



Covariates of Pediatric Nurses' Burnout: A Systematic Review

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ABSTRACT

Background: Because of the special nature of their patients, recent studies on burnout began to focus on pediatric rather than on general nurses. However, these studies mostly concentrated on selected covariates and lack comprehensiveness. **Purpose:** This paper aims to suggest a holistic theoretical model on burnout covariates among pediatric nurses. **Methods:** This review utilized a systematic search strategy in four databases and the PRISMA guidelines to retrieve and summarize studies investigating pediatric nurses' burnout. **Results:** Out of 78 retrieved articles, 21 relevant studies were included in our synthesis. **Conclusion:** The proposed model includes a wide range of burnout covariates. These covariates were categorized into contributing factors (e.g. COVID-19 pandemic, and poor work engagement) or consequences (e.g. poor well-being, and patient adverse events). **Implications for Nursing:** This model might be a comprehensive approach and guide for future studies addressing pediatric nurses' burnout. Future studies should test the suggested theoretical model by assessing the contributing factors and consequences of burnout.

Keywords: Theoretical model, Burnout, Pediatric, Nursing, Review.

What does this paper add?

1. Pediatric nurses are susceptible to burnout even more than general nurses; however, the COVID-19 pandemic exaggerated pediatric nurses' burnout.
2. This review integrated the results of previous studies and suggested a basic theoretical model for the covariates of pediatric nurses' burnout.
3. The suggested model may provide a baseline to develop a valid model guiding future research concerning pediatric nurses' burnout.

Introduction

Nursing is one of the most challenging jobs that makes nurses emotionally exhausted (Khatatbeh et al., 2021). Globally, around 11% of nurse's experience burnout symptoms (Woo et al., 2020). Nurses worldwide are susceptible to extreme stress and burnout (Labrague et al., 2018; Nantsupawat et al., 2016a; Rayan et al., 2019) and are willing to quit their nursing jobs (Burmeister et al., 2019). This, in turn, will contribute to the global shortage in the nursing workforce (Drennan & Ross, 2019; Lasater et al., 2021; Maré et al., 2019).

Furthermore, nurses' burnout is linked with many consequences, such as decreased patient satisfaction (Khatatbeh et al., 2021), increased medical errors (Khatatbeh et al., 2021a), and higher healthcare costs resulting from medical errors (Casalino et al., 2022).

Pediatric nurses might be even more vulnerable to burnout than general nurses, because they deal with immature, afraid, irritable children, and other emotional challenges pediatric nurses face, such as witnessing the suffering of children, dealing with parental anxieties, and navigating ethical dilemmas (Khatatbeh et al., 2022). Sometimes, these children are even critically ill intruding the mission of pediatric nurses (Khatatbeh et al., 2020; Khatatbeh et al., 2022). Moreover, pediatric nurses need to care for parents who are worried about their ill children. All of these factors make pediatric nurses more vulnerable to burnout than medical, surgical, or even critical care nurses.

With the speedy spread of the Coronavirus (COVID-19) (Pakai et al., 2023), further cases of infected children were diagnosed worldwide (Dewan & Gupta, 2020; Morand et al., 2020; Zhang et al., 2020; Zimmermann & Curtis, 2020) and sometimes they were critically ill (Kache et al., 2020; Morand et al., 2020; Society of Pediatrics, C.M.A., & Editorial Board, 2020). Even though children infected with COVID-19 have milder clinical symptoms and better clinical outcomes than adults (Hua et al., 2020; Zheng et al., 2021), it was reported that the incubation period of the virus for children infected with COVID-19 is longer than for adults. With the recent COVID-19 pandemic, the global shortage in the nursing workforce (Galanis et al., 2021; Khatatbeh et al., 2021; Pakai et al., 2023) and more specifically pediatric nursing workforce (Khatatbeh et al., 2021b; Khatatbeh et al., 2022) has worsened.

