



Perceived Stress and Coping Strategies among ICU Nurses: A Systematized Review

Faisal Alnahdi*

Advanced Nursing Science - Acute and Critical Care, Cardiac Surgery ICU Nurse, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia

*Corresponding Author: Faisal Alnahdi, Advanced Nursing Science - Acute and Critical Care, Cardiac Surgery ICU Nurse, King Faisal Specialist Hospital & Research Center, Riyadh, Saudi Arabia; Email: inahdy@yahoo.com

Received date: 03 August, 2024, Manuscript No. JNPC-24-144373

Editor assigned date: 05 August, 2024, PreQC No. JNPC-24-144373 (PQ);

Reviewed date: 20 August, 2024, QC No. JNPC-24-144373;

Revised date: 28 August, 2024, Manuscript No. JNPC-24-144373 (R);

Published date: 05 September, 2024, DOI: 10.4172/2573-4571.1000067.

Abstract

The complexity and urgency of Intensive Care Unit (ICU) nursing disproportionately stress nurses as they apply limited resources across competing demands. Various non-evidence-based coping strategies are used to reduce this stress.

Aim: This study synthesizes findings from primary research on coping strategies ICU nurses use to reduce perceived stress, addressing the question: "What coping strategies do ICU nurses use to reduce perceived stress?"

Method: A systematized literature review identified primary research articles from MEDLINE, PsycInfo, and CINAHL databases via Ovid and EBSCOhost.

Results: Screening identified 18 articles, with six deemed relevant: one qualitative study, one randomized controlled trial, three cross-sectional studies, and one mixed-methods study, one randomized controlled trial, three cross-sectional studies, and one mixed-methods study. ICU nurses employed multiple negative and positive coping strategies. Effective strategies included humor, socialization, social support, leaving work on time, spirituality and avoidance.

Conclusion: These coping strategies can be recommended for ICU nurses managing stress. Further randomized controlled trials and systematic reviews are needed to generate high-level evidence supporting practice and policy changes to integrate these strategies.

Keywords: Intensive Care Unit (ICU); Nurses; Stress; Coping

Introduction

The delivery of nursing care in the Intensive Care Unit (ICU) is difficult and complex since multiple healthcare professionals must collaborate continually to deliver critical care to patients [1]. Stress occurs among ICU nurses when the demands of their work surpass their abilities and resources [2]. The sensitive nature of nursing services in the ICU makes working in the environment stressful [3]. ICU nurses may become weak and stressed by the complexities of

their workplace to the extent of causing medical errors. The high level of responsibility in the ICU makes the nurses working there anxious, tense and stressed. Frequent disruptions, inappropriate patient behaviors, low social support and uncondusive workplace environments are some of the risk factors for stress among ICU nurses [1]. The ICU work environment is disproportionately characterized by high levels of stress. The workload and number of patients in a particular ICU determine the level of stress among the nurses working there [4]. The level of stress also depends on the type of ICU. For instance, some research suggests that neonatal ICUs have lower stress levels compared to cardiac and surgical ICUs.

Globally, ICU nurses are disproportionately stressed. In Saudi Arabia, more than 80% of ICU nurses report moderate levels of stress [4]. In Iranian hospitals, the prevalence of secondary traumatic stress among ICU nurses is estimated to be 96% [3]. A study conducted in ICUs of a healthcare facility in Srinagar reported high levels of stress in 54% of the nurses working there, Another 42% had moderate levels of stress, thus 96% of the ICU nurses in the facility were stressed. Another study conducted among ICU workers including nurses in multiple centers in Australia reported high levels of stress in 45% of nurses and medium levels of stress in 51% of nurses, implying that 96% of the ICU nurses were stressed [5]. Therefore, high and moderate levels of stress are prevalent among ICU nurses in various parts of the world.

Coping is the application of behavioral and cognitive efforts to manage the internal and external demands that exceed the capacity of a person [6]. ICU nurses use various coping strategies including self-blame, religious practices, planning, positive reframing, acceptance, venting, substance use, denial and self-distraction to cope with stress in their workplace [4-6]. Behavioral disengagement and blaming aggravate the stress while belief and acceptance provide relief. Mindfulness practices and cognitive behavioral skills are effective in enabling ICU nurses to cope with occupational stress [7]. Avenues of release where ICU nurses express themselves regarding workplace stress are necessary in helping them cope with the stress. A qualitative study by identified seeking and obtaining support, distancing oneself and recreation as the main approaches ICU nurses use to cope with stress [8]. Support can be obtained by learning from and getting encouraged by senior and experienced nurses, following faith practices, or engaging in ongoing professional learning. Therefore, ICU nurses apply a variety of coping strategies to manage occupation stress.

Most of the existing reviews focus on interventions to reduce stress among ICU nurses. They do not delve into the coping strategies the ICU nurses use to manage stress and conducted systematic reviews to summarize interventions for the management of stress among ICU nurses without exploring the coping strategies that the nurses currently use [9]. Other reviews do not address perceived stress directly review and meta-analysis focused on compassion fatigue among ICU nurses, which is related to but not the same as perceived stress. Broad reviews capturing not only perceived stress and coping strategies but other aspects in the workplace environment do not address perceived stress comprehensively, included burnout and job satisfaction in their review, hence stress and coping strategies were not intensively covered [10].

The systematic review focused on perceived stress and coping strategies but its study population was nursing students instead of ICU nurses [11]. Although some of the students might have experienced

the stress or applied coping strategies while rotating through the ICU, the findings of the review cannot be generalized to ICU nurses. Therefore, there is a need for a study to review detailed information on perceived stress and coping strategies among ICU nurses [12,13]. The availability of cross-sectional studies such as the ones by and qualitative studies such as the ones by calls for a literature review to comprehensively explore the concept of perceived stress and coping strategies among ICU nurses based on their findings [14,15]. The current review aims to synthesize detailed information about perceived stress and coping strategies of ICU nurses. It will analyze findings obtained from engaging ICU nurses regarding the topic or an aspect of the topic. Thus, qualitative studies and cross-sectional studies using open-ended or semi-closed questionnaires will be the main articles to be reviewed.

