MJN A Systematic Literature Review of Intensive Care Unit (ICU) Nurses' Experience During Covid-19

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ABSTRACT

Background: Numerous studies agree that intensive care unit (ICU) nurses carry a relatively heavy mental and physical load, which may be attributable to the gravity of their responsibilities in an environment where the slightest error could have catastrophic effects on the lives of the patients in their care. New insights are needed to support ICU nurses during the pandemic by recognizing their experiences and challenges in work environments. Hence, conducting a systematic literature review may provide a better understanding of the common challenges that ICU nurses experienced during COVID-19 and provide research-based evidence of effective adaptation strategies that have been implemented to lessen their burden. **Objective:** The impact of the 2019 COVID season on the work of intensive care unit (ICU) nurses is the subject of this review. **Methods:** A systematic literature review was performed on three electronic search engines, which are Scopus, ProQuest, and Google Scholar, from 2019 to 2022. A PRISMA flow chart was used to facilitate the process of article selection. **Results:** A total of 12 articles were selected for the review; the main themes were: i) The challenges in taking care of patients; ii) Adaptation strategies; iii) The impact of COVID-19 on social life; and iv) The impact of COVID-19 on perceptions of career. **Conclusion:** Given the challenges faced by ICU nurses during the COVID-19 pandemic, it is essential for healthcare institutions and policymakers to provide adequate support systems. This includes access to mental health resources, counseling services, and peer support programs to help nurses cope with the emotional and psychological stress associated with their work during a crisis. Even though this review attempted to identify the adaptation strategies used by ICU nurses, there are currently fewer studies investigating this issue. Hence, further study should explore this.

Keywords: Adaptation Strategies; Challenges; COVID-19; Intensive Care Unit Nurses

INTRODUCTION

Back in December 2019, an outbreak of coronavirus started to burst in Wuhan, China. This virus is believed to be linked with seafood and the wet animal wholesale market. Zhu *et al*. (2020) explained that coronaviruses are RNA viruses with an envelope that cause respiratory, gastrointestinal, hepatic, and neurological illnesses in humans, other mammals, and birds. This COVID-19 viral disease, which can progress to pneumonia, frequently exhibits the following symptoms: fever, cold, cough, bone pain, and breathing difficulties. This situation gets worse when this virus can mutate into different variants. Globally, COVID-19 has impacted the healthcare system negatively. Many studies highlighted that COVID-19 impacted healthcare workers' physical or psychological lives.

In the demanding setting of the intensive care unit (ICU), ICU nurses provide care for patients who are in the most critical condition (Heesakkers *et al*., 2023). In a study of nurses caring for COVID-19 patients, Sun *et al*. (2020) found that in the early phases, nurses felt negative feelings such as exhaustion, discomfort, and helplessness as the result of the hard job, as well as feelings of dread, anxiety, and worry. This study showed numerous challenges that nurses had to face during the pandemic. An intensive care unit (ICU) is a unit that

provides care to terminally ill patients who need intensive and specialized medical and nursing care (Nasirizad Moghadam *et al*., 2021). To deal with COVID-19, nurses are the most important human resource. However, nurses confront numerous difficulties when providing care, especially those in the intensive care units.

Physicians and other HCWs who work in emergency rooms and ICUs deal with the most critically ill patients and are therefore at a greater risk of infection and work-related stress (Gualano *et al*., 2021). Numerous studies agree that intensive care unit (ICU) nurses carry a disproportionately heavy mental and physical workload, which may be attributable to the high stakes of their work in an environment where the slightest error could have catastrophic consequences for the patients they care for. Numerous studies agree that intensive care unit (ICU) nurses carry a disproportionately heavy mental and physical workload, which may be attributable to the high stakes of their work in an environment where the slightest error could have catastrophic consequences for the patients they care for (Alizadeh *et al*., 2015; Nasirizad Moghadam *et al*., 2021).

