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MENTAL HEALTH OF EUROPEAN ICU NURSES WORKING WITH COVID-19 PATIENTS: A SYSTEMATIC LITERATURE REVIEW

ABSTRACT

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Mental health of European ICU nurses working with COVID-19 patients: A systematic literature review

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The purpose of this thesis was to describe the mental health of European ICU nurses during the COVID-19 pandemic. The objective was to summarize the available research of mental health of European ICU nurses during COVID-19 so healthcare organizations could use the results to prevent mental health disorders of ICU nurses and promote their well-being at work.

The thesis was done as a systematic literature review including nine studies. Different databases were used such as PubMed, Medline, CINAHL, as well as academic search premier to collect the data and then analyzed with a content analysis method.

According to the results, the COVID-19 pandemic has affected ICU nurses' mental health in various aspects. Working during the pandemic increased anxiety and depression symptoms and was also associated with high stress levels, exceeding those before the pandemic. During the pandemic, ICU nurses experienced insomnia and poor sleep quality. Additionally, they exhibited high levels of fear of COVID-19, worrying about getting infected with the virus and infecting others, which increased their risk of mental health symptoms. Understanding the impacts that a pandemic has on ICU nurses is necessary to encourage them to remain in the workforce and ensure proper support and explore ways to provide enhanced support in future pandemics.

In conclusion, this systematic review shows that the COVID-19 pandemic has affected ICU nurses' mental health. The findings highlight increased anxiety, depression, stress levels, insomnia, poor sleep quality, fear of COVID-19, and symptoms of PTSD among ICU nurses.

Keywords: ICU nurses, COVID-19, mental health

CONTENTS

1 INTRODUCTION

During December 2019, many cases of pneumonia emerged in China, Wuhan, later identified as the SARS-Cov-2 virus, commonly known as the corona virus or COVID-19 (WHO, 2023a). The World Health Organization (WHO) officially declared COVID-19 a pandemic during March 2020, as the number of cases increased in many countries and continents (Cucinotta & Vanelli, 2020). To this day, the pandemic remains a global health concern and 6.9 million deaths have been reported and in Europe 2,2 million people have died from the disease (WHO, 2023b). Even though COVID-19 is no longer classified as a Public Health Emergency it continues to have a major impact globally and it is clear the virus will stay many years to come (WHO, 2023c).

The pandemic had a severe impact on European countries, particularly on health care workers who were tasked to treat patients in critical conditions but also having their own fear of getting contaminated and contaminating their families (Marazziti et al., 2020; Beck & Daniels, 2023). The virus hit hard in many places in Europe, especially in Italy during the first wave. The number of cases caused a severe threat to the Italian national health system because of the limited capacity on ICU units, weeks after a lot of other European countries had similar problems (Saglietto et al., 2020).

The COVID-19 virus makes it a big risk for patients to be admitted to the intensive care unit (ICU) simultaneously and makes it a big challenge for the health care systems (Grasselli et al., 2020). Nurses have had an important role in the pandemic since they are at the front-line everyday caring for patients and delivering care directly to patients compared to other healthcare workers (Galehdar et al., 2020). Reports have been made of nurses working long hours with personal protective equipment (PPE) having extreme exhaustion and fear of catching the virus during the pandemic, lacking access to good PPE have had bigger risks for symptoms of depression and anxiety (Neto et al., 2020; Arnetz et al., 2020).

Research indicates that the occurrence for anxiety and major depression disorder during the COVID-19 pandemic resembled those in earlier pandemics such as SARS (Hill et al., 2022). The evidence shows that nurses were found to be at increased risk for having psychological problems in comparison to other healthcare workers during the prevalence of a pandemic because they are more likely to encounter patients with the virus (Hill et al., 2022). Therefore, it is important to study the impact of the pandemic on ICU nurses' mental health to prevent this in future pandemics and to enhance the overall mental health of ICU nurses.

The purpose of this thesis is to describe the mental health of European ICU nurses during the COVID-19 pandemic. The objective is to summarize the available research of mental health of European ICU nurses during COVID-19 so healthcare organizations could use the results to prevent mental health disorders of ICU nurses and promote their well-being at work.

2 BACKGROUND

This chapter explores the current literature and provides background information of this research topic. Key concepts of this thesis describe COVID-19 pandemic effect on nurses, mental health of nurses in general, and mental health of nurses in earlier pandemics.

2.1 COVID-19 pandemic effect on nurses

The COVID-19 pandemic has been affecting nurses and other healthcare workers in different aspects. According to Morley et al. (2020) the safety of nurses has been a concern because of the working conditions they have been facing. In the same study the nurses did not only express concerns about the lack of protective gear and personal safety but also their worries about transmitting the virus to their families. During the pandemic a lot of healthcare workers were also relocated to work in the ICU and began to feel like objects because they had to adopt their own lives of the employer's needs according to a study by Hallgren et al. (2022). They also had limited knowledge about the virus and how it spread which had a bad effect on their wellbeing in the same study. The nurses felt that they gave poorer quality patient care, had a lot of feelings of helplessness and moral distress because their inability to do their best (Moreno-Mulet, et al., 2021). Also, a lot of ethical dilemmas occurred, many patients passed away without their families present, affecting nurses and other healthcare workers greatly. Healthcare workers in some aspect may be seen as second victims of the COVID-19 pandemic because how it affected their personal, professional, and clinical lives (Moreno-Mulet, et al., 2021).

According to Haileamlak (2021) the COVID-19 pandemic also had a significant impact on healthcare in general and delayed a lot of services, both preventive care and curative care. He also states that the patients were unable to attend their check-ups and attend non acute services that in self-delayed more essential services (Haileamlak, 2021). Healthcare systems had major changes because of the pandemic and elective surgeries and non-acute care got postponed according to Yiasemidou et al. (2021) and a lot of patients with chronic diseases post

phoned their follow ups rather than go to the hospital. This has a big impact in the long run-on health care services and may affect many years on, so hospitals should offer more well-being sessions for healthcare workers to cope with the challenges from the pandemic (Yiasemidou, et al., 2021). This may impact ICU nurses in the long run because being constantly exposed to having high stress levels and seeing traumatic events can eventually lead to nurses getting burnouts (Hinderer et al., 2014). It is important to prevent this and research indicates that having a support system is important, including support from colleagues (Hinderer et al., 2014).

2.2 Mental health of nurses

According to the World Health Organization and the definition of mental health in this thesis is "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2022). Mental health is a difficult concept to define but a lot of factors such as anxiety, depression and stress can affect a person's mental health (Felman, 2022). Regardless of people's income, sex, age, and ethnicity everyone is at some risk of developing a mental health disorder (Felman, 2022). Another concept is psychological distress that generally described as a condition of emotional distress with symptoms as anxiety and depression, it is characterized by somatic symptoms as insomnia and fatigue (Horwitz, 2002). Psychological distress is prevalent among healthcare workers, particularly among nurses (Belay at al., 2021).

It has been demonstrated that healthcare workers suffer a lot from work-related stress that can lead to burnout and mental disorders (Ruotsalainen, 2015). Nurses have been reported to have more burnouts than other health care professionals due to their work environment, even before the pandemic and that the high burnout during the pandemic can be a consequence of the high burnout rates before the pandemic (Aiken et al., 2023). According to Khamisa et al. (2015) poor staff management, lack of resources and security risks for the employers are some of the factors contributing to this. They also state that having burnouts also compromises the impact of the quality of patient care and to prevent this,

hospitals should create environments where nurses have decent resources and secureness to profitably do their jobs. Having staffing shortage or heavy workload and high turnover makes it hard to provide good quality care for patients which gives nurses a bigger risk for burnout (Humphries et al., 2014).

Even before the pandemic the mental health of ICU nurses has been affected a lot by occupational stress according to a study by Tajvar et al. (2015), one reason for this has been related to shift work. ICU nurses working night shifts had bigger mental health issues than those working day shifts (Tajvar et al., 2015). Working in an ICU as nurse usually requires you to work in shifts and they have a very demanding work environment where they are exposed to stressful events that can lead to burnout (Shariari & Yazdannik, 2014). According to Mealer et al. (2007) they are more likely to have post-traumatic stress disorder (PTSD) symptoms compared to general ward nurses and these symptoms are similar to what veterans or traumatic victims are experiencing. Understanding ICU nurses' mental health before the pandemic is valuable as it provides a baseline for comparing their mental health before and after the pandemic.