The selected approach for the research is systemized review. It is the most appropriate approach because it has several elements of a systematic review which ranks at the top of the hierarchy of evidence framework [16,17].

Secondly, it avoids the narrow scope of a systematic review through flexibility to comprehensively answer the research question [18]. Additionally, it is the best alternative for a postgraduate student project considering the unavailability of adequate time and resources to conduct a systematic review [19]. It is better than narrative and scoping reviews because the search for articles is comprehensive and the articles are assessed following thorough inclusion and exclusion criteria.

Materials and Methods

This section describes the procedure that was followed to identify and assess the evidence used to answer the research question. Starts by justifying the Population, Exposure, Outcome (PEO) components of the research question. Then proceeds to describe other components of a systematized review including the search strategy, inclusion and exclusion criteria and quality assessment and assessment for the risk of bias in the identified articles.

The question for the review was developed by identifying gaps in the existing literature upon scoping the literature. It was developed following the PEO format. The PEO framework was selected over PICO (Population, Intervention, Comparison, Outcome) framework because the study is focusing on an area of interest, coping strategies, not evaluating an intervention. Besides, the targeted outcome is information on experiences of perceived stress rather than measurement of changes in stress levels, which is consistent with the PEO framework [20].

The population was identified as ICU nurses since they are the most affected by perceived stress [21]. The selection of coping strategies as the exposure was informed by the fact that nurses can easily adopt the effecting coping strategies, unlike interventions that may require external support and resources to implement [22]. The selected outcome was perceived stress since the coping strategies are meant to reduce it considering that they influence personal characteristics and the work environment [23]. Therefore, the review question is: What are the coping strategies used by ICU nurses to reduce perceived stress?

This systematized literature review evaluated peer-reviewed journal articles to describe the perceived stress of ICU nurses and their coping strategies. The ICU setting changed substantially during the

COVID-19 pandemic given the upsurge of ICU admissions, hence perceived stress is likely to be abnormally high in the COVID-19 context. According to, the COVID-19 pandemic increased the workload, working hours, patient: Nurse ratio, and incidences of treatment failure, which are contributory factors to occupational stress in ICUs. Therefore, articles that addressed the issue of perceived stress and coping strategies in the context of COVID-19 were inappropriate for the current review given that it seeks to determine the state of the issue in routine ICU circumstances. The coping strategies identified outside the context of COVID-19 will be valuable because their application will be relevant beyond the COVID-19 pandemic [24].

Key terms were searched in three databases for efficient and adequate coverage to identify relevant studies [25]. The selected key terms reflect the various aspects of the research question likely to yield the best results [26]. The Boolean operators (AND/OR) and other database-appropriate syntax were applied to combine search terms where appropriate to increase the specificity of the search process [26]. Besides searching the databases, additional articles were identified by perusing the reference lists of relevant studies. The method was ideal for the exhaustive identification of studies that focus on the study topic to ensure that no appropriate evidence is missed [25].

Inclusion and exclusion criteria strategies

Inclusion criteria: Publication in the English language; ICU nurses as the study population; Perceived stress and coping strategies featured in the research.

Exclusion criteria: Study conducted in the context of COVID-19; Secondary research articles; Studies conducted before 2018.

Databases

Three databases were searched through Ovid and EBSCOhost search engines to identify articles relevant to the topic. The databases include MEDLINE, PsychINFO and CINAHL; they were selected because they provide access to journal articles in health sciences [27]. Medline was selected because it contains articles in life sciences including nursing; and the current research is targeting ICU nurses. PsychINFO was selected because it contains articles in the field of psychology and perceived stress that is under investigation in this study is a psychological issue. CINAHL was an appropriate database because nursing is one of its focus areas and the current topic's study population is ICU nurses. Besides, searching CINAHL facilitated the identification of qualitative studies because it is better than MEDLINE at indexing them (25). Qualitative studies are integral in obtaining information regarding perceived stress because perceptions are often narrated by the participants.

"ICU and Nurses and Stress and Coping" were searched in the Boolean/Phrase search mode. The limits applied include publication year and year published data (2018-2022), publication status (fully published), publication type (peer-reviewed journal), language (English), population group (human), intended audience (professional & research), and document type (journal article). The provision for excluding dissertations was selected. The search yielded no results. The search mode was changed to "Find all my search terms" and the "apply related words" expander was applied but no results were found.

The reference lists of the eight relevant articles were manually reviewed to identify any recent and relevant article. Only one article

that had already been selected through searching CINAHL was identified in the screening of reference lists. There were also two relevant articles in the reference lists but they were published in 2017 yet the publication year limit for this study was 2018-2020. The selection of the articles was as shown in the PRISMA flow diagram in (Figure 1).

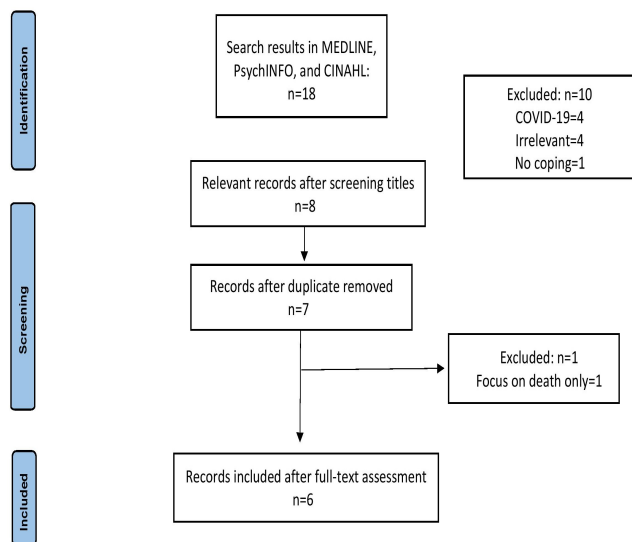


Figure 1: PRISMA flow chart for inclusion of papers.