Additionally, a recent study showed that two-thirds of ICU nurses were concerned about burnout, which was linked to their employment situations during the initial COVID-19 outbreak wave (Bruyneel *et al*., 2021). Another study showed that ICU nurses experience significant burnout characterized by diminished personal achievement, increased levels of depersonalization, and heightened emotional exhaustion (Ali & Eissa, 2018). New insights are needed to support ICU nurses during the pandemic by recognizing their experiences and challenges in work environments. The impact of the 2019 COVID season on the work of intensive care unit (ICU) nurses is the subject of this review. Eventually, organizing the accumulated review of existing studies regarding this issue can produce clear implications for the hospital's administrators or management, the policymaker, and the nurse's trainers in charge of providing training for ICU nurses.

METHODOLOGY

This study employed a systematic literature review to identify, sort out, and critically appraise research to provide readers with the latest, reliable, and evidence-based knowledge related to the research topic (experience of ICU nurses during COVID-19). For this study, the researcher used a few search engines: Scopus, ProQuest and Google Scholar. Keywords used for the search were – "nurses" AND "challenges" AND "adaptation" OR "coping" AND "strategies" AND "ICU settings" AND "pandemic" OR "COVID-19". Inclusion criteria include. I) The articles published from 2019 to 2022, since the COVID-19 pandemic started in 2019, II) In English language, III) Study setting is in an Intensive Care Unit (ICU), and IV) The study sample is nurses. Exclusion criteria include I) The article from a systematic literature review or press release, or books or unpublished dissertations, and II) The study sample is nursing students**.** The author included all related articles after assessing the aim, data collection, data analysis methods, study sample, and a summary of the study findings. The extracted data in **Table 1** contains the authors, years, countries, objectives, design, sampling method, sample size, data collection and analysis, and lastly, the findings.

Quality Appraisal

There was a total of five cross-sectional quantitative studies, six qualitative studies, and one mixed-methods study included in this systematic literature review. Critical appraisal tools for quantitative and qualitative studies were taken from Joanna Brigg Institution (JBI) since they enable the author to ensure important information is not missed and hence offer trustworthy information, while the Mixed Method Appraisal Tool (MMAT) version 2018 was used for the mixed-method study.

RESULTS

Search Outcome

Next, the researcher filtered the search articles to obtain only reliable and related articles for the topics chosen. The researcher restricted the search to articles obtained in full text. Besides, the obtained articles will be assessed to determine whether they fulfill inclusion and exclusion criteria.