Review of Literature

Previous studies examined the phenomenon of burnout among pediatric nurses concerning many variables whether as contributing factors or consequences. In terms of predictors and contributing factors, the variables that were studied included alternating work shifts (Khatatbeh et al., 2022), poor manager support (Khatatbeh et al., 2021), and the work environment (Ali et al., 2023; Khatatbeh et al., 2022). Particularly, pediatric nurses who were working night shifts showed higher levels of burnout than their counterparts (Khatatbeh et al., 2022). Similarly,

pediatric nurses who perceive less manager support demonstrated a higher level of burnout than their counterparts (Khatatbeh et al., 2021). Regarding the work environment, pediatric nurses working at teaching and university hospitals demonstrated lower levels of burnout than those working at governmental hospitals (Khatatbeh et al., 2022).

On the other hand, variables that were studied as consequences include nurses' perceived health status (Khatatbeh et al., 2022), poor quality of life (Khatatbeh et al., 2021b), patient adverse events (Khatatbeh et al., 2022), and poor patient safety (Bilal & Sari, 2020). These studies demonstrated that pediatric nurses with higher levels of burnout have a poorer quality of life than their counterparts. Additionally, they perceive committing more adverse events and poorer patient safety than their counterparts. Regarding the levels of burnout among pediatric nurses, a recent scoping review found them moderate to high (Buckley et al., 2020).

Study Aims

It is crucial to understand burnout among pediatric nurses and suggest interventions to provide better healthcare services to children and improve their safety. Researchers continue to assess the covariates of pediatric nurses' burnout; however, there is no holistic theoretical framework guiding them. The main purpose of this article is to suggest a theoretical model of the covariates of burnout among pediatric nurses. Additionally, this study aims to conduct a systematic literature review, extract covariates discussed in previous studies, and integrate these covariates into our model. Ultimately, the suggested theoretical model might serve as a compass to guide future studies about pediatric nurses' burnout.

A theoretical model is a valuable part of nursing research that organizes research procedures and determines how to address a particular research question. Theoretical models are beneficial in defining the delimitation of the research in terms of the theories and paradigms that will be examined. Additionally, they can be used to explain the research hypotheses to be examined, and the predicted relationship between the constructs (Grant & Osanloo, 2014; Mitchell et al., 2010).

For several reasons, proposing an inclusive theoretical model on burnout covariates among pediatric nurses is significant. For instance, it would present a

comprehensive framework to determine the individual and organizational risk factors that contribute to burnout among pediatric nurses. Such information can be used to develop directed interventions that prevent burnout and improve the well-being of nurses, ultimately leading to better quality of care for patients.

Furthermore, identifying the mechanisms through which burnout develops, the model can help design interventions that address the root causes of burnout. Moreover, the model could prospectively identify factors that protect against burnout. This information can be used to develop interventions that help nurses build resilience and cope with job stressors.

On the other hand, the model can improve awareness of burnout, its impact on nurses and patients, and the need for support. In turn, this increased awareness can lead to greater support for pediatric nurses and their families.

All in all, suggesting an inclusive theoretical model on burnout covariates among pediatric nurses is a significant step towards building a more inclusive and efficient strategy for preventing and treating pediatric nurses' burnout.

Methods

To develop a theoretical model on the covariates of pediatric nurses' burnout, literature was systematically reviewed to identify studies assessing pediatric nurses'

burnout. Based on this systematic literature review, pediatric nurses' burnout covariates were identified in the included studies. Then, these covariates were integrated into a theoretical model and discussed in this article.

Information Sources and Search Strategy

Four electronic databases, which include bibliographic information for articles covering nursing and psychology, were searched in July 2023 by (H.K. & T.A.). These databases are CINAHL, PubMed, Medline, and Psychology and Behavioral Sciences Collection. The terms used in searching PubMed were "Pediatric nursing" [MeSH Terms] AND "Burnout, Professional" [Mesh Terms]. Similar terms (pediatric nurse(s) and burnout) were used in other databases. Some search restrictions were applied including studies published in the English language and scholarly journals between 2012 and 2022 (*See Table 1*). PRISMA guidelines were followed to perform this systematic review (*See PRISMA checklist in the supplementary file 1*) (Liberati et al., 2009). PRISMA includes evidence-based items for reporting systematic reviews and meta-analyses (Liberati et al., 2009). The Cochrane Database of Systematic Review was checked to determine registered systematic reviews of a similar aim, and no systematic reviews addressing burnout covariates among pediatric nurses were found.