The eight articles selected were then subjected to the inclusion and exclusion criteria by assessing them based on the information in their full text. Since part of the inclusion and exclusion criteria such as publication in the English language were applied when selecting limits in the advanced search engines used to access the databases, the selected articles already met them. Besides, the screening of the articles by checking their titles and abstracts was done in consideration of the inclusion and exclusion criteria such as the study population of ICU nurses and the exposure being perceived stress; the nine selected articles already met them. Articles that focused on stress in ICUs during the COVID-19 pandemic were excluded. Moreover, no secondary research article including literature reviews, scoping reviews, narrative reviews, systematic reviews, or meta-analyses was selected when screening the articles. One article was excluded because it was a duplicate. Upon reading the full-text articles, another article was excluded since it focused on the reaction to death aspect of stress in the ICU instead of addressing stress healthful. [28,29].

Only studies that were conducted among ICU nurses were included in the review. The research question focuses on ICU nurses, hence only articles that collected data from them could be relevant. The delineation of clear boundaries on the target population was necessary to ensure the selection of articles that directly collect data from them [30]. The studies must have explored the perceptions of stress among the ICU nurses and the coping strategies they use to deal with the stress. The clarification of the exposure and outcomes was necessary to specify the scope of the literature review so that only articles with the specified information could be chosen [30].

Quality assessment and assessment for the risk of bias in the included papers

The articles selected include a qualitative, the quality and risk of bias of the article were assessed using the Critical Appraisal Skills

Programme (CASP) qualitative checklist (S1) since it is endorsed by the cochrane qualitative and implementation methods group [31]. The goal of the research matches the aim of the current review since it explored personal and organizational factors integral to moral distress and burnout among healthcare providers including nurses in the ICU setting, which included coping strategies [32].

The second article selected is a randomized controlled trial testing the effect of a combination of music and progressive muscle relaxation on stress, fatigue and coping strategies among ICU nurses, thus its purpose is consistent with the goal of the current literature review. Its quality and risk of bias was assessed using the CASP randomized controlled trial checklist (S2) since identified it as the main appraisal tool for RCTs [33].

The third selected article is a cross-sectional study, that investigated coping strategies as predictors of the levels of compassion fatigue among critical care and emergency nurses. The fourth study selected is a multicenter survey that explored stress coping styles among ICU personnel including nurses [34]. The fifth article chosen for inclusion in the literature review is a cross-sectional study by that investigated perceived stress and coping strategies among ICU nurses. The quality and risk of bias of the three cross-sectional studies were assessed using the (AXIS) appraisal tool for cross-sectional studies (S3) [35]. The tool is appropriate since it covers study design, reporting quality and risk of bias in cross-sectional studies.

The sixth article selected is a mixed-methods study, that collected quantitative data using the ICU Stressors Survey and Ways of Coping Scale, and qualitative data through an online survey system known as Qualtrics [36]. It was critically appraised using version 2018 of the (MMAT) mixed methods appraisal tool (S4) whose content validity is improved compared to version 2011 of MMAT [37].

The review results will be presented first by describing the quality and key characteristics of the included studies. Synthesis of the findings of the included studies will follow. An article-by-article approach will guide the description of the key characteristics and quality of the articles. The synthesized findings will be presented thematically whereby coping strategies that will emerge as useful in reducing perceived stress will be described based on supporting evidence from the included articles [38].

Results

This section is to report the quality, summarize and synthesize the findings of articles identified for evidence to answer the research question: "What are the coping strategies used by ICU nurses to reduce perceived stress?" The information synthesized is from the six articles selected through the systemized literature search. The section starts with a report of the identities of the articles retrieved from the search. It then provides an analysis of the quality, key characteristics and findings of the selected articles. The final part is a description of the findings of the systemized review as generated from the analysis of the evidence in the included studies.

The literature search produced a total of 18 results. Ten of them were either irrelevant, conducted in the context of COVID-19 or were not addressing coping strategies based on the screening of the titles, hence they were excluded. Out of the eight remaining articles, one article was excluded for being a duplicate. Another article was excluded after reading the full texts of the articles since it only focused

on death as the cause of stress. The systemized literature search identified a total of six articles (Figure 1).

The selected articles used different study designs but they addressed the research question, hence they were appropriate for the systemized review. Out of the six articles included in the literature review, one was a qualitative study, four were quantitative studies, and one was a mixed-methods research design. Amongst the four quantitative studies, one was a randomized controlled trial and three were cross-sectional studies (S5) [4,39,40].

Quality, key characteristics and findings of the included studies

To explore factors contributing to moral distress and burnout among ICU staff. Coping strategies are some of the factors that the researchers considered in the data analysis. Focus group participants in the study provided examples of the strategies they apply to cope with both internal and external workplace stressors. A qualitative study was appropriate for the research since coping strategies are subjective [41]. Discussion of the coping strategies in a focus group is appropriate data collection strategy since it allows thought stimulation, supplementation of a viewpoint, or disagreement with a statement made by a participant [42]. Synthesized the responses from the ICU nurses to describe the coping strategies that they used to reduce perceived stress; hence their findings are valuable in answering the review's research question.

The selected participants, who are mainly ICU nurses, are congruent to the population of interest that comprises ICU nurses. Only results about the ICU nurses were synthesized in the review for precision since ICU nurses are the study population. The number and composition of focus groups are specified as six and 4-8 respectively [43]. The authors do not declare their relationship with the participants and its potential influence on the data collection. However, they indicate that they reduced the risk of bias in data analysis by engaging multiple professionals in the research group. Each research team member generated codes that they compared with the others' codes to note areas of similarity and discuss differences for consensus which increased the credibility of the findings.