Additionally, duplicate references have been removed, and the titles and abstracts of each article have been reviewed to ensure they belong to the correct topic clusters. From the database, 56 relevant articles were found. The aim, objective, data collection, data analysis methods, study sample, and summary of study findings were compared in evaluating selected articles. After that, the researcher critically appraised the research. Hence, the researcher extracted 12 relevant articles (see Figure 1).
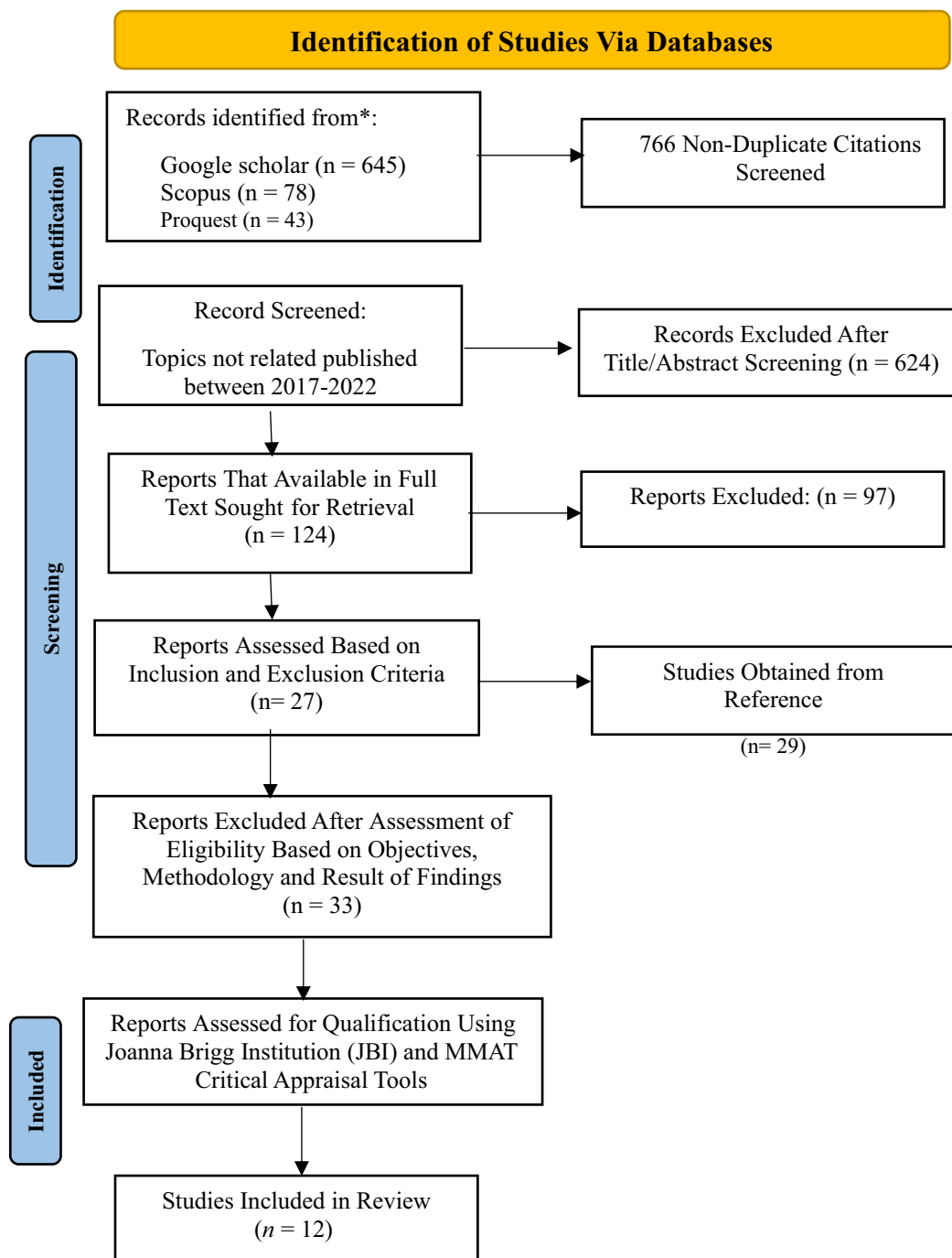
Identification of Studies Via Databases

Identification

Records identified from*:

Google scholar (n = 645)
Scopus (n = 78)
Proquest (n = 43)

→ 766 Non-Duplicate Citations Screened

Screening

Record Screened:

Topics not related published between 2017-2022

→ Records Excluded After Title/Abstract Screening (n = 624)

Reports That Available in Full Text Sought for Retrieval (n = 124)

→ Reports Excluded: (n = 97)

Reports Assessed Based on Inclusion and Exclusion Criteria (n= 27)

→ Studies Obtained from Reference (n= 29)

Reports Excluded After Assessment of Eligibility Based on Objectives, Methodology and Result of Findings (n = 33)

Included

Reports Assessed for Qualification Using Joanna Brigg Institution (JBI) and MMAT Critical Appraisal Tools

Studies Included in Review (*n* = 12)

Figure 1: Identification of Studies Via Databases

Quality Assessment Results

For a quantitative study, the study will be included in the review if it fulfills 75% of the criteria. Besides, for the qualitative study and mixed-method study, the study will be included if it fulfills 80% of the criteria. All of the selected 12 studies have fulfilled the requirement.