2.3 Mental health of nurses during earlier breakouts

Nurses have always had a big role in outbreaks and pandemics according to the American Nurses Association (2018) because they are essential to prevent widespread illnesses (Corless et al., 2018). According to a study made by Erhuvwukorotu et al.(2017) the nurses were living in fear during an Ebola outbreak which affected them psychologically. Also, during the Ebola virus outbreak in West Africa in 2014 nurses had difficulties falling asleep during their mission and working under unfamiliar environment with unsafety working conditions were stressful (Liu et al., 2019). Another study that investigated nursing staffs experience after working at an Ebola treatment center in West Africa said that they had a big need to get mental health and psychosocial support after their deployment and required to learn about coping mechanism (von Strauss et al., 2017).

There has been a lot of focus on having enough protective equipment but not about the physical health needs of healthcare workers during an outbreak

(Greenberg et al., 2015). A previous study has shown that an outbreak respond needs a quick assessment of psychological stressors for both health care workers and civilians (Shultz et al., 2015). Stigma around an epidemic or pandemic can influence mental health in nurses, that is why it is important that policymakers should make efforts to decrease stigma around infectious diseases (Park et al., 2018). Also, during the MERS-CoV outbreak is South Korea 2015 the mental health of nurses was worse engaging with infected patients than engaging in other wards (Park et al., 2018). The importance of knowing nurses' mental health during earlier breakouts helps identify the factors that contribute to nurses' mental health during a pandemic and inform policy makers to reduce these issues in the future (Shah et al., 2020).

Until this date there are limited studies about nurses' experiences of an epidemic or pandemic, especially compared from other healthcare professionals. It has not been clear before how the nurse's input has been taken into consideration, especially in the early stages of a pandemic (Corless et al., 2018). Understanding the impacts that a pandemic has on nurses is necessary to get them to remain in the workforce and be supported (Fernandez et al. 2020).

3 THE PURPOSE AND OBJECTIVE OF THE THESIS

The purpose of this thesis is to describe the mental health of European ICU nurses during the COVID-19 pandemic. The objective is to summarize the available research of mental health of European ICU nurses during COVID-19 so healthcare organizations could use the results to prevent mental health disorders of ICU nurses and promote their well-being at work. The research question is the following:

1. What is the mental health of European ICU nurses working with COVID-19 patients?

4 DATA COLLECTION, DATA AND ANALYSIS

4.1 Systematic review as a method

The research question was answered through a systematic literature review, which provides an overview over already existing research on a specific topic. For this thesis it was an appropriate and relevant method to describe the mental health of European ICU nurses during the pandemic (Hempel, 2019). It involved summarizing the available research to answer the research question, offering new perspectives for existing scientific topics, and providing a context for future research (Hempel, 2019). The intention was to review and comment on the literature related to the topic and demonstrate an understanding of the research and methods. The aim was to focus on a particular research question instead of merely identifying general knowledge gaps (Aveyard, 2010). This systematic review involved conducting searches, critically assessing the literature, and then motivating the research question by linking it to already existing literature, it was chosen because it summarizes the available research knowledge to answer the research question in this thesis.

4.2 Literature search

The PICO (Problem/patient, intervention, comparison, outcome) was used to justify if the research question can be answered by a systematic literature review. This is in the appendix 1. Following the PICO criteria guided the inclusion and exclusion criteria and selecting the correct method and it also helped create the right search terms and synonyms for the literature search (Mikkonen & Kääriäinen, 2019).

Literature search was conducted in February 2022 and updated in February 2023 and March 2024. The following keywords were used: ICU nurse AND mental health AND COVID-19. Different databases were used as PubMed, Medline, CINAHL, and academic search premier. These research databases are available within health literature both globally and personally (PUBMED, 2022). They also have the most records of Nursing and Health Literature (EBSCO, 2022). The

updated literature search was conducted in February 2023 with the same databases. The key words were the same for PubMed but for the other databases the keywords were ICU nurses or intensive care nurses or critical care nurses AND covid-19 or coronavirus or pandemic AND mental health or mental illness or mental disorder or psychiatric illness to get more accurate studies. The search strategy is presented in table 1 with all the findings. The updated search chart from February 2023 can be found in the appendix 2 which includes one study in this thesis. The updated search in March 2024 did not include studies in this thesis.

The studies were limited to only English, Swedish, and Finnish language, and the year 2019 onwards. The location was originally global, but later limited to Europe to be more manageable and comprehensive analysis of the region. The studies had to be peer-reviewed.

Table 1. Search strategy

Date	Search terms
16/2/22-1/3/22	ICU nurse and mental health and covid-19 Pubmed (n =65) Medline (n=22) Cinahl (n=11) Academic search premier (n=21)
Updated search 15/2-2023 -25/2/2023 Old and new findings	ICU nurse and mental health and covid-19 Pubmed (n=93) ICU nurses or intensive care nurses or critical care nurses and covid-19 or coronavirus or pandemic and mental health or mental illness or mental disorder or psychiatric illness Medline (n=76) Cinahl (n=49) Academic search premier (n=54)
Updated search 25/2-2023- 23/2/2024 New findings	ICU nurse and mental health and covid-19 Pubmed (n=21) Medline (=8) Cinahl (=13) Academic search premier (n=17)

A systematic approach was used in this systematic literature study to increase the reliability, this means having clear inclusion and exclusion criteria (Forsberg & Wengström, 2003, p.26-28). Also, a systematic assessment of the validity of the included articles, this means explaining reasons why eventual articles were excluded or included in this thesis (Forsberg & Wengström, 2003, p.26-28).

This thesis inclusion criteria were published in full text and published from 2019 onwards because that's when the pandemic started (WHO, 2023a).

The inclusion criteria for these studies were that the studies could be written in English, Swedish or Finnish. Participants must be ICU nurses who worked with COVID-19 patients. Exclusion criteria included studies conducted outside of Europe. The targeted profession included in this study had to be intensive care nurses working in a COVID-19 ICU or in an ICU with a majority of COVID-19 patients. The specific inclusion and exclusion criteria are presented in Table 2.

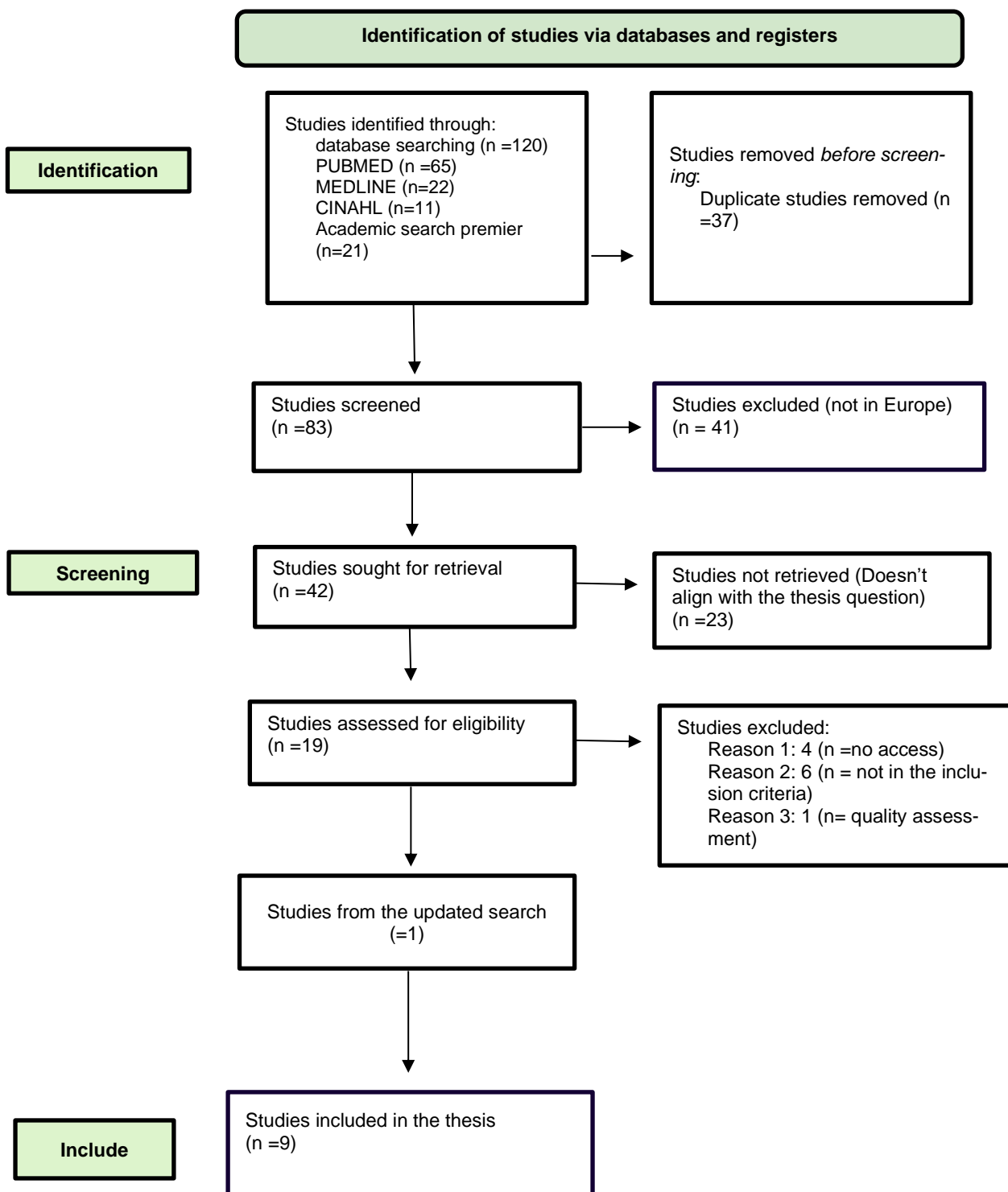Table 2. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Published from 2019 onwards.	Published before 2019.
Study written in English, Swedish or Finnish.	Study written in other language than mentioned.
ICU nurses that have been working with COVID-19 patients	NON-ICU nurses or other healthcare worker. ICU nurses working with non-COVID-19 patients.
In Europe	Outside of Europe