The participants employed both self-constructive strategies such as exercise and self-destructive strategies like excessive alcohol consumption. Other constructive personal coping strategies discussed include leaving work on time, family and pets, maintaining a work-life balance and hobbies. Other destructive personal coping strategies include excessive spending, overeating, and emotionally excluding from others [44]. The constructive ICU workplace coping strategies described by the participants include humor, socializing outside of work, talking with peers, communicating with families and caring for a supportive work environment. They also highlighted negative practices such as negative chatter about colleagues, shaming, bullying, detaching from patients and withdrawing from coworkers as workplace coping strategies [45].

The effectiveness of music and progressive muscle relaxation in enhancing coping strategies among stressed ICU nurses using in a randomized controlled trial. Since coping strategies that ICU nurses in the study used to reduce perceived stress feature in the article, it was valuable for the review. The RCT had a clearly focused question since the population is identified as ICU nurses, the intervention is stated as progressive muscle relaxation combined with music, the comparison is described as attention matched education and the outcomes are listed

as stress level, fatigue severity and coping styles. The study is relevant because it has both coping strategies and stress as outcomes, whose correlations can be deduced from the findings to determine whether coping strategies are associated with reduced perceived stress. The 63 nurses that participated in the RCT were randomly assigned using the lottery method into groups A (control) and B (intervention) with 31 and 32 participants respectively by a researcher that was not involved in administering the intervention. Thus, there was no risk of selection bias.

The characteristics of the participants were largely similar at the baseline, hence there is a low likelihood that the observed outcomes were due to confounding. However, blinding was not applied, which implies that the risks for observation and measurement bias were high [46]. Overall, the rigor of the RCT was sufficient to generate moderate evidence. Notably, the generalizability of the findings of the RCT might be limited since the participants were all females and mainly graduates, hence they are not fully representative of the ICU nurses' population.

The Brief Committee on Publication Ethics (COPE) was used to measure coping strategies to stressors. Its dimensions include active coping, self-distraction, denial, use of emotional support, substance use, behavioral disengagement, use of instrumental support, venting, planning, positive reframing, humor, religious practices, acceptance, and self-blame, which are common coping strategies among ICU nurses. Humor, acceptance, venting, self-distraction and use of emotional support as coping strategies against stress significantly improved after the progressive muscle relaxation and music intervention. The improvements in coping strategies may have mediated the reduction of stress upon the intervention considering that they occurred concurrently. Therefore, coping strategies reduce perceived stress and they can be improved using progressive muscle relaxation and music [47].

The role of coping strategies in moderating compassion fatigue and secondary stress syndrome; hence they had a clear study objective [35]. The cross-sectional design was appropriate for the objective since it could determine the association between coping strategies and secondary stress syndrome and compassion satisfaction, which is tantamount to indicating the role of coping strategies in the two outcomes. The sample size of 270 in four government teaching hospitals represents the population of interest since it comprised ICU nurses.

The proportion of participants that responded to the questionnaires (84.4%) is high, thus there was little risk of non-response bias. The Coping Strategies Indicator (CSI) Questionnaire that was used to collect data on coping strategies is validated and is frequently used in many countries [48]. Similarly, the Professional Quality of Life Scale version 5 (ProQoL-5) that the researchers used to collect data on compassion fatigue and secondary stress is reliable since its subscales have acceptable internal consistency and it has been used in several nursing studies [39].

The higher mean scores of indicators of coping strategies namely avoidance ($p=0.001$) and seeking social support ($p=0.010$) were significantly associated with lower secondary stress syndrome. Therefore, coping strategies are substantial mediators of secondary stress syndrome. Although only a few coping strategies were investigated, the observed significant association with reduction in stress is an indication that other coping strategies may be valuable in reducing perceived stress as well [35].

The cross-sectional study directly addresses the research question since it investigated stress levels and coping strategies among critical care nurses. It provides information about the local situation since it was conducted in intensive care units in two tertiary hospitals in Saudi Arabia. The sample size of 154 ICU nurses was conveniently selected from a population of 300 ICU nurses; thus, it was adequately representative [32]. It is justified since it was calculated using the Survey Monkey sample size calculator. The participants were obtained from surgery, cardiac, and pediatric ICUs, which are representative since they are the most common types of ICUs in Saudi Arabia. The Perceived Stress Scale-10 (PSS-10) that was used to collect perceived stress data is reliable since its internal consistency and convergent validity were ascertained. Its Cronbach's alpha value was 0.84. The Brief Committee on Publication Ethics (COPE) that was used to collect data on coping strategies had good internal consistency since its reliability as shown by a Cronbach's alpha value of 0.80 was high [4].

The results of the multiple regression to determine the effect of coping behaviors on perceived stress show that the two variables are significantly associated. The multiple regression showed a significant result with all the 14 predictor variables that were included based on indicators of coping strategies ($F=3.67, P<.001$) [4]. The coping strategies explained 19.6% of the variance in the perceived stress of the nurses. The researchers identified behavioral disengagement and self-blame as coping strategies that significantly influenced perceived stress since they resulted in higher levels of stress. On the other hand, acceptance as a coping strategy reduced stress levels. Given the greater effect of the negative coping strategies compared to the positive coping strategies, emphasis on avoiding the negative coping strategies is necessary. Although religion was not identified as a significant predictor variable, its value should be investigated further since the study revealed that it is commonly used among ICU nurses in Saudi Arabia. Explored stressors, coping strategies, and satisfiers in the Neonatal Intensive Care Unit (NICU), hence their article contains valuable information for answering the research question of the current study. The sample size of 72 NICU nurses recruited from 3 Magnet facilities in North Carolina is justified as the authors describe that recruitment was exhaustive. The nurse managers shared links with ICU nurses in their units through in-hospital e-mails, and the links remained active for one month [36]. The tool used to collect perceived stress data, the ICU Stressors Survey, is theoretically congruent but its performance measures are not indicated [37]. The Ways of Coping Scale that the researchers used to collect data on coping processes has subscales with good internal consistency considering the reported Cronbach's alpha values. Open-ended questions were used to collect the qualitative data where the respondents were expected to write their responses to the three survey questions, hence they shared their views comprehensively [49]. The question "What would help you cope with work stress?" in particular collected data that is instrumental in answering the question of whether coping strategies reduce perceived stress. Found that about 43% of the participants coped with stress by mainly just concentrating on the next task. About 36% mainly prayed to cope with a stressful situation. The themes that emerged from a content analysis of the qualitative data include adequate staffing and teamwork. NICU nurses indicated that having some assistance in busy situations would help them cope with stress [36]. They also identified joint non-work-related activities as strategies that would be beneficial in coping with stress.