Analytical Findings

The total number of participants in this review was 1,094, and 870 of them were nurses. Of the 12 studies

included, there were 2 that not only included nurses as their participants but other types of healthcare workers as well. Studies were conducted in China (16.67%), the United States (16.67%), Brazil (8.33%), Turkiye (8.33%), Nepal (8.33%), Singapore (8.33%), Iran (8.33%), France (8.33%), Spain (8.33%), and Qatar (8.33%).

Table 1: Summary of Studies Included for the Systematic Literature Review

Author (year) Country	Title Objective	Design	Sample Method and Population	Data collection Tools and Analysis	Key Findings
Saurin *et al* (2022), Brazil	Coping with complexity in the COVID-19 pandemic: An exploratory study of Intensive Care Units An exploratory study of the strategies used by ICUs in Brazil to cope with the difficulty brought on by the pandemic.	Qualitative study	Purposive sampling 23 physicians, 8 nurses, 1 physiotherapist, and 1 nutritionist	Semi-structured interview thematic analysis	The study highlights the challenges faced by ICUs in terms of resource allocation, staffing shortages, and decision-making processes, while also identifying resilience practices implemented to address these challenges.
Sezgin *et al* (2021), Turkey	Experiences and perceptions of Turkish intensive care nurses providing care to Covid-19 patients: A qualitative study: To discuss the experiences, attitudes, and working conditions of intensive care nurses who provided care to COVID-19 patients during the pandemic.	Qualitative study	Snowball sampling 10 nurses	Semi-structured interview, thematic analysis	This study has established five main topics: 'death and fear of death', 'impact on family and social lives', 'nursing care of Covid-19 patients', 'changing perceptions of their own profession: empowerment and dissatisfaction', and 'experiences and perceptions of personal protective equipment and other control measures.
Hu *et al* (2021), China	Nurses' experiences of providing care to patients with covid-19 in the ICU in Wuhan: A descriptive phenomenological research. To examine intensive care unit (ICU) nurses' experiences of caring for patients with COVID-19, and understand better their everyday experiences of patient' management in the ICU.	Qualitative study	Purposive sampling, 13 nurses were recruited from three ICUs in Wuhan, Hubei, China.	Individual interview, Colaizzi's seven-step framework	Nurses' experiences of providing care to COVID-19 patients in the ICU revealed four distinct stages of feelings. Concern of contracting the illness and spreading it to family members persisted throughout all four stages. The four stages were characterized by the following themes: early conflicting emotions, rapid adaptation to the "new working environment" during the first to two weeks in the ICU, despair following adaptation, and clinging on and surviving.

Tamrakar *et al* (2021), Nepal	Anxiety and depression among nurses in COVID and non-COVID intensive care units. To compare the prevalence of anxiety and depression among nurses caring for COVID-19 patients in intensive care units (ICUs) and nurses caring for patients who were admitted for other reasons (non-COVID ICUs), as well as the factors that contribute to these disorders.	Quantitative comparative cross-sectional study	Convenience sampling 99 participants	Google forms, SPSS version 26.0 analysis	Psychiatric case was prevalent in 82 (85.4%) of the 96 involved nurses. Between COVID ICU nurses and non-COVID ICU nurses, there was no remarkable difference in the prevalence of psychiatric cases, anxiety, and depression. The only concerns that were found significantly higher in COVID ICU nurses were sleep disturbances, confidence in treating patients with COVID-19, and intentions to leave their current job. These were found to be factors that could potentially lead to psychiatric case, anxiety, and depression.
Tang *et al* (2021), Singapore	'From expert to novice', perceptions of General Ward nurses on deployment to outbreak intensive care units during the Covid-19 pandemic: A Qualitative Descriptive Study. To investigate the general ward nurses' perceptions of their readiness and psychological health prior to their assignment to the COVID-19 pandemic's outbreak intensive care units (ICUs).	Qualitative study	Purposive sampling Five focus groups consisted of 30 recruited general ward nurses for outbreak ICU deployment	Focus group, semi-structured interview, thematic analysis	Three themes: 1. The theme "Into the deep end of the pool" reflected the feelings of stress and worry general ward nurses experienced due to their increased exposure risk and increased responsibility for caring for critically sick patients. 2. The theme "Preparing for War" demonstrated how crucial clear communication is and the need for critical care nursing training for deployed nurses. 3. "Call of duty" underlined the nurses' desire for more extensive psychosocial support as well as their willingness on a personal and professional level to embrace the shift to the ICUs.
Nasirizad *et al* (2021), Iran	Nursing physical workload and mental workload in intensive care units: Are they related? To examine the concurrent physical and mental workload and potential connections between these two aspects.	Cross sectional study	105 ICU nurses	Demographic questionnaire, Nurses Activity Score (NAS), NASA-task Load Index, SPSS v 25 software IBM	ICU nurses had a disproportionately heavy physical and mental workload, and there was a strong correlation between the two.
Caillet *et al* (2020),	Psychological	Quantitative	Purposive	Questionnaire,	The prevalence of anxiety and

