionnaire. Bi-weekly mails to the facilitators and head nurses were sent for data collection. Data collection was performed from 10 December 2017 to 25 February 2018. Demographic characteristics included age, gender, highest degree, years of ICU experience, type of ICU, hospital name, and time of most commonly worked shift.

The English version of the tools was used for data collection since the working environment is culturally diverse and English is both a requirement and common language. The Perceived Stress Scale-10 (PSS-10) is a 10-item self-report scale which examines the individual stress levels.¹³ The respondents are asked to rate their feelings and thoughts during the past month. Each item was answered by the nurses on a five-point scale ranging from never (0) to very often (4). Therefore,

each participant's score may range from 0 to 40. Higher scores indicate higher perceived stress. PSS scores between 0 and 13 indicate low stress; 14-26 are moderate stress; and 27 or above are severe stress. There were four items that used reverse scoring (items 4, 5, 7, 8). Convergent validity was obtained through correlational analysis of the PSS with measures on anxiety, depression, helplessness, and disease activity.¹³ The PSS-10 has an internal consistency of 0.78.¹⁵

The Brief COPE Inventory (BCOPE) contains 28 items and has 14 subscales (2 items per subscale) that captured various coping behaviors.¹⁶ Seven subscales (2 items each) containing a total of 14 items examined the effective coping strategies, which included active coping, instrumental support, and acceptance. The other seven subscales examined ineffective coping behaviors, which included self-distraction, denial, behavioral disengagement, and self-blame. Each item of this instrument was answered by the respondents using a 4-point Likert scale ranging from 1 (I have not been doing this at all) to 4 (I have been doing this a lot). Total scores for each subscale were calculated, and higher total subscale scores indicated greater perceived use of a corresponding coping behavior. The BCOPE scale has been used widely in examining coping behaviors related to traumatic stressors. A previous report showed Cronbach's alpha values from 0.50 to 0.90 among domains of BCOPE.¹⁷ A pilot study was done with 20 nurses to test the reliability of the tool. Pre-testing resulted to Cronbach's alpha value of 0.84 for PSS-10 and 0.80 for BCOPE Inventory which indicated that the tools have good internal consistency.

Ethical clearance and approval for the conduct of the study were obtained from the Institutional Review Board of King Saud University Medical City with the Reference Number 17/0012 IRB and Project No.E-17-2791. Informed consent explaining the rights of the respondents to withdraw and refuse, the purpose of the study, the role of the respondents was sent together with the questionnaire to the respondents before starting the study. Freedom of participation was ensured for all nurses. Moreover, confidentiality of data and anonymity of the respondents were secured by instructing respondents to register and login using their employee ID number and password.

Data analysis was done using IBM SPSS version 23 (IBM, Armonk, NY). Mean, standard deviation, frequency count and percentages were calculated for the perceived stress. Mean and standard deviation were done to analyze the coping behavior of the respondents. The *t* test, Pearson product moment correlation, and one-way analysis of variance with Tukey HSD test as

post hoc were carried out to examine the association between perceived stress and demographic characteristics. A multiple regression analysis was performed to examine the influence of the coping behaviors on the perceived stress of the respondents. A *P* value less than .05 was considered significant.

RESULTS

Almost 300 ICU nurses were eligible to participate, but only 154 respondents gave complete and valid answers. Incomplete answers or those with missing data were excluded as samples. Hence, the return rate was 91.1%. The mean (SD) age of the respondents was 35.5 (7.0) years (**Table 1**). Most (*n*=148) were female (96.1%). About equal proportions had a Diploma in Nursing and Baccalaureate in Nursing (*n*=77, 50.0%). Most had 6 months to 10 years of experience. Almost equal proportion of the respondents were employed in Hospital A and B. The majority of the nurses were working in a cardiac ICU.

Table 1. Demographic characteristics of intensive care unit nurses in government tertiary hospitals in Saudi Arabia (*n*=154).

| Demographic variables | n (%) |
|----------------------------------|---------------------------|
| Age (years) | 35.5 7.0 (range 20-55) |
| Gender | |
| Male | 6 (3.9) |
| Female | 148 (96.1) |
| Highest educational level | |
| Diploma Nursing | 76 (49.4) |
| Baccalaureate Nursing | 77 (50.0) |
| Years of ICU experience | |
| 6 months-5 years | 44 (28.6) |
| 6-10 years | 51 (33.1) |
| 11-15 years | 37 (24.0) |
| >15 years | 22 (14.3) |
| Type of ICU | |
| Surgical | 30 (19.5) |
| Cardiac | 104 (67.5) |
| Pediatric | 20 (13.0) |
| Hospital | |
| Hospital A | 80 (51.9) |
| Hospital B | 74 (48.1) |