In the first literature search 120 studies were identified from these databases. After duplicates (37) were excluded 83 studies were left for screening and studies conducted outside Europe (41) were excluded. After screening the title and abstract of each study and assessment of the full texts for eligibility, 8 studies were included from the first literature search. The studies excluded was those that did not align with the thesis question, no access to them or not in the inclusion criteria (Hempel, 2019).

In the updated literature search, 272 studies were identified from the databases. Following the removal of 94 duplicates, 178 studies remained for screening. Subsequently, 122 studies were excluded as they were not conducted in Europe. Out of these, 56 were sought for retrieval, but they were not included due to their exclusion in the initial literature search or their prior inclusion in studies identified during the first search. The studies assessed for eligibility totaled 29, with reasons

for exclusion being either lack of access or not in the inclusion criteria. Consequently, only 1 study was included in this thesis from the updated literature search. 8 studies were included from the first literature search and 1 from the updated literature search so overall 9 studies were included in this thesis (Figure 1).

FIGURE 1. PRISMA diagram for article selection

Identification of studies via databases and registers

Identification

Studies identified through:
database searching (n =120)
PUBMED (n =65)
MEDLINE (n=22)
CINAHL (n=11)
Academic search premier (n=21)

Studies removed *before screening*:
Duplicate studies removed (n =37)

Studies screened
(n =83)

Studies excluded (not in Europe)
(n = 41)

Screening

Studies sought for retrieval
(n =42)

Studies not retrieved (Doesn't align with the thesis question)
(n =23)

Studies assessed for eligibility
(n =19)

Studies excluded:
Reason 1: 4 (n =no access)
Reason 2: 6 (n = not in the inclusion criteria)
Reason 3: 1 (n= quality assessment)

Studies from the updated search
(=1)

Include

Studies included in the thesis
(n =9)

4.3 Quality Appraisal

The quality of the eligible studies was assessed according to the Joanna Briggs Institute critical appraisal tool (2020). I critically reviewed the studies because some may differ in quality, and some will be more important to answer the research question (Hempel, 2019). Since the design of the nine eligible studies was cross-sectional, the checklist for analytical cross-sectional studies was chosen. Two reviewers (myself and another Master's student) appraised the trustworthiness and relevance of the studies, which eliminated studies with low quality (Mikkonen & Kääriäinen, 2019). We considered if the study design was relevant for the participants and if the results were reported truthfully (Mikkonen & Kääriäinen, 2019).

This toolkit consists of eight different questions, and the response options are ''yes,'' no,'' '' unclear,'' or ''not applicable.'' In this toolkit is also an explanation section for every question with some examples (JBI,2020). After completing our assessments, we discussed our findings and worked on a mutual agreement on which studies should be included and what was relevant to the research question (Mikkonen & Kääriäinen, 2019).

Doing the quality check, one study was excluded, and eight of the nine studies were high quality and got at least 6/8 points in the tool. In the updated literature search one study was assessed in the tool and got 7/8 points so resulting in a total of nine studies being included in this systematic review.

The quality of each study is presented in the summary table in appendix 4.

4.4 Data analysis

Inductive content analysis was used to process the results in this systematic review which means the data was extracted and synthesized (Mikkonen & Kääriäinen, 2019). The research question (What is the mental health of European ICU nurses working with COVID-19 patients?) was a guideline for the content analysis. The data were extracted independently from the included studies. A summary table was made that is presented in appendix 4. This includes various types of information as publication dates, authors, participants characteristics and which research methodologies were used but also main results (Mikkonen & Kääriäinen, 2019).

The findings of all nine selected studies were collected under one table. The process began with the raw data being divided into codes; the raw data consists of phrases or whole sentences (Mikkonen & Kääriäinen, 2019). For example, the raw data could be: ' Among the COVID-19 ICU staff, nurses had the highest anxiety score'' (Celik & Dagli, 2021). This raw data provided me with meaning units, which were further simplified by creating 32 codes, such as ' Nurses had the highest anxiety score among staff'. The codes were then reviewed and read through multiple times (Mikkonen & Kääriäinen, 2019). The content analysis process, from raw text to codes, is presented in Appendix 3. Subsequently the codes were organized into 11 subcategories based on their content, context, and how relevant they are to each other (Mikkonen & Kääriäinen, 2019). For example, the code above led to the subcategory 'high anxiety.' Each subcategory had to include at least two similar codes.

These codes then formed the categories anxiety, depression, stress and fear and, ultimately, one main category ' Psychological distress' that answered the research question. Table 3 provide an example of data analysis results with quotes and codes to the main category.

Table 3: Data analysis result

Example of quotes	Codes	Sub-category	Category	Main category
'' Among the COVID-19 ICU staff, nurses had the highest anxiety score''(1) '' The levels of state anxiety were found to be higher in those working in the intensive care unit… during the pandemic'' (6)	Nurses had the highest anxiety score among staff. Nurses working in an ICU unit had high levels of anxiety.	High anxiety	ANXIETY	PSYCHOLOGICAL DISTRESS
''While the majority of nurses reported symptoms of anxiety (61,5%)'' (3) '' The first surge of the COVID-19 pandemic had a profound impact on the mental well-being ICU nurses…one in four had symptoms of anxiety.'' (2) ''The mean total SAS score of the nurses was 51.51 ± 9.94(Table2)… 65.5% had anxiety'' (6) ''Symptoms of anxiety, % Nurses (n = 498) 7 (5–10) 50%…'' (8) '' Norwegian COVID-ICUs were experiencing low symptom levels of anxiety… during the first wave of the pandemic'' (9)	Majority of nurses reported symptoms of anxiety. One in four ICU nurses had symptoms of anxiety. Nurses reported anxiety during the pandemic. ICU nurses reported symptoms of anxiety. Low symptom levels of anxiety during the first wave of the pandemic.	Symptoms of anxiety		
''Nurses were more likely to meet the thresholds…and anxiety (moderate and severe)'' (4) ''When these findings are considered together, the majority of the intensive care nurses had severe or extremely severe…anxiety (45.4%)'' (5)	Nurses had moderate to severe anxiety. ICU Nurses had severe or extremely severe anxiety levels.	Moderate or severe anxiety.		