France	impact of covid-19 on ICU Caregivers. To assess the psychological impact of COVID-19 on the caregivers at the peak of the "crisis period".	study	sampling 208 ICU caregivers (84 nurses)	analysed using Mann-Whitney Test for quantitative data, chi-2 test for qualitative data and logistic regression	depression were 48% and 16%, respectively. 27% of respondents reported having PTSD symptoms. The absence of intensive care medicine training and being tasked in COVID19 ICU were independent risk factors for developing anxiety syndrome. Burnout in the past and the absence of ICU training are two independent risk factors for PTSD.
Moreno-mulet *et al* (2021), Spain	The impact of the covid-19 pandemic on ICU healthcare professionals: A mixed methods study. To investigate how COVID-19 patient care affects ICU healthcare providers	Mixed method study	Convenience sampling for quantitative study consisted of 122 ICU healthcare providers (79 nurses) Snowball sampling for qualitative study consisted of 11 participants (4 nurses)	Self-report online survey - analyzed using SPSS 25.0 for Windows, semi-structure in-depth online interview - analyzed using content analysis	The moral distress scale was answered with a score of 2.5 out of 5, the compassion satisfaction scale was moderate to high, and the burnout and compassion fatigue subscales were moderate. Age was positively correlated with workload and the lack of safety equipment, but considerably negatively correlated with professional quality of life. The in-depth interviews revealed three primary categories of pandemic-related themes: (a) clinical, (b) professional, and (c) personal and familial implications in the two waves.
Kader *et al* (2021), Qatar	Perceived stress and post-traumatic stress disorder symptoms among intensive care unit staff caring for severely ill coronavirus disease 2019 patients during the pandemic: a national study. To examine perceived stress and post-traumatic stress disorder (PTSD) symptoms disclosed by ICU staff dealing with COVID-19 patients directly.	Cross sectional study	Purposive sampling 124 participants (117 nurses)	Online survey, SPSS (version 27.0; IBM, Armonk, NY, USA) and Epi Info (Centers for Disease Control and Prevention, Atlanta, GA, USA)	Most participants found that it was moderately to severely stressful to care for COVID-19 patients in the ICU. Additionally, 71.4% of physicians and 74.4% of nurses reported feeling moderate to extremely stressed out. Compared to individuals without prior ICU experience, the staff members with prior ICU experience were less likely to have a probable diagnosis of PTSD.
Bethel *et al* (2022). United States	A qualitative descriptive study of the COVID-19 pandemic: Impacts on nursing care delivery in the critical care work system. To explore nurses' perceptions of the	Qualitative study	Purposive sampling 20 critical care nurses	Online semi-structured interview, content analysis	The nurses spoke about caring for some of the terminally ill patients despite a lack of staff, a shortage of resources, ongoing change, and higher workloads. The impact on patients, critical care nurses, and healthcare systems was extensively discussed by participants along with a variety of barriers and facilitators to care. To continue working during the epidemic, the