The mean score of the respondents on the PSS-10 was 17.71 (SD=3.76, range=9.00-28.00) (**Table 2**). Majority of the respondents reported a moderate level of stress experienced in the last month with only a few reporting a low level of stress. Only two of the ICU nurses reported experiencing a high level of stress in the last month. From the 14 dimensions of the BCOPE, religion was rated as the highest coping behavior followed by positive reframing, active coping, acceptance, use of emotional support, use of instrumental support, and planning. The lowest rated dimensions were substance abuse, self-blame, behavioral disengagement, denial, and humor.

The perceived stress of the respondents varied significantly between types of ICU (**Table 3**). The Tukey HSD test revealed that nurses working in cardiac ICUs reported significantly higher levels of stress compared with nurses working in surgical ICUs. No significant as-

sociations were observed between the perceived stress and the other demographic characteristics.

The multiple regression model with all 14 predictor variables was statistically significant ($F=3.67$, $P<.001$), and accounted for 19.6% of the variance in the nurses' perceived stress ($R^2=0.270$; adjusted $R^2=0.196$) (**Table 4**). Behavioral disengagement, acceptance, and self-blame were significant factors influencing perceived stress. Specifically, an increase of one in the behavioral disengagement and self-blame scores corresponded to 0.48 ($P=.016$, 95% CI=0.09, 0.87) and 0.88 ($P<.001$, 95% CI=0.40, 1.36) point increase, respectively, in the PSS-10 score. Moreover, a point increase in the acceptance score corresponded to 0.56 ($P=.048$, 95% CI=-1.12, -0.01) decrease in the PSS-10 score.

DISCUSSION

The study revealed that the majority of the respondents

Table 2. Perceived stress and coping behaviors among intensive care unit nurses in government tertiary hospitals in Saudi Arabia.

| | STRESS | | | |
|-----------------------------|--------|------|---------|---------|
| | n | % | | |
| Low stress | 18 | 11.7 | | |
| Moderate stress | 134 | 87.0 | | |
| Severe stress | 2 | 1.3 | | |
| | Mean | SD | Minimum | Maximum |
| Overall Perceived stress | 17.71 | 3.76 | 9.00 | 28.00 |
| | COPING | | | |
| | Mean | SD | Minimum | Maximum |
| Self-distraction | 5.14 | 1.61 | 2.00 | 8.00 |
| Active coping | 5.94 | 1.56 | 2.00 | 8.00 |
| Denial | 4.32 | 1.38 | 2.00 | 8.00 |
| Substance use | 2.22 | 0.81 | 2.00 | 7.00 |
| Use of emotional support | 5.69 | 1.62 | 2.00 | 8.00 |
| Use of instrumental support | 5.63 | 1.46 | 2.00 | 8.00 |
| Behavioral disengagement | 4.01 | 1.91 | 2.00 | 8.00 |
| Venting | 4.60 | 1.40 | 2.00 | 8.00 |
| Positive reframing | 5.97 | 1.74 | 2.00 | 8.00 |
| Planning | 5.59 | 1.54 | 2.00 | 8.00 |
| Humor | 4.35 | 1.80 | 2.00 | 8.00 |
| Acceptance | 5.75 | 1.70 | 2.00 | 8.00 |
| Religion | 6.70 | 1.72 | 2.00 | 8.00 |
| Self-blame | 3.87 | 1.38 | 2.00 | 7.00 |

Table 3. Association between perceived stress and demographic characteristics.

| Variable | Mean | SD | Statistical test | P value |
|----------------------------------|-------|------|------------------|-------------|
| Age | | | r=-0.15 | .061 |
| Gender | | | | |
| Male | 16.33 | 6.06 | t=-0.57 | .590 |
| Female | 17.76 | 3.66 | | |
| Highest educational level | | | | |
| Diploma Nursing | 17.63 | 3.09 | t=-0.25 | .804 |
| Baccalaureate Nursing | 17.78 | 4.33 | | |
| Years of ICU experience | | | | |
| 6 months-5 years | 17.86 | 3.51 | F=0.25 | .861 |
| 6-10 years | 17.94 | 4.34 | | |
| 11-15 years | 17.49 | 3.45 | | |
| > 15 years | 17.23 | 3.44 | | |
| Type of ICU^a | | | | |
| Surgical | 16.17 | 3.21 | F=3.48 | .033 |
| Cardiac | 18.18 | 3.88 | | |
| Pediatric | 17.55 | 3.36 | | |
| Hospital | | | | |
| Hospital A | 17.44 | 3.34 | t=-0.92 | .359 |
| Hospital B | 18.00 | 4.16 | | |