Stress coping styles among ICU and anesthesiology workers, thus its objective is congruent to the research question of the current study.

They recruited the personnel from 15 Polish hospitals and distributed a survey among them to collect data on various stress coping strategies including Task-Oriented (TOC), Avoidance-Oriented (AOC), and Emotion-Oriented Coping (EOC) styles. The data published in the article was obtained from a larger project on the prevalence of stress and stressors among ICU and anesthesiology personnel. The project had distributed 1900 surveys via regular mail whereby the hospitals received the surveys in packages and research assistants distributed them to the participants. Since only 460 surveys were returned out of which only 425 were included in the study, the response rate was poor (24%). Hence, the risk of non-response bias was high [35].

Nevertheless, the sample comprised mainly nurses (73%), hence it has similarities with the target population in the current study. The researchers used the Polish version of the Coping Inventory for Stressful Situations (CISS). Its Cronbach's alpha for the various subscales ranged from 0.65 to 0.92, hence its internal consistency was adequate for reliability to collect data on coping styles. Data on perceived stress was collected using the Polish version of the Perceived Stress Scale (PSS-10), whose subscales' Cronbach's alpha ranged from 0.72 to 0.92 [40]. Therefore, the tools they used for data collection were appropriate.

A statistically significant relationship between perceived stress levels and main coping styles. The correlation between (EOC) and perceived stress levels was positive and significant ($\rho =0.54, p<0.01$). Similarly, there was a positive correlation between (AOC) and stress levels although the level of significance was borderline $\rho =0.11, p<0.05$. On the other hand, (TOC) was negatively but significantly correlated with stress level ($\rho =-0.20, p<0.01$) [40]. The significant correlations show that coping strategies modify perceived stress. Therefore, caring for positive coping styles while decrease the negative coping styles can reduce perceived stress.

Limitations

Considering the overall methodological limitations of the included studies, the identified coping strategies can only be suggested as possible approaches to reduce coping strategies; they cannot be recommended as evidence-based strategies. Humor is one of the effective strategies for reducing perceived stress [31]. ICU nurses cope with stress by transforming stressful situations into humorous scenarios both in the working environment and outside the workplace. Humor creates room for socialization, which is another valuable coping strategy. If socialization can extend outside the workplace, its benefits in reducing stress can amplify [31]. ICU nurses can adopt techniques to improve their ability to apply humor and socialization in coping with stress. Listening to music while undertaking progressive muscle relaxation can improve the capacity to leverage humor and socialization to cope with stress [38]. Therefore, ICU nurses should engage in activities that improve their humor and socialization abilities within and outside the workplace to be better positioned to cope with perceived stress.

ICU nurses can seek social support from workmates, family and friends. Social support is associated with a reduction in perceived stress [39]. Several of the strategies that ICU nurses in the study was identified as valuable to them are tantamount to seeking social support. They include having family and pets, communicating with family and friends, talking with peers and engaging in hobbies. Therefore, ICU nurses can network outside the workplace and influence the support from the social contacts to reduce stress.

Changes in the hospitals where the ICU nurses work can improve their capacity to reduce perceived stress. First, the working schedules for the ICU nurses can be adjusted to enable them leave work on time. The adjustment will secure them time to interact with family and friends and engage in hobbies and social activities that are vital in coping with stress. Besides, the ICU nurses can have joint non-work-related activities both in the hospital and outside the workplace to enhance their ability to cope with stress [36].

Introducing programs with interventions such as progressive muscle relaxation that can provide opportunities to enhance the coping abilities of the nurses can support the ICU nurses in the workplace. Creating avenues for ICU nurses to emotionally support each other can also improve their coping abilities [38]. Establishing structures in the hospital through which the ICU nurses can seek social support when stressed can be transformative [39].

The hospital can also create avenues for the identification of systemic causes of errors in the ICU to avoid the poor outcomes that stress nurses. ICU nurses may self-blame for the stressful situations, hence the need to address the root causes [4]. Preventing self-blame is helpful since it prevents the compounding of perceived stress. Additionally, the work environment can be enhanced to reduce perceived stress by establishing systems for the assistance of ICU nurses on duty when the workload increases [36].

ICU nurses can also apply spirituality and religious practices to reduce perceived stress. The strategy of prayer helped more than a third of the participants in the study by [36]. Joint prayers can form part of the non-work-related activities embraced by the ICU nurses. Several ICU nurses' resort to religion when they encounter stress [38]. Although it did not identify religion as a significant predictor of perceived stress, certain religious aspects must be helpful otherwise there would be no motivation for multiple nurses to be using it as is the case.