Table 1. Results of searching electronic databases

Database	Articles Found
CINAHL	24
PubMed	33
Medline	16
Psychology and Behavioral Sciences Collection	2
Total	75

Study Selection

After collecting the studies, the articles were screened for eligibility to include peer-reviewed, cross-sectional studies measuring pediatric nurses' burnout using a validated tool, and then data on burnout covariates was extracted from the included articles. To guarantee a reliable selection process, it was independently performed by the first two authors. The selection process started with screening titles and abstracts, followed by a full reading of the selected studies.

Data Evaluation

The selected studies meeting the inclusion criteria were assessed for possible methodological bias using Ciapponi's critical reading checklist (Ciapponi, 2010). Ciapponi's checklist includes 13 key criteria concerning methodological bias, such as inclusion criteria and sample size estimation. Every article was evaluated for methodological quality, and no one was excluded for methodological bias (*See the results of critical reading in the supplementary file 2*). To resolve any disagreement, a third member of the review team was

consulted. A total of 21 studies were finally included in this systematic review (See PRISMA flow diagram,

Figure 1).

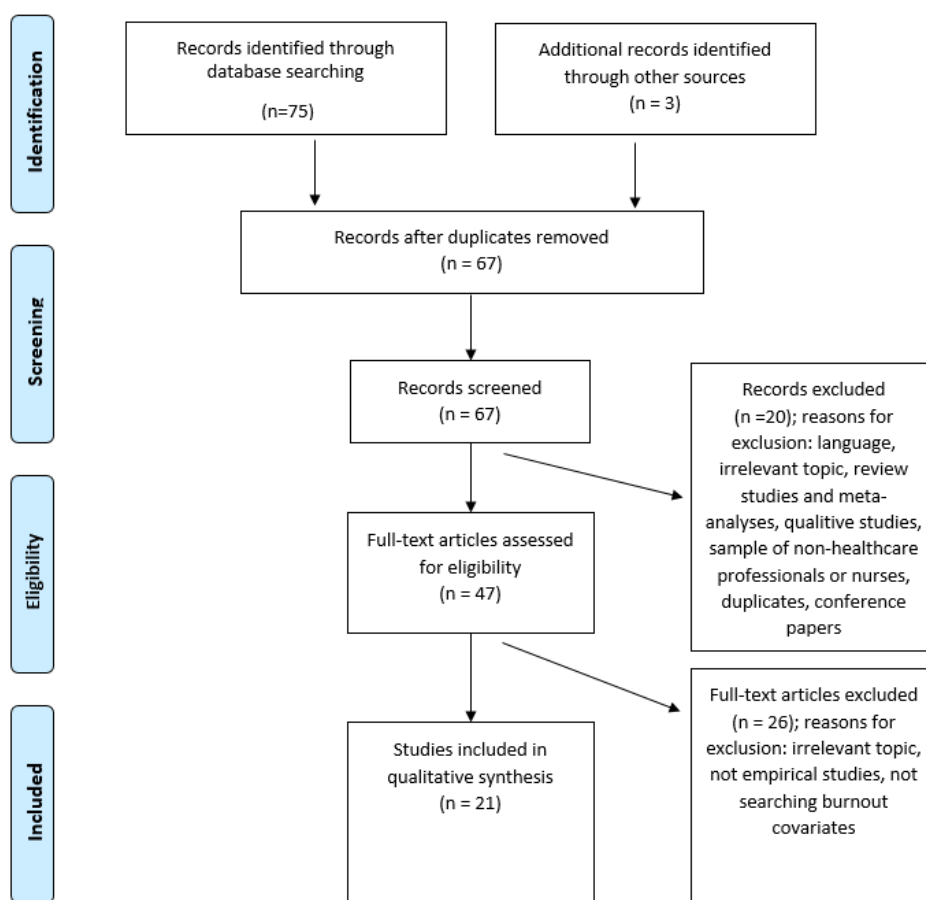


Figure 1. PRISMA flow diagram

Data Extraction

For the 21 included articles (See Table 2), necessary data was independently extracted by the first two authors. The extracted data was the author's surname, year of publication, country, research design, sample

size, and covariates studied concerning burnout. If there was a difference of opinion about a particular article, another member of the research team was consulted until an agreement was reached.