	critical care work system during the COVID-19 pandemic in the U.S				nurses modified both patient care and their personal coping mechanisms.
Silverman *et al* (2021), United States	Moral distress in nurses caring for patients with Covid-19. 1. To examine causes of moral distress in nurses caring for Covid-19 patients. 2. To identify strategies to enhance their moral resiliency.	Qualitative study	Purposive sampling: 31 acute care unit nurses taking care of COVID-19 patients	Focus group discussion and in-depth interview, qualitative content analysis	Following were the themes and sub-themes of main factors of moral distress in nurses caring for COVID-19 patients: (a) Lack of knowledge and uncertainty regarding the treatment of a new illness (b) Being overwhelmed by the depth and breadth of the COVID-19 illness (c) Fear of exposure to the virus leading to suboptimal care (d) Adopting a team model of nursing care that caused intra-professional tensions and miscommunications (e) Policies to reduce viral transmission (visitation policy and PPE policy) that prevented nurses to assume their caring role (f) Practicing within crisis standards of care (g) Dealing with medical resource scarcity. - There were three level of coping mechanisms existed based on participants' discussion: individual level, relational level and institutional level.
Zhang *et al* (2021), China	Does Psychological Capital Mediate Occupational Stress and Coping Among Nurses in ICU? To explore mediating effects of PsyCap on the relationship between job stress and coping style among ICU nurses	Cross sectional study	Purposive sampling 288 nurses	Cross sectional survey, SPSS version 20.0	High-level of occupational stress and PsyCap were found among participants who mainly used a positive coping style. PsyCap was significantly negatively correlated with job stress and positively correlated with coping style. Structural equation model analysis revealed that job stress negatively influenced PsyCap, while PsyCap positively influenced coping style.

Challenges Experienced by ICU Nurses in Taking Care of Patients During COVID-19

According to the two qualitative studies, the pandemic raised the workload for nurses in the ICU, which led to a rise in workplace health hazards and care issues (Sezgin *et al*., 2021; Hu *et al*., 2021). Besides, the nurses experienced various challenges during COVID-19, including insufficient workforce and equipment, difficulty in making decisions, increased workload, and many more (Saurin *et al*., 2022; Bethel *et al*., 2022). Furthermore, the nurses' psychological load from working in the ICU is increased; they experience stress and anxiety. (Tang *et al*., 2021; Caillet *et al*., 2020; Kader *et al*., 2021). The fact that ICU healthcare workers have experienced various hardships has qualified them to be recognized as second victims of COVID-19 (Moreno-Mulet *et al*., 2021).

Adaptation Strategies

There were four qualitative studies and one quantitative study under the subtheme of *adaptation strategies*. Four of five studies highlighted the need for interventions for ICU nurses. The interventions include training and psychological support; the nurses should be equipped with sufficient knowledge regarding the disease; and the nurses' management during COVID-19 needs to be followed up to ensure they did it correctly (Hu *et al*., 2021; Tang *et al*., 2021; Kader *et al*., 2021; Bethel *et al*., 2022). Nursing instructors can provide manual instructions to nurses in the ICU and emergency department to enhance the quality of care (Albougami, 2019). Besides, a qualitative study with eight ICU nurses as participants pointed out that to overcome the challenges of lack of equipment and workforce, they use reallocation of sources to cover them (Saurin *et al*., 2022). Finally, a cross-sectional study in China revealed that nurses with excellent adaptation abilities, comradeship, and support systems can transition from burnout to an advanced stage (Yao *et al*., 2021).

The Impact of COVID-19 on Social Life

Three separate studies conducted in Turkey, China, and Spain clarified that based on their studies, it is proved that ICU nurses agreed that COVID-19 has impacted their social life greatly as they need to distance themselves from their families as they might infect them or vice versa (Sezgin *et al*., 2022; Hu *et al*., 2021; Moreno-Mulet, 2021).