Example of quotes	Codes	Sub-category	Category	Main category
'' Among the personnel of COVID-19 ICU, depression levels of nurses were found to be the highest,''(1) ''Nurses were more likely to meet the thresholds for depression (moderate and severe)'' (4) ''When these findings are considered together, the majority of the intensive care nurses had severe or extremely severe depression (39.2%)'' (5) ''The rate of moderate-to-severe depressive symptoms was significantly higher in intensive care unit nurses'' (7)	High depression levels of ICU COVID-19 nurses. Nurses had moderate and severe depression. ICU nurses had severe or extremely severe depression score. ICU nurses had high rates of moderate- to severe depression symptoms.	High or severe depression	DEPRESSION	PSYCHOLOGICAL DISTRESS
''The first surge of the COVID-19 pandemic had a profound impact on the mental well-being ICU nurses one in five had symptoms of depression'' (2) '' reported normal levels of depression, with no differences between nurses and physicians''…'' (3) ''HADS = Hospital Anxiety and Depression Scale'' Symptoms of depression, %... 31.6'' (8) ''Norwegian COVID-ICUs were experiencing low symptom levels of…depression'' (9)	One in five ICU nurses had symptoms of depression. Nurses reported normal levels of depression. ICU nurses reported symptoms of depression. Low symptom levels of depression during the first wave of the pandemic.	Symptoms of depression		
''COVID-19 ICU nurses had higher stress levels than ICU nurses'' (1) ''A clear association with the surge is seen in stress levels, as experienced stress was 2.5 times higher than before the pandemic and remained elevated after the surge.'' (2) ''When these findings are considered together, the majority of the intensive care nurses had severe or extremely se-vere…stress (27.9%)'' (5) ''The mean total SAS score of the nurses was 51.51 ± 9.94(Table2). Stress due to the	High stress levels among COVID-19 ICU nurses. Higher stress levels than before the pandemic and remained high after. ICU nurses had severe or extremely severe stress score.	Stress symptoms	STRESS	

Example of quotes	Codes	Sub-category	Category	Main category
COVID-19 outbreak accounted for 73.6%'' (6)	Nurses reported stress during the pandemic.			PSYCHOLOGI-CAL DIS-TRESS
''Symptoms of…PTSD (post traumatic stress disorder) , were present in 256 (35.3%) of the ICU nurses'' (2) ''Nurses were more likely to meet the thresholds...probable PTSD… (moderate and se-vere)'' (4) ''Norwegian COVID-ICUs were experiencing low symptom lev-els of…PTSD during the first wave of the pandemic'' (9)	ICU nurses had symptoms of PTSD. Nurses had mod-erate and severe probable PTSD. Low symptom levels of PTSD during the first wave of the pan-demic.	PTSD	STRESS	
''71% of nurses reported symp-toms of insomnia''(3) ''39.7% of the nurses experi-enced moderate or severe in-somnia'' (5) ''sleep disorders may occur in healthcare workers during COVID-19 outbreak. Intensive care unit nurses were at highest risk.'' (7)	Nurses reported symptoms of in-somnia. Nurses experi-enced moderate or severe insom-nia. ICU nurses had high risk for sleep disorders.	Sleep prob-lems		
''First of all, our study; revealed that COVID-19 ICU staff work-ing at the forefront of care and treatment of COVID-19 patients had higher levels of COVID-19 fear… than ICU staff'' (1) ''Moreover, younger partici-pants, and ICU nurses exhibited a higher level of fear for COVID-19 disease.'' (7)	Working in a COVID-19 ICU was associated with high levels of COVID-19 fear. ICU nurses had a high level of fear of COVID-19	High COVID-19 fear.	FEAR	
''Analyses indicated that fear of infecting relatives and insuffi-cient number of trained person-nel were significantly associated with increased risk for symp-toms of anxiety, depression, PTSD'' (2) ''reported fear of infecting oth-ers, especially family members in their own household.''. (9)	Fear of infecting relatives was as-sociated with higher risk for mental health symptoms. Reported a fear of infecting oth-ers.	Fear of in-fecting others		
''The mean total SAS score of the nurses was 51.51 ± 9.94(Table2)…and 61.6% were worried about being infected with COVID-19'' (6)	Nurses were worried about being infected with COVID-19	Fear of being infected.		

Example of quotes	Codes	Sub-category	Category	Main category
''Fear of being infected…were independently associated with the presence of psychological burden'' (8)	during the pandemic. Fear of being infected was associated with psychological burden.	Fear of being infected	FEAR	PSYCHOLOGICAL DISTRESS

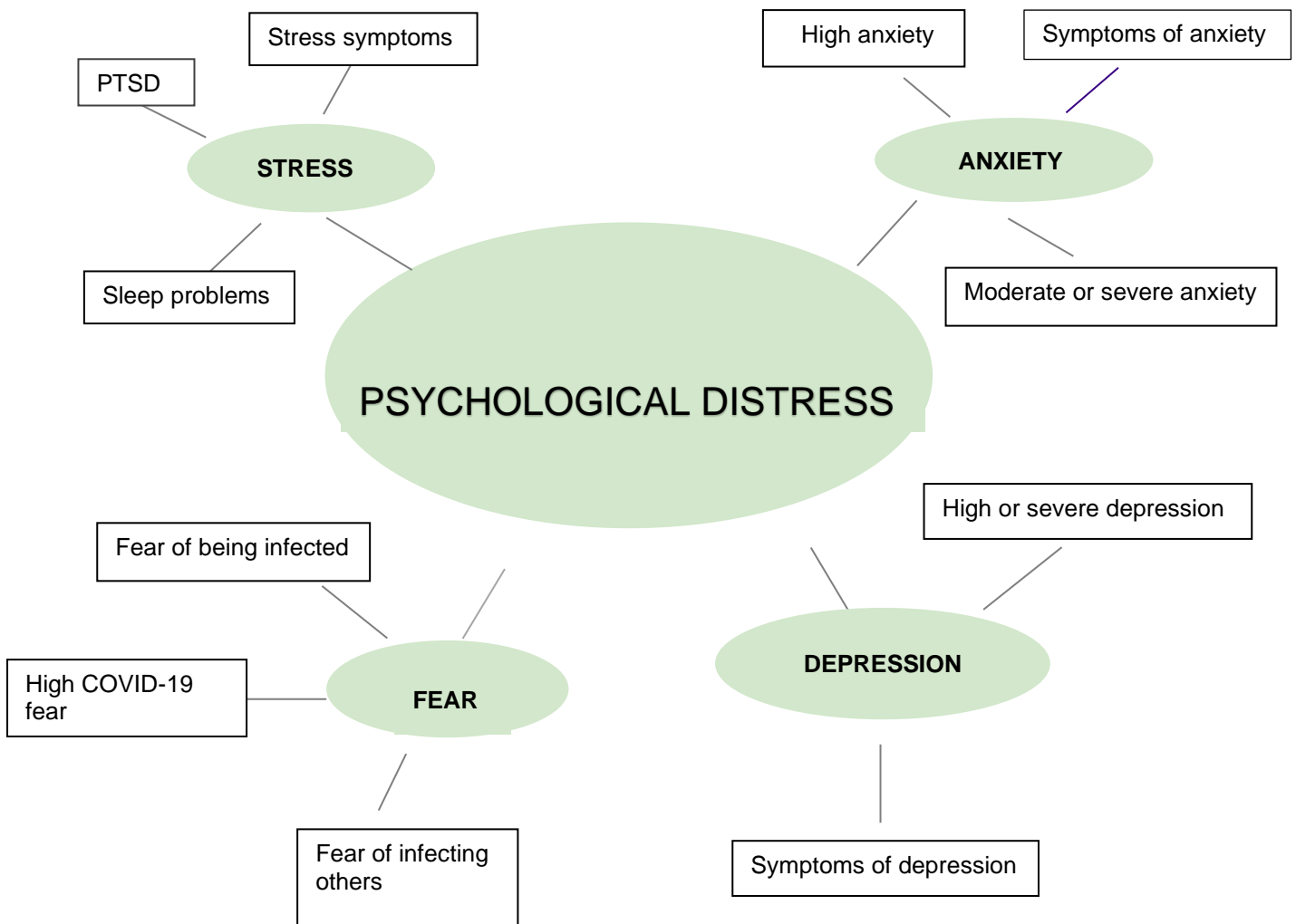In FIGURE 2 is an overview of results to simplify it.

FIGURE 2: Overview of results

5 RESULTS

The results section of this thesis provides an overview of the study characteristics. One main category describing the mental health of European ICU nurses working with COVID-19 patients was psychological distress, consisting of four categories: 1) Anxiety, 2) Depression, 3) Stress, and 4) Fear.

5.1 Study characteristics

Nine studies were included in this systematic review. The countries that were covered in the studies included Turkey [4] (Celik & Dagli 2021; Kandemir et al., 2022; Bahadir-Yilmaz & Yüksel., 2021; Saracoglu et al., 2020), Italy (Stocchetti et al., 2021),the Netherlands (Heesakkers et al., 2021), Norway (Stafseth et al., 2022), England (Greenberg et al., 2021), and France (Azoulay et al., 2020). The study design was cross-sectional in all included studies (Celik & Dagli 2021; Heesakkers et al., 2021; Stocchetti et al., 2021; Bahadir-Yilmaz & Yüksel 2021; Saracoglu et al., 2020; Azoulay et al., 2020; Stafseth et al., 2022; Kandemir et al., 2022; Greenberg et al., 2021).ICU nurses and the sample size varied between 84 (Stocchetti et al. 2021; Celik & Dagli,2021 and 100 (Heesakkers et al., 2021; Greenberg et al., 2021; Kandemir et al., 2022; Bahadir-Yilmaz & Yüksel 2021; Azoulay et al., 2020).