^aSurgical versus cardiac ICU (P=.025) (Tukey post-hoc comparison)

experienced a moderate level of stress during the past month. The mean score of the respondents in the PSS1-0 was below the midpoint of the possible score, indicating a low to moderate level of stress. The perceived level stress of the respondents in this study is lower compared to those reported in earlier studies. For example, a survey conducted among nurses in Jordan reported that the mean score of ICU/CCU nurses in the PSS-10 was 22.62 (SD=4.31).¹⁸ Another study conducted in the Midwest region of the United States reported a mean score of 21.76 (SD=3.85) among critical care nurses.¹⁹ In contrast, the present findings are higher than the perceived stress of ICU nurses in France, with reported PSS-10 mean of 14.4 (SD=6.8).²⁰ Several studies have pointed out that ICUs/CCUs are one of the most stressful clinical areas. Critical care nurses often experience stress caused by fear of committing errors

in highly technical and complicated nursing interventions, inadequate training on the use of technology in critical care settings, interaction with patients with complicated health conditions, ethical dilemmas in relation with end-of-life care, and dealing with families of dying patients.^{19,21} Administrative issues, such as shortages in the nursing workforce, inadequate support from nursing supervisors, low salary, and high levels of expectations are also reported as stressors among ICU nurses.²⁰

Our findings further reveal the association between the perceived stress and the type of ICU. The multiple comparisons revealed that nurses working in the surgical ICU had significantly lower stress compared with nurses working in the cardiac ICU. This finding is in contrast with a study conducted in Iran. According to that study, working in the surgical ICU was associated with higher levels of stress.²² However, since few studies have compared the stress experienced by nurses working in different types of critical care settings, further comparison is not possible. The higher level of stress among cardiac ICU nurses in this study may be related to several factors, such as the higher number of patients and workload in these units compared with others. Similar findings showed that these two factors also contribute to occupational stress among outpatient department nurses working in Saudi Arabia.²³ Heavy workloads and patient care were also stress factors among Saudi student nurses.²⁴ The sources and factors of occupational stress among nurses in Saudi Arabia vary significantly with the working environment.²⁵ A study indicated that Saudi nurses showed low satisfaction with their 'quality of nurse work life' factor with high intent to leave the organization.²⁶ Saudi nurses would be more satisfied with their jobs if they had greater access to educational opportunities, if there was a reduction in workload, and if perceived favoritism in the workplace was addressed.²⁷ Moreover, in our study, the cardiac ICU is distinct from surgery and pediatric since specific and advance interventions are performed which require specialized knowledge and skills. This added further responsibilities to the ICU nurses. This assumption, however, needs to be investigated in future studies.

The ICU nurses in our survey demonstrated more effective than ineffective coping behaviors, which was similar to previous studies conducted in USA and Ghana.^{2,28} While different coping behaviors were reported by the ICU nurses in this study, religion was rated as the most frequent coping mechanism especially during stressful situations. Religion and other spiritual interventions have been reported by several studies as effective means in coping with physical and mental stresses.^{29,30} Religion offers resources that foster coping with stress-

Table 4. Influence of different coping behaviors on perceived stress.

| Predictor variables | β | SE-b | Beta | t | P value | 95% CI | |
|-----------------------------|---------|------|-------|-------|-----------------|--------|-------|
| | | | | | | Lower | Upper |
| Self-distraction | 0.22 | 0.24 | 0.09 | 0.90 | .372 | -0.26 | 0.69 |
| Active coping | -0.25 | 0.35 | -0.10 | -0.73 | .469 | -0.93 | 0.43 |
| Denial | 0.66 | 0.39 | 0.25 | 1.72 | .087 | -0.10 | 1.43 |
| Substance use | -0.78 | 0.42 | -0.17 | -1.84 | .068 | -1.62 | 0.06 |
| Use of emotional support | -0.42 | 0.25 | -0.18 | -1.66 | .100 | -0.92 | 0.08 |
| Use of instrumental support | 0.11 | 0.34 | 0.04 | 0.32 | .753 | -0.57 | 0.78 |
| Behavioral disengagement | 0.48 | 0.20 | 0.25 | 2.45 | .016 | 0.09 | 0.87 |
| Venting | 0.11 | 0.30 | 0.04 | 0.37 | .713 | -0.48 | 0.70 |
| Positive reframing | 0.28 | 0.32 | 0.13 | 0.87 | .385 | -0.35 | 0.90 |
| Planning | 0.21 | 0.32 | 0.09 | 0.65 | .517 | -0.42 | 0.84 |
| Humor | -0.34 | 0.27 | -0.16 | -1.25 | .212 | -0.87 | 0.20 |
| Acceptance | -0.56 | 0.28 | -0.25 | -1.99 | .048 | -1.12 | -0.01 |
| Religion | -0.16 | 0.25 | -0.08 | -0.66 | .513 | -0.65 | 0.33 |
| Self-blame | 0.88 | 0.24 | 0.32 | 3.65 | <.001 | 0.40 | 1.36 |