The Impact of COVID-19 towards Career Perceptions

A comparative cross-sectional study in Nepal showed that nurses in COVID-19 ICUs tend to have higher intentions to leave the job (Tamrakar *et al*., 2021). A mixed-methods study in Spain also mentioned that the participants heard the issue of colleagues' intent to leave the job for the first time (Moreno-Mulet *et al*., 2021). However, in three different studies, the participants acknowledged that working in the ICU during COVID-19 gave them opportunities for career growth, despite their fear of the risks (Sezgin *et al*., 2021; Hu *et al*., 2021; Tang *et al*., 2021).

DISCUSSION

Challenges in Taking Care of the Patient

A study by Saurin *et al*. (2022) showed that a few challenges occurred in ICUs, such as the supply of spare resources, the variety of viewpoints in decision-making, monitoring and recognizing completed work, and finally, monitoring and understanding of unintended effects. Research is necessary to better understand the experiences of nurses during the COVID-19 pandemic and to discover helpful resources that can improve the well-being of ICU nurses (Guttormson, 2022). Bethel *et al*. (2022) also highlighted in their study that critical care nurses experienced shortages of staff, resource constraints, ongoing transformation, and higher duties during COVID-19. This study's findings are similar to those of Silverman *et al*. (2021). Putting on personal protection equipment (PPE) and using it for a considerable time while delivering patient care has also caused physical distress, especially for nurses who had to spend the entire shift in isolation units.

Studies conducted among intensive care nurses in Turkey and China showed that the pandemic has raised their labor and obligations, which increased the risks of occupational illness and care challenges. (Sezgin *et al*., 2021; Hu *et al*., 2021). According to a study, ICU nurses' mental and physical workload is quite high, and there is a significant association between those two aspects (Nasirizad Moghadam *et al*., 2021). Being assigned to the ICU and COVID-19 was mentioned by Caillet *et al*. (2020) as one of the risk factors for developing anxiety syndrome. Additionally, they highlighted that having a history of burnout is one of the risk factors for post-traumatic stress disorder (PTSD).

Most nurses working in the ICU with COVID-19 patients experience moderate to severe perceived stress (Kader *et al*., 2021). According to research done in Singapore, anxiety and stress are related to increased exposure risk and more outstanding obligations to care for critically ill patients (Tang *et al*., 2021). According to a mixed-methods study conducted in Spain, ICU healthcare personnel should be viewed as second victims of the COVID-19 outbreak, as they have undergone significant psychological, professional, and moral distress (Moreno-Mulet *et al*., 2021). To sum up, ICU nurses have faced significant challenges even before COVID-19, and this pandemic has caused the challenges to become more outstanding.

Adaptation Strategies

The physical and psychological well-being of nurses is significantly impacted by COVID-19. Nurses had to confront many difficulties. Therefore, efficient adaptation measures are required to enhance the well-being of nurses and the quality of care. A qualitative study in Brazil showed that healthcare workers (HCWs) in the ICU have adapted to a lack of resources, such as staff and equipment, by reallocating them as needed (Saurin *et al*., 2022). Besides, this study also revealed that the HCWs overcome the diversity in decision-making by consulting with the patient's caregivers and having frequent meetings between management and staff. Moreover, Saurin *et al*. (2022) mentioned that even though digital technologies helped show the visibility of processes and outcomes in ICU, it is still not sufficient to illustrate the situation to the top health officials in the meetings.

According to the study by Tang *et al*. (2021), the data showed that, although general ward nurses had a positive perception of their anticipated ICU deployment, they nevertheless need continuous assistance to make the shift seamless. In a study managed in Italy, the researchers concluded that during the COVID-19 pandemic, specific interventions to improve the mental well-being of ICU personnel should be implemented and assessed regularly (Kader *et al*., 2021). Not only that, but this study is akin to a qualitative study directed among ICU nurses in the US; the researchers concluded that to minimize adverse effects on patient outcomes, critical care nurses took up most of the adaptation in the critical care work system. This influences their well-being, and as a result, critical care nurses require urgent and continuous assistance from organizations (Bethel *et al*., 2022).