Four studies measured the prevalence of anxiety of ICU nurses during the pandemic (Azoulay et al., 2020; Bahadir-Yilmaz & Yüksel., 2021; Stocchetti et al., 2021; Heesakkers et al., 2021). Single studies focused on the fear of COVID-19 and how it affected nurses' mental health (Celik & Dagli, 2021), depression, anxiety, insomnia, and stress levels of ICU nurses (Kandemir et al., 2022), the amount of mental health disorders in the ICU staff (Greenberg et al., 2021), and the risks for depression, PTSD and sleep problems (Saracoglu et al., 2020). The characteristics of all nine studies are presented in Appendix 4.

5.2 Psychological distress

Psychological distress is the main category which describes the mental health of European ICU nurses which consists of four categories: 1) Anxiety, 2) Depression, 3) Stress, and 4) Fear.

5.2.1 Anxiety

The category anxiety consists of the subcategories: 1. Symptoms of anxiety, 2. High anxiety, and 3. Moderate or severe anxiety.

ICU nurses reported symptoms of anxiety during the pandemic in the countries Italy, the Netherlands, Turkey and France (Stocchetti et al., 2021; Heesakkers et al., 2021; Bahadir-Yilmaz & Yüksel 2021; Azoulay et al., 2020). One study conducted in Norway indicated low symptom levels of anxiety during the first wave of the pandemic (Stafseth et al., 2022).

The level of anxiety varied among nurses. In Turkey, the majority of ICU nurses reported severe or extremely severe anxiety (Kandemir et al., 2022) or high level of anxiety (Celik & Dagli, 2021; Bahadir-Yilmaz & Yüksel, 2021) while working in a COVID-19 ICU: In England, nurses were more likely to meet the threshold for anxiety at moderate to severe levels (Greenberg et al., 2021).

5.2.2 Depression

The category depression consists of the subcategories: 1. High or severe depression, and 2. Symptoms of depression.

ICU nurses showed symptoms of depression in the Netherlands and France (Heesakkers et al., 2021; Azoulay et al., 2020).
High rates of moderate to severe depression symptoms were observed among the nurses in England and Turkey (Greenberg et al., 2021; Saracoglu et al., 2020). ICU nurses had also high or extremely severe levels of depression in studies made in Turkey (Kandemir et al., 2022; Celik & Dagli 2021). One study in

Norway showed low symptom levels of depression during the first wave of the pandemic (Stafseth et al., 2022), while normal levels of depression were reported in Italy (Stocchetti et al., 2021).

5.2.3 Stress

The category stress consists of the subcategories: 1. Stress symptoms, 2. Sleep problems, and 3. PTSD.

ICU nurses reported stress symptoms during the COVID-19 pandemic (Bahadir-Yilmaz & Yüksel., 2021), from high stress levels (Celik & Dagli 2021) to severe or extremely severe stress scores (Kandemir et al., 2022) in Turkey. The stress levels were higher than before the pandemic and remained high after in the Netherlands (Heesakkers et al., 2021).

ICU nurses during the COVID-19 pandemic also reported high risk for sleep disorders with symptoms of insomnia in Italy and Turkey (Stocchetti et al., 2021; Saracoglu et al., 2020) with moderate or severe insomnia (Kandemir et al, 2022). Additionally, ICU nurses had symptoms of PTSD in the Netherlands (Heesakkers et al., 2021) and likely to meet the threshold for moderate to severe PTSD in England (Greenberg et al., 2021). In Norway the COVID-19 ICU nurses had low symptom levels of PTSD during the first wave of the pandemic in Norway (Stafseth et al., 2022).

5.2.4 Fear

The category fear consists of the subcategories: 1. High COVID-19 fear, 2. Fear of infecting others, and 3. Fear of being infected.

Studies showed that ICU nurses working in COVID-19 ICU had high levels of COVID-19 fear in Turkey (Celik & Dagli 2021; Saracoglu et al., 2020). They were worried about being infected with the virus during the pandemic (Bahadir-Yilmaz & Yüksel 2021). Also having the fear of being infected was associated with a psychological burden on them in France (Azoulay et al., 2020). They also

reported a fear of infecting others, especially family members and this was asso-ciated with a higher risk for mental health symptoms in Norway and the Nether-lands (Stafseth et al., 2022; Heesakkers et al.,2021).

6 ETHICAL PERSPECTIVES AND RELIABILITY

This chapter explains the ethical perspectives and the reliability and trustworthi-ness of the thesis.

6.1 Ethical perspectives

This study was performed according to The Finnish Advisory Board on Research Integrity (TENK,2012) and their guidelines throughout the research process. The principles of the research community, such as having integrity, awareness, and truthfulness in conducting research were followed (TENK, 2012). This thesis demonstrates these principles through showing that the methods used were eth-ically sustainable and accommodate scientific criteria. The results published are discussed in an open and responsible way with scientific knowledge. Other peo-ple's work and citing their publications accordingly were respected. The refer-ences were done according to Diak's guidelines for writing thesis papers.

The study was conducted and planned according to the standards set for scien-tific knowledge. These nine studies were collected from reliable sources from search engines advised by Diakonia University of applied sciences and their li-brary guides.

6.2 Reliability and trustworthiness

The first thing is to check for personal biases which may have influenced the findings. This matter was the authors personal experience with working with COVID-19 patients as a nurse. That is why it was important to have reliable sources and only other nurses' experiences. This is also why the focus was cho-sen on the intensive care nurses as there is no experience from that field. While analyzed the data and showed the results it was demonstrated the clear thought

process in detail. Also making sure that the data perceptions were consistent and easy to understand for the reader, to make it clear as possible (Noble & Smith 2015).

To ensure the trustworthiness of a content analysis there are different phases. In the preparation phase, choosing the most suitable method for collecting the data is essential to ensure its credibility (Elo et al., 2014). In this case choosing a systematic review was a good way of delivering a comprehensive overview over available research in this topic. To describe the mental health of European ICU nurses during the COVID-19 pandemic. In the sampling strategy it is important to be structured and all steps being explained in detail. This means in the thesis having relevant keywords and search terms and having tools like the pico to help (Elo et al., 2014).

In the organization phase to ensure the trustworthiness of this thesis includes open coding, creating categories and abstraction. These steps are crucial in organizing and making sense of the research findings (Elo et al., 2014). While organizing the thesis, the challenges are to figure out how to create relevant categories to answer the research question. This phase involves important steps like open coding, making categories, and abstraction, which are crucial for organizing and making sense of the research findings (Elo et al., 2014).

Reporting results should be presented systematically and logically. (Elo et al., 2014). The results were put into meaningful units and then codes and then subcategories and then categories and then one main category that answered the research question. The content is also presented in a clear and understandable way.

It is important to explain the methodology used to generate the results. Readers should easily understand the analysis and the conclusions drawn from it (Elo et al., 2014). The results were carried out in a systematic way with the help of content analysis. The results are trustworthy because the method and analysis are transparent and systematic. The data was merged and extracted. This way the data was approached systematic with the tools used (Mikkonen &

Kääriäinen,2019). To enhance the credibility of this systematic review, the nine full-text studies included in the final review were read multiple times for clarification (Mikkonen & Kääriäinen,2019). In this research, it's been made sure to be clear and transparent about the methods chosen. The information is easy to understand, thanks to tables and figures. All the nine studies were collected from reliable sources chosen from Diaconia University of applied sciences search engines. All the included and excluded studies were explained in the PRISMA Flow diagram in Figure 1. Additionally, the template from Diaconia University of Applied Sciences was used.

7. DISCUSSION

The purpose of this thesis was to describe the mental health of ICU nurses during the COVID-19 pandemic.

Based on the results of this systematic review the COVID-19 pandemic has affected ICU nurses' mental health in various aspects. The findings show that working during the pandemic increased anxiety and depression symptoms. It was also associated with high stress levels, exceeding those before the pandemic. During the pandemic, ICU nurses experienced insomnia and poor sleep quality. Additionally, they exhibited high levels of fear of COVID-19, worrying about getting infected with the virus and infecting others, which increased their risk of mental health symptoms. They also had symptoms of PTSD. There were also some local differences; for example, in Norway (Stafseth et al., 2022), the ICU nurses experienced lower anxiety, PTSD and depression levels compared to their counterparts in other European countries.