ICU nurses have been avoiding stressful situations as a coping strategy to prevent perceived stress. They can also avoid embracing destructive coping strategies. Avoidance is among the coping styles that identified as useful. The approach of only concentrating on the next task that almost half of the participants in the study used is an avoidance-oriented coping strategy also established that avoidance significantly helps in reducing perceived stress. Besides, avoiding negative coping strategies such as alcohol abuse, tolerant and social isolation as indicated and can reduce perceived stress. Since negative coping strategies cause destruction at a faster rate than the rate of positive coping strategies causing benefits, avoiding them is substantially beneficial.

Discussion

This section discusses the literature obtained from the research articles included in the systematized review. It starts by summarizing the main results of the systematized review. A description of the consistency and coherence of the findings of the six articles is then provided to determine whether the agreements in the findings are sufficient for the generalizability required to answer the research question. The main quality aspects and risks of bias in the included articles are outlined for a critical consideration of the strengths of evidence generated from the articles. The strengths and limitations of the systematized review methodology applied in this project are examined to interpret the extent to which the review has answered the

research question "What are the coping strategies used by ICU nurses to reduce perceived stress?"

Brief recap of the main findings

Several coping strategies emerged as effective in reducing perceived stress among ICU nurses. They include humor, socialization, social support, accommodative work schedules, spirituality and religious practices and avoidance, among others. The coping strategies are more effective when applied both within and outside the workplace. Evidence-based interventions such as progressive muscle relaxation and systems for identification of systemic causes of errors can reduce the compounding of perceived stress, hence increasing the effectiveness of coping strategies.

The findings in the six articles are variable since diverse coping strategies were identified in their findings. However, coherence was observed between studies because the identified coping strategies are related. For example, humor, which was identified in two articles, is related to socialization. Besides, some articles describe strategies through which the identified coping strategies can be enhanced.

Critical consideration of the strength of the evidence base

The six articles used various study designs to generate their findings but their overall quality is acceptable since they selected the appropriate study designs and optimally followed the methodologies of the selected study designs. The qualitative study design used in the research was appropriate because work stress is a subjective experience. Collecting data using focus group discussions facilitated the participants to exhaustively discuss stress and coping strategies [49]. For the Randomized Controlled Trial (RCT) both the coping strategies and stress are outcomes. Nevertheless, their concurrent improvement makes the RCT relevant in answering the research question.

Appropriate in answering the reviews' research question because the researchers measured stress as part of professional quality of life and used the Coping Strategy Indicator (CSI) questionnaire, which is a validated tool, to collect data on coping strategies assessed the perceived stress levels of the participants using the Perceived stress scale and coping strategies using the coping inventory for stressful situations; both tools are validated hence the data collected using them is reliable in studying the phenomena to generate information useful for the review directly addressed the topic of the review since both concepts of perceived stress and coping strategies are captured provides quality input to the review since it describes the coping strategies that Neonatal ICU (NICU) nurses apply to thrive in the stressful work environment.

The risks of bias in the six articles were considered when synthesizing the findings. The study by may have been limited by the risk of bias given the self-selection of participants, but the authors considered the risk in the discussion of their results [50]. The administration of the intervention and collection of the data was done by the principal investigator, which may have introduced bias in the study [47]. Since the questionnaires that used are closed, the exact perceptions of stress by the ICU nurses may have been missed which may have introduced some bias in the study.

The low rate of returning completed questionnaires in the study may have increased the risk of bias since the survey might have been mainly completed by the most adversely affected ICU personnel [51].

At high risk for social desirability bias given the self-reporting data collection approach. The mixed- methods approach used by increased in the richness of the information provided in the study to reveal underlying structures in the data, thus minimizing the risk of bias [52].

Strengths and limitations of review methodology

The systematized review method is a valuable approach to synthesizing the results of original studies. Its rigor in the search strategy and article selection ensures the identification of articles with findings that fill a knowledge gap in the general body of literature [50]. Since a systematized review is not as focused as a systematic review, it includes insightful works that may have been left out if the predefined scope approach of systematic reviews was applied [53]. The flexibility in the systematized review methodology is important in answering the current research question considering the diversity of stress coping strategies, interconnections between them and relationships with interventions to address perceived stress [50,51].

The extent of answering the review question

The evidence generated from the systematized review has answered the research question “What are the coping strategies used by ICU nurses to reduce perceived stress?” The included articles especially the qualitative study and the mixed-methods research highlighted the coping strategies that ICU nurses apply when coping with stress. The three cross-sectional studies and the mixed-methods study included in the review showed an association between the application of positive coping strategies and a reduction in perceived stress. Nevertheless, randomized controlled trials testing the efficacy of the coping strategies that emerged as commonly used and associated with reduced perceived stress are needed to increase the strength of evidence that can be advantageous to recommend the coping strategies to ICU nurses.

Key points

Main finding 1: ICU nurses employ a variety of coping strategies including humor, socialization and seeking social support.

Implication: Incorporating humor and social support in workplace interventions can reduce stress levels among ICU nurses.

Main finding 2: Effective coping strategies also include leaving work on time, engaging in non-work-related activities and applying spirituality.

Implication: Policies that promote work-life balance and support spiritual practices can enhance the well-being of ICU nurses.

Main finding 3: Negative coping strategies such as self-blame and behavioral disengagement increase stress levels.

Implication: Training programs should focus on reducing negative coping mechanisms and promoting positive ones.

Main finding 4: Structured interventions like progressive muscle relaxation combined with music showed significant improvement in coping strategies.

Implication: Implementing evidence-based interventions can provide ICU nurses with effective tools to manage stress.

Main finding 5: More randomized controlled trials and systematic reviews are needed to establish high-level evidence for these coping strategies.

Implication: Future research should focus on robust trials to validate the effectiveness of identified coping strategies.

Conclusion

The systematized review answered the research question “What are the coping strategies used by ICU nurses to reduce perceived stress?” The coping strategies that were associated with reduced perceived stress in the synthesized findings of the six articles include humor, socialization, seeking social support, leaving work on time, participating in non-work- related activities, seeking emotional support, preventing self-blame, applying spirituality and religion, and avoiding stressful situations.