Table 2. Summary of the included studies

Author, Year, Country	Study Design	Sample	Covariates studied in relation to burnout
Adwan (2014), United States	Descriptive, cross-sectional	120	Grief experience, and job satisfaction
Akman et al. (2016), Turkey	Descriptive, cross-sectional	165	Job satisfaction, age, and marital status
Bagnasco et al. (2020), Italy	Descriptive, cross-sectional	2243	Envisioned patient safety, and adverse events
Bilal & Ahmed, (2017), Pakistan	Descriptive, cross-sectional	113	Organizational structure (involvement in decision-making, formalization, instrumental communication, integration, promotional opportunity)

Bilal & Sari (2020), Turkey	Descriptive, cross-sectional	104	Attitudes towards patient safety
Buckley et al. (2019), Canada	Descriptive, cross-sectional	134	Attitudes about engaging with patients/families (centeredness)
Buckley et al. (2021), Canada	Descriptive, cross-sectional	143	Work engagement, and quality of work-life
Calisir et al. (2020), Turkey	Descriptive, cross-sectional	536	Liking of children
Issever & Bektas (2021), Turkey	Descriptive, cross-sectional	165	Intention to leave
Karakachian et al. (2021), United States	Descriptive, cross-sectional	146	Moral distress
Kaya & Dalgic (2021), Turkey	Descriptive, cross-sectional	326	Job satisfaction, age, and experience
Khatatbeh et al. (2021), Jordan	Descriptive, cross-sectional	225	Manager support, adverse events, and intent to leave
Khatatbeh, Al-Dwaikat et al. (2022), Jordan	Descriptive, cross-sectional	225	Quality of life, age, and unit capacity
Khatatbeh, Hammoud et al. (2022), Jordan	Descriptive, cross-sectional	225	Perceived health, and common work-shift
Lawrence et al. (2021), United States	Descriptive, cross-sectional	254	Relationship distress, age, poor sleep quality, and rotating work shift
Liao et al. (2022), China	Descriptive, cross-sectional	488	Work stress, occupational commitment, and social support
Lin et al. (2016), Taiwan	Descriptive, cross-sectional	144	Work stress, and depression level
Meyer et al. (2015), United States	Descriptive, longitudinal	251	Exposure to stress, and compassion fatigue
Peck& Sonney (2021), United States	Descriptive, cross-sectional	796	COVID-19
Quigley et al. (2022), United States	Descriptive, cross-sectional	97	Participation in quality improvement
Waterworth & Grace (2021), New Zealand	Descriptive, cross-sectional	467	Resilience

Results and Discussion

Summary of the Reviewed Articles

The total number of pediatric nurses in the included studies was 7,367. All of the included studies utilized a cross-sectional design to assess pure samples of pediatric nurses. Regarding the study country, six studies were from the United States, five studies were from Turkey, three Studies were from Jordan, two studies were from Canada, one study was from Italy, one study was from New Zealand, one study was from China, one study was from Taiwan, and one study was from Pakistan.