The mental health of nurses was in fact worse working with infected patients than working in other wards like in the MERS-Cov outbreak in South Korea in 2015 (Park et al., 2018). This thesis indicates that ICU nurses' mental health was compromised during the pandemic. According to Mureno-Mulet et al. (2021) healthcare workers in some aspect may be seen as second victims of the COVID-19 pandemic because how it affected their personal, professional, and clinical lives. It is important to take into account that understanding nurses' mental health prior to the pandemic is a bit challenging due to lack of comparative studies.

The result from this thesis also supports the work of other studies that the fear of infection of the virus and symptoms of depression was associated with higher levels of psychological distress (Hovland et al., 2023). Also, that nurses having insomnia was more likely to evolve to psychological distress (Belay et al., 2021). ICU nurses should be supported and protected both now and in the future. More attention should be paid to them to promote their well-being at work (Celik & Dagli, 2021).

The following enhancements could assist healthcare organizations to use this result to prevent mental health disorders of ICU nurses and promote their well-being at work:

1. Studies has shown a correlation between stress and sleep problems so it should be important that healthcare organizations provide rest areas for the ICU nurses and limit their shift hours (Kandemir et al., 2022).
2. Implementing preventive interventions such as access and education in using protective gear and specific training in treating this particular patient group can prevent the ICU nurses having fear of getting infected or infecting others, thereby preventing anxiety (Kandemir et al., 2022, Shen et al., 2020).
3. It is essential to provide psychological support to the ICU nurses and having early psychological assessments for them, this can include individual psychotherapy or having group counseling (Shen et al., 2020).
4. To let the ICU nurses get familiar with the working environment at the earliest opportunity, especially if they have been relocated. To get to know their colleagues can prevent them from getting psychological distress (Shen et al., 2020).

This study has some limitations, the keywords could have had more different spellings, related concepts or word variants, as this would have been a more systematic approach that could potentially have resulted in additional included articles (JCU, 2024). The study was conducted by one researcher which can limit the number of relevant studies (Stoll et al., 2019). Also, the results can't show which stage during the pandemic the studies were conducted and how bad the pandemic hit certain hospitals.

In conclusion, the result of this systematic review shows that the COVID-19 pandemic has affected ICU nurses' mental health in various ways. The findings highlight increased anxiety, depression, stress levels, insomnia, poor sleep quality, fear of COVID-19, and symptoms of PTSD among ICU nurses working during the pandemic. Some local differences were observed.

This impact was observed only within a specific timeframe, with no research conducted on differences during different pandemic waves. Several gaps were identified, including the need to address how to prepare ICU nurses and other healthcare workers for future pandemics and trauma that may impact their mental health. While valuable insights were gained from the COVID-19 pandemic, more research is necessary to adequately prepare for the challenges of future pandemics. Organizational leaders must allocate sufficient resources to support nurses' mental health proactively, both before and after a pandemic.

For future recommendations, it would be important to compare the mental health conditions of ICU nurses before the pandemic, during various phases of the pandemic and after, also how the vaccines have affected.

Understanding the long-term effects of this pandemic on ICU nurses' mental health is essential. As highlighted by Fernandez et al. (2020), understanding the impacts that a pandemic has on nurses is necessary to encourage them remaining in the workforce and ensure proper support.

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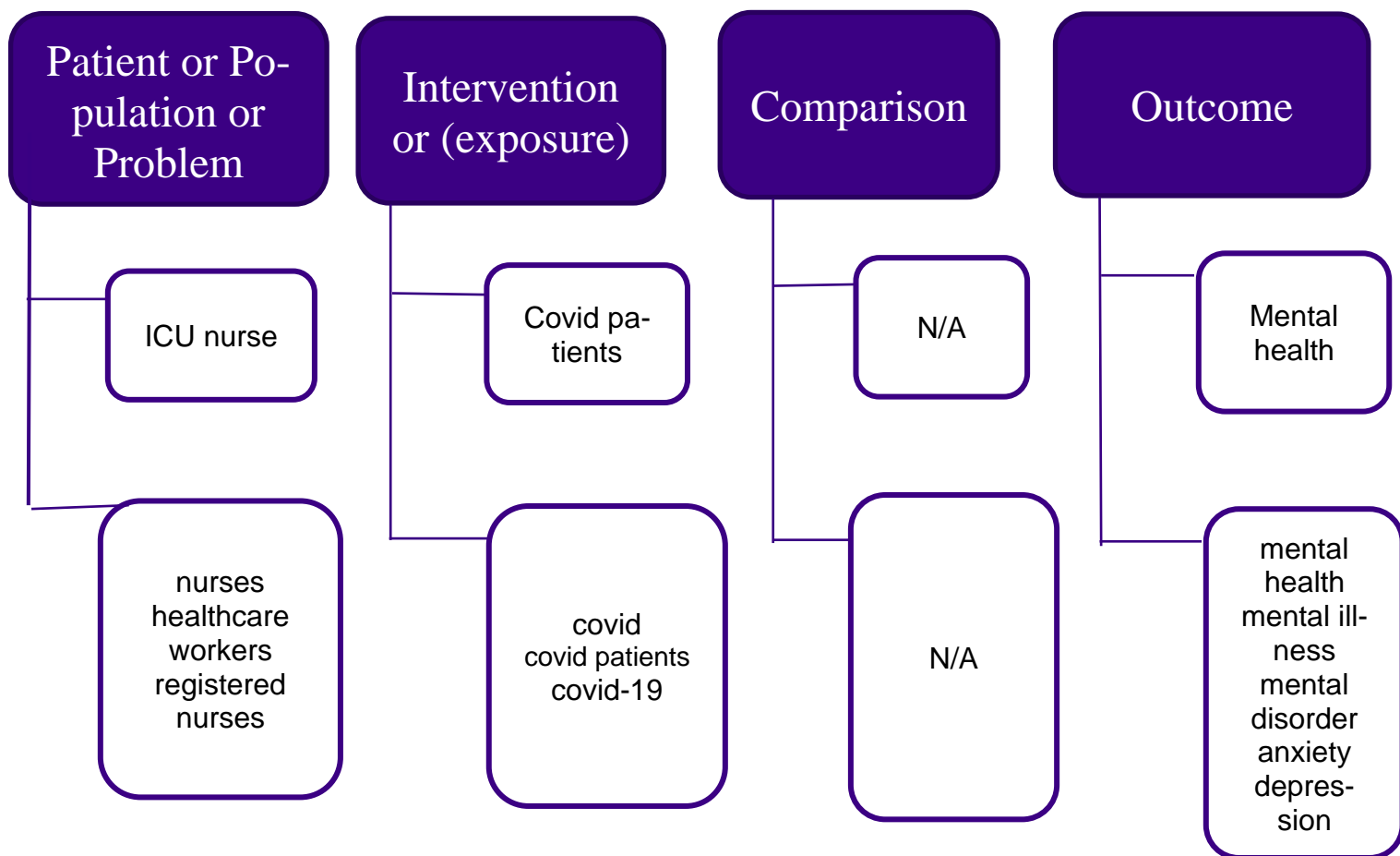
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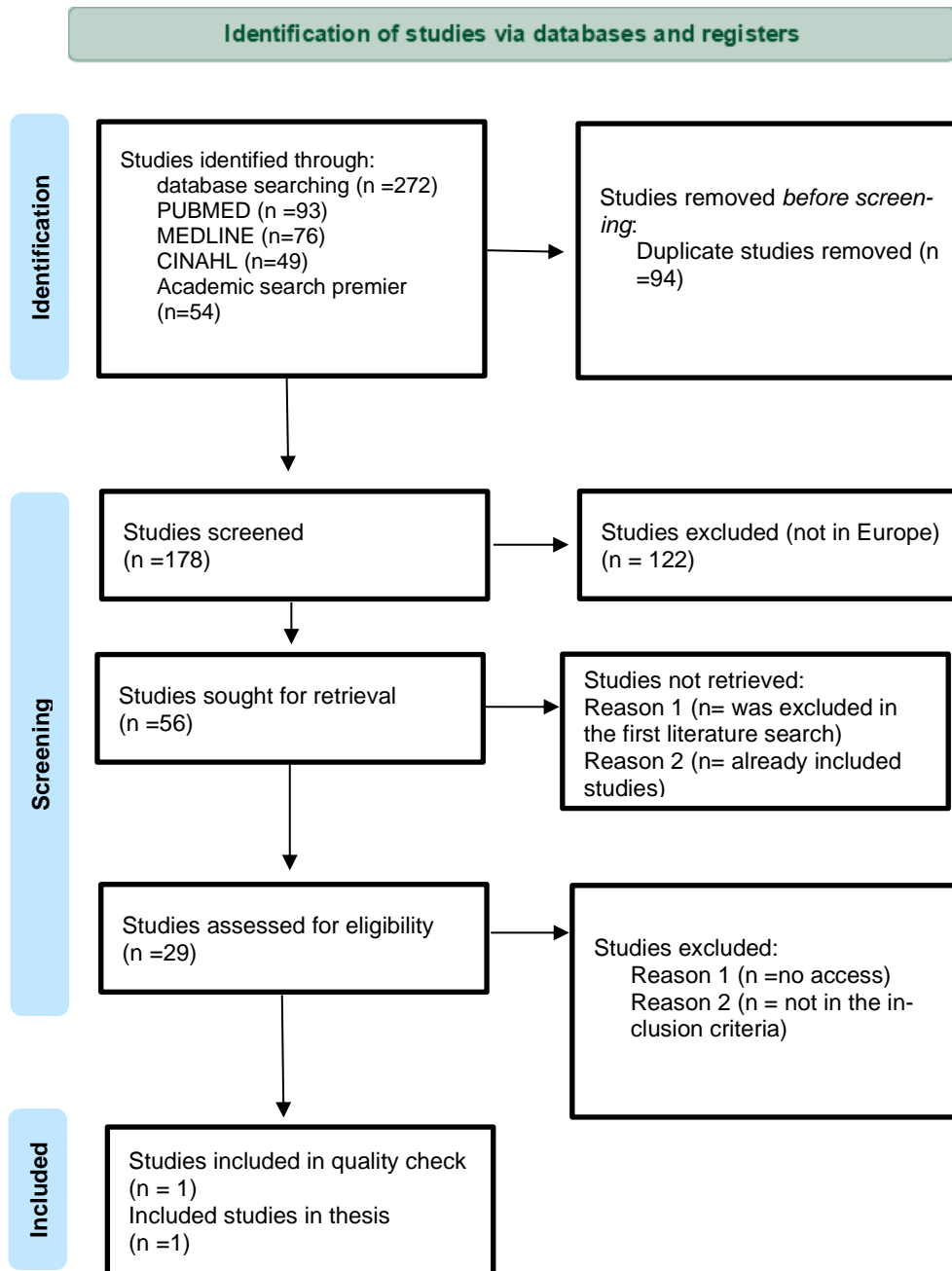
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APPENDIX 1. PICO