Since the benefits of the coping strategies were mainly extracted from a qualitative study and three cross-sectional studies, the strength of the evidence base may not be sufficient to support practice or policy changes. However, considering the quality of the included studies and their respective risks of bias, the synthesized evidence is sufficient to suggest the identified coping strategies for ICU nurses struggling with perceived stress. The coping strategies can also be taught in nursing education as approaches that can potentially reduce ICU nurses’ perceived stress.

Future research should focus on generating level I and level II evidence regarding the effectiveness of the identified coping strategies in reducing perceived stress. Level II evidence will be generated by conducting multisite randomized controlled trials testing the effectiveness of the identified coping strategies. Level I evidence will be obtained by meta-analyzing and systematically reviewing the findings of the conducted randomized controlled trial. The level I and II evidence will be pivotal in recommending practice and policy changes on ICU nurses’ coping strategies. More qualitative studies are needed for a deeper understanding of the ICU nurses’ experiences when using the various coping strategies.

Acknowledgment

The research for this paper was conducted independently, prior to my affiliation with King Faisal Specialist Hospital & Research Center, and did not utilize any resources or facilities from the hospital. The views expressed are solely those of the author and do not reflect those of the institution.

References

1. Akhter G, Dar MA, Kour MP (2021) A study to assess the level of stress and coping strategies among nurses working in intensive care units of Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar. *Ind J Holist Nurs* 12(4):7-11.
2. Al Barmawi MA, Subih M, Salameh O, Sayyah Yousef, Sayyah N, et al. (2019) Coping strategies as moderating factors to compassion fatigue among critical care nurses. *Brain Behav* 9(4):e01264.
3. Alharbi H, Alshehry A (2019) Perceived stress and coping strategies among ICU nurses in government tertiary hospitals in Saudi Arabia: A cross-sectional study. *Ann Saudi Med* 39(1): 48-55.

4. Alharbi J, Jackson D, Usher K (2019) Compassion fatigue in critical care nurses: An integrative review of the literature. *Saudi Med J* 40(11):1087.
5. Alkhalwaldeh JF, Soh KL, Mukhtar FB, Peng OC, Anshasi HA (2020) Stress management interventions for intensive and critical care nurses: A systematic review. *Nurs Crit Care* 25(2):84-92.
6. Anguera MT, Portell M, Chacón-Moscoso S, Sanduvete-Chaves S (2018) Indirect observation in everyday contexts: Concepts and methodological guidelines within a mixed methods framework. *Front Psychol* 30;9:13.
7. Aveyard H, Bradbury-Jones C (2019) An analysis of current practices in undertaking literature reviews in nursing: Findings from a focused mapping review and synthesis. *BMC Med Res Methodol* 19:1-9.
8. Ball E, Regan P (2019) Interpreting research to inform practice: The hierarchy of evidence framework. *J Health Visit* 7(1):32-38.
9. Barrett D, Twycross A (2018) Data collection in qualitative research. *Evid Based Nurs* 21(3):63-64.
10. Bayuo J, Agbenorku P (2018) Coping strategies among nurses in the Burn Intensive Care Unit: A qualitative study. *Bur Open* 2(1):47-52.
11. Betriana F, Kongsuwan W (2020) Grief reactions and coping strategies of Muslim nurses dealing with death. *Nurs Crit Care* 25(5):277-283.
12. Bramer WM, De Jonge GB, Rethlefsen ML, Mast F, Kleijnen J (2018) A systematic approach to searching: An efficient and complete method to develop literature searches. *J Med Libr Assoc* 106(4):531.
13. Bresesti I, Folgori L, De Bartolo P (2020) Interventions to reduce occupational stress and burn out within neonatal intensive care units: A systematic review. *Occup Environ Med* 77(8): 515-519.
14. Capili B (2020) How does research start?. *Am J Nurs* 120(10): 41-44.
15. Cook DA (2019) Systematic and nonsystematic reviews: Choosing an approach. *Healthcare Simulation Research: A Practical Guide* 55-60.
16. Pajalic Z, de Sousa DA, Strøm BS, Lausund H, Breievne G (2023) Welfare technology interventions among older people living at home—A systematic review of RCT studies. *PLOS Digit Health* 2(1):e0000184.
17. Long HA, French DP, Brooks JM (2020) Optimising the value of the Critical Appraisal Skills Programme (CASP) tool for quality appraisal in qualitative evidence synthesis. *Res Meth Med Heal Sci* 1(1):31-42.
18. Downes MJ, Brennan ML, Williams HC, Dean RS (2016) Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *BMJ Open* 6(12):e011458.
19. Durmaz A, Dursun İ, Kabadayi ET (2020) Mitigating the effects of social desirability bias in self-report surveys: Classical and new techniques. In *Applied social science approaches to mixed methods research*. IGI Global.
20. Fiske E (2018) Nurse stressors and satisfiers in the NICU. *Adv Neonatal Care* 18(4):276-284.
21. Friganović A, Selić P, Ilić B (2019) Stress and burnout syndrome and their associations with coping and job satisfaction in critical care nurses: a literature review. *Psychiatr Danub* 31(suppl. 1): 21-31.
22. Golfenshtein N, Deatrck JA, Lisanti AJ, Medoff-Cooper B (2017) Coping with the stress in the cardiac intensive care unit: Can mindfulness be the answer?. *J Pediatr Nurs* 37:117-126.
23. Grant MJ, Booth A (2009) A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Info Libr J* 26(2):91-108.
24. Gustavson K, Røysamb E, Borren I (2019) Preventing bias from selective non-response in population-based survey studies: Findings from a Monte Carlo simulation study. *BMC Med Res Methodol* 19:1-8.
25. Hancock J, Witter T, Comber S, Daley P, Thompson K, et al. (2020) Understanding burnout and moral distress to build resilience: A qualitative study of an interprofessional intensive care unit team. *Can J Anaesth* 67(11):1541-1548.
26. Hays MA, All AC, Mannahan C, Cuaderes E, Wallace D (2006) Reported stressors and ways of coping utilized by intensive care unit nurses *Dimens Crit Care Nurs* 25(4):185-193.
27. Holly C, Salmond S, Saimbert M, (2021) *Comprehensive systematic review for advanced practice nursing*. Springer
28. Hong QN, Pluye P, Fàbregues S, Bartlett G, Boardman F, et al. (2019) Improving the content validity of the mixed methods appraisal tool: A modified e-Delphi study. *J Clin Epidemiol* 111:49-59.
29. Hong QN, Fàbregues S, Bartlett G, Boardman F, Cargo M, et al. (2018) The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Educ Info* 34(4):285-291.
30. Howeri NM, ALBashtawy M (2020) Workplace stress among nurses in intensive care units. *EC Psych Psyc* 9(3):1-3.
31. Krauss A (2018) Why all randomised controlled trials produce biased results. *Ann Med* 50(4):312-322.
32. Kwiatosz-Muc M, Fijałkowska-Nestorowicz A, Fijałkowska M, Aftyka A, Kowalczyk M (2018) Stress prevalence and stressors among anaesthesiology and intensive care unit workers: A multicentre survey study. *Aust Crit Care* 31(6):391-395.
33. Kwiatosz-Muc M, Fijałkowska-Nestorowicz A, Fijałkowska M, Aftyka A, Pietras P, et al. (2019) Stress coping styles among anaesthesiology and intensive care unit personnel—links to the work environment and personal characteristics: A multicentre survey study. *Scand J Caring Sci* 33(3):661-668.
34. Labrague LJ, McEnroe-Petitte DM, De Los Santos JA, Edet OB (2018) Examining stress perceptions and coping strategies among Saudi nursing students: A systematic review. *Nurse Educ Today* 65:192-200.
35. Linnenluecke MK, Marrone M, Singh AK (2020) Conducting systematic literature reviews and bibliometric analyses. *Austr J Man* 45(2):175-194.
36. Purssell E (2020) Can the critical appraisal skills programme check-lists be used alongside grading of recommendations assessment, development and evaluation to improve transparency and decision-making?. *J Adv Nurs* 76(4):1082-1089.
37. Ma LL, Wang YY, Yang ZH, Huang D, Weng H, et al. (2020) Methodological quality (risk of bias) assessment tools for primary and secondary medical studies: What are they and which is better?. *Mil Med Res* 7:1-1.
38. Masa'Deh R, Alhalaiqa F, AbuRuz ME, Al-Dweik G, Al-Akash HY (2016) Perceived stress in nurses: A comparative study. *Glob J Heal Sci* 9(6):195.