Perceived stress was the dependent variable in the multiple linear regression. β is the unstandardized coefficients; SE-b is the Standard error. $R^2=0.270$; Adjusted $R^2=0.196$.

ful events and supports positive emotions and thinking over the detrimental impacts of stress.³¹ The religious context of the society in Saudi Arabia, which is considered one of the most religious places in the world, may have offered relief, support, and strength to the respondents during difficult times.²⁹ Several studies have noted that religion and a healthy spiritual climate can help improve the perception of nurses towards their working environment in Saudi Arabia. Religion was reported as a significant factor supporting the perceived job satisfaction among nurses in the country. Alotaibi et al suggested that health care facilities in Saudi Arabia should establish a spiritual climate as this is known to impact the perceptions of Saudi nurses.²⁷ Moreover, Cruz et al recommended the creation of safe places where both Saudi and non-Saudi nurses can freely express their spirituality in their working environment.³⁰

Furthermore, three of the 14 coping behaviors were shown to influence the level of stress of the ICU nurses. Specifically, behavioral disengagement and self-blame influenced the level of stress. This finding means that more frequent use of these two coping behaviors result in a higher level of stress. On the other hand, using acceptance is a positive coping strategy whereby accept-

ing clinical challenges can reduce stress levels. Similar findings were reported by a previous study. According to McMeekin et al, denial, self-distraction, self-blame, and behavioral disengagement predict the severity of symptoms of posttraumatic stress among ICU nurses.⁴ However, negative coping behaviors showed greater effects than positive coping. Similar findings were also reported in the study of Muller and Spitz, where acceptance and self-blame was negatively and positively associated with stress, respectively.³² Behavioral disengagement, which was characterized by disengaging from the stressful situation and emotions that go along side with the stress, causes lack of control during stressful events, and lack of will to confront the stressor, which can further lead to poorer wellbeing.³³ Self-blame was considered an avoidance and escape coping mechanism, which promotes helplessness during a stressful situation. It also leads to self-criticism during stress, which is not a conducive coping mechanism during stressful events.³⁴ Acceptance, on the other hand, creates control over difficult circumstances that make one feel helpless. It also reduces the distress of negative emotions.³⁵ Critical care nurses are confronted with a lot of difficult situations every day, such as dying patients.

Accepting that there are situations that are beyond their control, viewing change as a natural phenomenon, and responding to uncontrollable situations in a way that aligns closely to their values can be liberating to nurses thereby reducing stress.

In conclusion, the perceived stress level of ICU nurses was moderate, and was mostly aggravated by blaming and behavioral disengagement and relieved by beliefs and acceptance. The area of clinical practice in ICU was associated with the perception of stress. These findings can serve as a basis in creating a health working environment wherein factors contributing to work-related stress are reduced and coping strategies are enhanced. Improvement in the environment can be initiated by nurse administrators by formulating policies and procedures. Nurse educators can develop a plan that will enhance nurse awareness of strategies for stress reduction and coping behaviors.

Despite the valuable contributions of this study, several limitations are acknowledged. First, self reporting may have introduced some degree of social desirability bias; however, appropriate measures were carried out to control for the effect. Second, the convenience sam-

pling technique may have lead to selection bias. Hence, generalization of the results to other units in the country may not be possible. Third, nationality of the nurses was not included as a variable in the study. Differences in culture, as well as being away from home (for expatriate nurses), may have impacted stress levels and coping behaviors. Fourth, data collection through an online survey may limits the number of samples and the generalization of the results since participants are limited to those with enthusiasm to voluntarily participate. Future studies should consider this factor. Fifth, translating and exploring stress and coping behaviors using an Arabic version can help decipher several variables like the emotional reactivity in PSS-10 and others. This will provide deeper insights among the Saudi nurses. Nonetheless, the present findings lay the groundwork for further studies on these issues in this part of the world.

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