Patient or Population or Problem	Intervention or (exposure)	Comparison	Outcome
ICU nurse	Covid patients	N/A	Mental health
nurses healthcare workers registered nurses	covid covid patients covid-19	N/A	mental health mental illness mental disorder anxiety depression

APPENDIX 2: Updated literature search

Identification of studies via databases and registers

Identification

Studies identified through:
    database searching (n =272)
    PUBMED (n =93)
    MEDLINE (n=76)
    CINAHL (n=49)
Academic search premier
(n=54)

→

Studies removed *before screening*:
    Duplicate studies removed (n =94)

Screening

Studies screened
(n =178)

→

Studies excluded (not in Europe)
(n = 122)

Studies sought for retrieval
(n =56)

→

Studies not retrieved:
Reason 1 (n= was excluded in the first literature search)
Reason 2 (n= already included studies)

Studies assessed for eligibility
(n =29)

→

Studies excluded:
    Reason 1 (n =no access)
    Reason 2 (n = not in the inclusion criteria)

Included

Studies included in quality check
(n = 1)
Included studies in thesis
(n =1)

Appendix 3: From raw text to codes

Raw text	Meaning unit	Codes
Celik & Dagli,2021 [1] '' Among the personnel of COVID-19 ICU, depression levels of nurses were found to be the highest,''…'' Among the COVID-19 ICU staff, nurses had the highest anxiety score''…'' Nurses had the highest stress levels amongst COVID-19 ICU staff''…'' COVID-19 ICU nurses had higher stress levels than ICU nurses'' …''First of all, our study; revealed that COVID-19 ICU staff working at the forefront of care and treatment of COVID-19 patients had higher levels of COVID-19 fer… than ICU staff''	Depression levels of nurses among the personnel of COVID-19 ICU were found to be the highest. Nurses had the highest anxiety score among the COVID-19 ICU staff. COVID-19 ICU nurses had higher stress levels than ICU nurses. Staff working at the forefront care and treatment of ICU COVID-19 patients had higher levels of COVID-19 fear.	1. High depression levels of ICU COVID-19 nurses. 2. Nurses had the highest anxiety score among staff. 3. High stress levels among COVID-19 ICU nurses. 4. Working in a COVID-19 ICU was associated with high levels of COVID-19 fear.

Heesakkers et al,2021 [2] ''Symptoms of…PTSD (post traumatic stress disorder) , were present in 256 (35.3%) of the ICU nurses''… '' The first surge of the COVID-19 pandemic had a profound impact on the mental well-being ICU nurses one in five had symptoms of depression or PTSD, one in four had symptoms of anxiety.''… ''Analyses indicated that fear of infecting relatives and insufficient number of trained personnel were significantly associated with increased risk for symptoms of anxiety, depression, PTSD and NFR.''… ''A clear association with the surge is seen in stress levels, as experienced stress was 2.5 times higher than before the pandemic and remained elevated after the surge.''.	PTSD (post traumatic stress disorder) symptoms were present in 246 or 35,5% of the ICU nurses. The first surge had a big impact on ICU nurses, one in five ICU nurses had symptoms of depression. The first surge had a big impact on ICU nurses, one in five ICU nurses had symptoms of PTSD. The first surge had a big impact on ICU nurses, one in four ICU nurses had symptoms of anxiety. Analyses indicated that fear of infecting relatives and insufficient number of trained personnel were significantly associated with increased risk for symptoms of anxiety, depression, PTSD and NFR. Stress was 2.5 times higher than before the pandemic and remained elevated after the surge.	5. ICU nurses had symptoms of PTSD. 6. One in five ICU nurses had symptoms of depression. 7. One in five ICU nurses had symptoms of PTSD. 8. One in four ICU nurses had symptoms of anxiety. 9. Fear of infecting relatives was associated with higher risk for mental health symptoms. 10. Higher stress levels than before the pandemic and remained high after.
Stocchetti et al,2021 [3] ''While the majority of nurses reported symptoms of anxiety (61,5%)''…'' In particular, more than one out of two intensivists (54.8%) reported normal levels of depression, with no differences between nurses and physicians''…'' 71% of nurses reported symptoms of insomnia''.	Majority of nurses reported symptoms of anxiety (61,5%). More than one out of two intensivists (54.8%) reported normal levels of depression, with no differences	11. Majority of nurses reported symptoms of anxiety. 12. Nurses reported normal levels of depression. 13. Nurses reported symptoms of insomnia.

	between nurses and physicians. Symptoms of insomnia was reported 71% of nurses.	
Greenberg et al,2021 [4] ''Nurses were more likely to meet the thresholds for depression (moderate and severe), probable PTSD and anxiety (moderate and severe)''…''We found substantial rates of probable mental health disorders, and thoughts of self-harm, amongst ICU staff; these difficulties were especially prevalent in nurses''	Nurses were more likely to meet the thresholds for moderate and severe probable PTSD. Nurses were more likely to meet the thresholds for moderate and severe depression. Nurses were more likely to meet the thresholds for moderate and severe anxiety. Thoughts of self-harm among ICU staff were especially prevalent in nurses.	14. Nurses had moderate and severe probable PTSD. 15. Nurses had moderate and severe depression. 16. Nurses had moderate to severe anxiety. 17. ICU Nurses had thoughts of self-harm.
Kandemir et al,2022 [5] ''When these findings are considered together, the majority of the intensive care nurses had severe or extremely severe depression (39.2%), anxiety (45.4%), and stress (27.9%) scores; in addition, 39.7% of the nurses experienced moderate or severe insomnia''.	Majority of ICU nurses had severe or extremely severe depression scores. Majority of ICU nurses had severe or extremely severe anxiety score. Majority of ICU nurses had severe or extremely severe stress score. 39.7% of the nurses experienced moderate or severe insomnia.	18. ICU nurses had severe or extremely severe depression score. 19. ICU Nurses had severe or extremely severe anxiety levels. 20. ICU nurses had severe or extremely severe stress score. 21. Nurses experienced moderate or severe insomnia.
Bahadir-Yilmaz & Yüksel,2021 [6] '' The levels of state anxiety were found to be higher in those working in the intensive care unit… during the pandemic compared with those who were working in the emergency department''…'' The mean total SAS score of the nurses was 51.51 ± 9.94(Table2). Stress due to the	The levels of state anxiety were found to be higher in those working in the intensive care unit. 65,5% of the nurses had anxiety.	22. Nurses working in an ICU unit had high levels of anxiety. 23. Nurses reported anxiety during the pandemic. 24. Nurses reported stress during the pandemic. 25. Nurses were worried about being infected with COVID-19 during the pandemic.