Previous studies reported that nurses with higher degrees of coping skills, camaraderie, and support systems shifted from burnout to leaping forward stages more (Yao *et al*., 2021). Because of the uncertainty and distinctiveness of COVID-19, research done in ICU settings also showed that nurses were worried about getting the disease and spreading it to their loved ones while they were there (Hu *et al*., 2021). They advised that to manage COVID-19 patients and maintain their health, nurses needed interventions such as understanding illness, simulation training, emotional support, and follow-up care.

The Impact of COVID-19 on Social Life

Sezgin *et al*. (2021) highlighted that ICU nurses in their study expressed their loneliness and felt isolated due to their inability to meet with their family members as they were scared that they might contract COVID-19. Besides, the nurses also mentioned that society tends to distance itself from them, as they learned they worked in the COVID-19 ICU. This study's findings are similar to those conducted in ICU settings in China and Spain; the nurses also expressed their concerns about getting the illness and spreading it to their loved ones (Hu *et al*., 2021; Moreno-Mulet *et al*., 2021).

The Impact of COVID-19 towards Career Perceptions

In a mixed-methods study by Moreno-Mulet *et al*. (2021), nurses described it as their first-time hearing co-workers consider leaving the profession. However, relationships among co-workers, their capacity for change, resilience, tolerance, humility, humanism, and empathy were also strengthened. Besides, the ICU healthcare professionals also mention that COVID-19 has strengthened the solidarity of the team, interprofessional collaboration, satisfaction, and dimmed the authority between professional categories by focusing on expertise over rank. Additionally, they believed that society as a whole and the patients' families appreciated their work (Moreno-Mulet *et al*., 2021).

A comparison study of nurses in COVID-19 and non-COVID ICUs revealed that COVID-19 ICU nurses have a higher rate of problems that consist of the concern of sleep disorder, assurance in their ability to treat COVID-19 patients, and intentions to leave their current job (Tamrakar *et al*., 2021). Even though the nurses conveyed their feelings of anxiety and fear upon their deployment to the ICU with COVID-19 patients, they also perceived this as an opportunity for their career growth. They accepted that it was their responsibility as nurses (Tang *et al*., 2021).

A qualitative study in Turkiye disclosed that despite the risks, the ICU nurses claimed that they had to accept the necessity of their line of work. They viewed this procedure as a chance to pick up a variety of new abilities and assume accountability for various new duties. Because they have witnessed the "worst," having such an experience will make their work much simpler during the post-pandemic phase (Sezgin *et al*., 2021). A qualitative study in China exposed that the nurses saw working on the front lines and taking part in this conflict as a privilege. However, because the majority of the patients in the ICU were sick and had significant illnesses, they were also worried about contracting an infection (Hu *et al*., 2021). For future research, it's important for researchers to look into what nursing students think about patient safety and also compare how nurses in various areas like medical, surgical, or specialized units view the same thing (Ludin, & Bajuri, 2020).

CONCLUSION

The COVID-19 pandemic presented enormous difficulties for ICU nurses, affecting not only their physical and emotional health but also their social and professional attitudes. However, nurses may be able to overcome these obstacles and continue providing patients with high-quality care with the aid of adaptation strategies and a support system. ICU nurses' perseverance and commitment during this pandemic show their passion for both their job and the health of their patients. Even though this review tried to investigate adaptation strategies used by ICU nurses to overcome the challenges, it discovered that currently there are fewer studies investigating this issue. Besides, this review also found a scarcity of this kind of issue in Southeast Asia. Hence, it is suggested that further study should focus on the adaptation strategies used by ICU nurses, and it is recommended for researchers from Southeast Asia to explore this issue since different regions may offer varying results. Lastly, the result of this review concludes the need for organizations, colleagues, and social support to help the ICU nurses facing the challenges during COVID-19.

Conflict of Interest

The authors proclaim no potential conflict of interest.

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