39. Muka T, Glisic M, Milic J, Verhoog S, Bohlius J, et al. (2020) A 24-step guide on how to design, conduct and successfully publish a systematic review and meta-analysis in medical research. *Eur J Epidemiol* 35:49-60.
40. Ozgundodu B, Metin ZG (2019) Effects of progressive muscle relaxation combined with music on stress, fatigue and coping styles among intensive care nurses. *Intensive Crit Care Nurs* 54:54-63.
41. Pollock A, Berge E (2018) How to do a systematic review. *Int J Stroke* 13(2):138-156.
42. Rodríguez-Rey R, Palacios A, Alonso-Tapia J, Pérez E, Álvarez E, et al. (2019) Burnout and posttraumatic stress in paediatric critical care personnel: Prediction from resilience and coping styles. *Aust Crit Care* 32(1):46-53.
43. Sağlam BÖ, Eser İS, Ayvaz S, Çağı N, Mert H, et al. (2021) Intensive care experiences of intern nurse students: A qualitative study. *Nurse Educ Today* 107:105098.
44. Salimi S, Pakpour V, Rahmani A, Wilson M, Feizollahzadeh H (2020) Compassion satisfaction, burnout and secondary traumatic stress among critical care nurses in Iran. *J Transcult Nurs* 31(1):59-66.
45. Şanlıtürk D (2021) Perceived and sources of occupational stress in intensive care nurses during the COVID-19 pandemic. *Intensive Crit Care Nurs* 67:103107.
46. Spector PE (2019) Do not cross me: Optimizing the use of cross-sectional designs. *J Bus Psychol* 34(2):125-137.
47. Sutton A, Clowes M, Preston L, Booth A (2019) Meeting the review family: Exploring review types and associated information retrieval requirements. *Health Info Libr J* 36(3): 202-222.
48. Togas C, Alexias G (2018) Factor structure and psychometric properties of the Greek version of the coping strategy indicator. *Int J Caring Sci* 11(1):87-99.
49. Tomaszewski LE, Zarestky J, Gonzalez E (2020) Planning qualitative research: Design and decision making for new researchers. *Int J Qual Methods* 19:1609406920967174.
50. van Mol MM, Nijkamp MD, Bakker J, Schaufeli WB, Kompanje EJ (2018) Counterbalancing work-related stress? Work engagement among intensive care professionals. *Aust Crit Care* (4):234-241.
51. VanHorn EK, Worobel-Luk P, Tanner B, Jang H (2021) Nurse-facilitated reflective exercise post patient death in the ICU: A best practice implementation project. *JBHI Evid Implement* 19(2): 162-176.
52. Viswanathan M, Patnode CD, Berkman ND, Bass EB, Chang S, et al. (2018) Recommendations for assessing the risk of bias in systematic reviews of health-care interventions. *J Clin Epidemiol* 97:26-34.
53. Xie W, Chen L, Feng F, Okoli CT, Tang P, et al. (2021) The prevalence of compassion satisfaction and compassion fatigue among nurses: A systematic review and meta-analysis. *Int J Nurs Stud* 120:103973.