COVID-19 outbreak accounted for 73.6%,65.5% had anxiety, and 61.6% were worried about being infected with COVID-19''	73,6% of the nurses had stress. 61,6% of the nurses were worried about being infected with COVID-19.	
Saracoglu et al, 2020 [7] ''Moreover, younger participants, and ICU nurses exhibited a higher level of fear for COVID-19 disease.''… '' The rate of moderate-to-severe depressive symptoms was significantly higher in intensive care unit nurses''…'' sleep disorders may occur in healthcare workers during COVID-19 outbreak. Intensive care unit nurses were at highest risk.''	ICU nurses exhibited a higher level of fear for COVID-19 disease. ICU nurses had significantly higher rates of moderate-to-severe depression symptoms. ICU nurses were at the highest risk for sleep disorders.	26. ICU nurses had a high level of fear of COVID-19 27. ICU nurses had high rates of moderate- to severe depression symptoms. 28. ICU nurses had high risk for sleep disorders.
Azoulay et al,2020 [8] ''The questionnaire was built in a timely manner to allow us to capture data at the time of the surge. The study started 20 days after the peak of the pandemic in France, at a time when the participating ICUs had more than 50% of patients with COVID-19. '' '' The total number of patients with COVID-19 managed was 478 per ICU '' '' Symptoms of Anxiety, Depression, and Peritraumatic Dissociation among the Respondents…HADS anxiety subscale, median (IQR) Symptoms of anxiety, % Nurses (n = 498) 7 (5–10) 50%… HADS = Hospital Anxiety and Depression Scale'' Symptoms of depression, %... 31.6'' '' Symptoms of peritraumatic dissociation, %... 34'' ''Fear of being infected…were independently associated with the presence of psychological burden''.	50% of nurses in this study had symptoms of anxiety when the participating ICUs had more than 50% of patients with covid-19. 31,6% of nurses in this study had symptoms of depression when the participating ICUs had more than 50% of patients with covid-19. Fear of being infected were independently associated with the presence of psychological burden.	29. ICU nurses reported symptoms of anxiety. 30. ICU nurses reported symptoms of depression. 31. Fear of being infected was associated with psychological burden.

| Stafseth et al, 2022 [9] '' Anxiety symptoms, measured with the HSCL-10 during the COVID-ICU work, were present in 10.7% of RNs''…'' , whereas the corresponding incidence of depression were 13.0% (RNs)''…'' RNs had a significantly higher prevalence of symptom-defined PTSD (7.1%)''…'' The main results of this prospective, observational cross-sectional study are that HCPs as both clinicians (nurses and physicians) and leaders in Norwegian COVID-ICUs were experiencing low symptom levels of anxiety, depression, and PTSD during the first wave of the pandemic''…'' More than half of all the responding health care professionals (n = 326, 67.4%) reported fear of infecting others, especially family members in their own household.''. | COVID-ICU nurses were experiencing low symptom levels of anxiety during the first wave of the pandemic.

COVID-ICU nurses were experiencing low symptom levels of depression during the first wave of the pandemic.

COVID-ICU nurses were experiencing low symptom levels of PTSD during the first wave of the pandemic.

They reported a fear of infecting others, especially family members in their own household. | 32. Low symptom levels of anxiety during the first wave of the pandemic.
33. Low symptom levels of depression during the first wave of the pandemic.
34. Low symptom levels of PTSD during the first wave of the pandemic.
35. Reported a fear of infecting others. |

Appendix 4: Summary table

	Author(s), year, country	Title	Purpose	Method and size	Main results	JBL
1	Celik & Dagli.2021, Turkey	Comparison of the Mental Status of COVID-19 Intensive Care Unit and General Intensive Care Unit Staff.	To compare covid-19 fear experienced by covid-19 ICU staff and general ICU staff and the effect it has on mental health.	Cross-sectional study N=96 ICU nurses	The pandemic has affected the mental health of ICU staff, especially females and nurses. They had higher depression, anxiety, and stress scores.	6/8
2	Heesakkers et al.2021. The Netherlands.	The impact of the first COVID-19 surge on the mental well-being of ICU nurses: A nationwide survey study.	To measure the occurrence of symptoms of anxiety, depression, PTSD, and work fatigue of ICU nurses after the first covid-19 surge and to find out associated risk factors with the outcomes.	Cross-sectional study N=726 ICU nurses	The first surge had a big impact on the ICU nurses' mental health with 27% had symptoms of anxiety and 18,6% had symptoms of depression and 22,2% had symptoms of PTSD.	7/8
3	Stocchetti et al. 2021. Italy	Burnout in Intensive Care Unit Workers during the Second Wave of	To examine the prevalence of distress and symptoms of anxiety,	Cross-sectional study	This study shows that the pandemic had a big impact on the psychological wellbeing of ICU staff and	7/8

		the COVID-19 Pandemic: A Single Center Cross-Sectional Italian Study.	depression, insomnia, and burnout in healthcare workers during the covid-19 pandemic and to identify potential factors with the response.	N=84 ICU nurses	especially nurses had higher scores in insomnia and anxiety levels.	
4	Greenberg et al. 2021. England.	Mental health of staff working in intensive care during Covid-19.	During June and July 2020 identify the amount of probable mental health disorders in ICU staff in nine English hospitals.	Question-naires N=344 ICU nurses	This study found among ICU staff, especially nurses had signific amount of mental health disorders and thoughts of harming oneself during the pandemic.	7/8
5	Kandemir et al. 2022. Turkey.	Analysis of mental health symptoms and insomnia levels of intensive care nurses during the COVID-19 pandemic with a structural equation model.	During the pandemic to determine the depression, anxiety, insomnia, and stress levels of ICU nurses.	A multi-site survey study, structural equation model. N=194 ICU nurses	The results showed that most of the ICU nurses working during the covid-19 pandemic experienced moderate to extremely severe levels of depression, anxiety, insomnia, and stress. There was also positive relationship between these.	7/8
6	Bahadir-Yil-maz &	State anxiety levels of nurses providing care to patients with COVID-19 in Turkey.	To examine the anxiety levels of nurses	Cross-sec-tional study	The levels of anxiety were high for nurses, especially for those who	7/8

				N=596 ICU nurses	worked in the ICU, female, married and service nurses.	
	Yüksel. 2021. Turkey.		providing care for covid-19 patients.			
7	Saracoglu et al.2020. Turkey.	The Psychological Impact of COVID-19 Disease is more Severe on Intensive Care Unit Healthcare Providers: A Cross-sectional Study.	Was to examine the risks for PTSD, sleep disturbance and depression in healthcare workers providing care for covid-19 patients.	Cross-sectional study N=140 nurses	ICU nurses were at the highest risk of having symptoms of depression, anxiety, sleep problems during the covid-19 surge.	7/8
8	Azoulay et al.2020. France.	Symptoms of Anxiety, Depression, and Peritraumatic Dissociation in Critical Care Clinicians Managing Patients with COVID-19. A Cross-Sectional Study.	To find out in health care workers the prevalence of symptoms of depression, anxiety and peritraumatic dissociation during the covid-19 pandemic.	Cross-sectional study N= 498 ICU nurses	Health care workers and especially nursing assistants and nurses were in high risks of symptoms of depression, anxiety and peritraumatic dissociation. There was a connection between these and fear of being infected, inability to rest and seeing rapid end-of life decisions.	7/8

| 9 | Stafseth et al.2022. Norway. | Symptoms of Anxiety, Depression, and Post-Traumatic Stress Disorder in Health Care Personnel in Norwegian ICUs during the First Wave of the COVID-19 Pandemic, a Prospective, Observational Cross-Sectional Study. | How the first wave of the pandemic affected ICU nurses ,physicians and leaders' mental health but also work effort and disturbance of social life. | Observational cross-sectional study N=392 nurses | The results showed that the leaders in Norwegian ICU COVID-19 units and nurses were experiencing low symptoms of depression, PTSD and anxiety during the first surge. Less work experience and being younger increased the symptoms of depression and anxiety. | 7/8 |