Theoretical Model

Using the data extracted from the included 21 studies, 25 covariates for pediatric nurses' burnout were identified. According to the included studies, 19 of the covariates were contributing factors and six covariates were consequences. The contributing factors are

demographic traits, COVID-19 pandemic, poor occupational commitment, engaging with patients/families, liking of children, resilience, depression level, moral distress, compassion fatigue, grief experience, work stress, rotating work-shift, poor manager support, absence form quality improvement, poor work engagement, poor quality of work life, poor organizational structure, relationship distress, and poor social support. The consequences are poor quality of life, poor sleep quality, poor perceived health, job dissatisfaction, intention to leave, and adverse events. In the next step, the identified covariates were grouped into inclusive categories and integrated into our model as either contributing factors or consequences. (See *Figure 2*). For instance, relationship distress and poor social support were grouped under the inclusive category called social life. Similarly, poor quality of life, poor sleep quality, and poor perceived health were grouped under the inclusive category called poor wellbeing.

According to our suggested model, several factors contribute to pediatric nurses' burnout, which leads to several consequences. According to our model, the contributing factors are demographic traits of pediatric nurses, the COVID-19 pandemic, occupational commitment, personality and behavioral traits, work environment and organizational structure, and social life.

environment and organizational structure, and social life. Our theoretical model suggests that pediatric nurses' burnout might lead to the intention to leave and patient adverse events, and impact their well-being, job satisfaction, and patient safety.

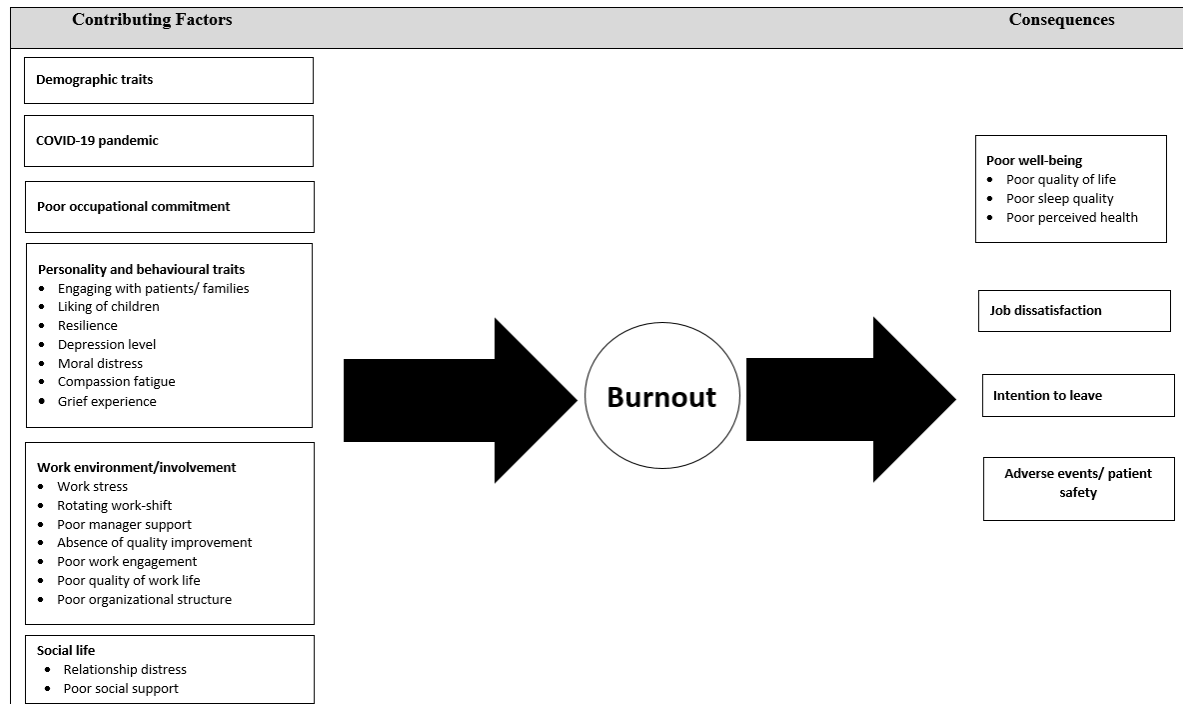


Figure 2. A theoretical model on pediatric nurses' burnout

Burnout

The well-known burnout syndrome is defined by dehumanization, or apathy toward one's job or patients, a diminished sense of performance, and emotional tiredness (Schaufeli & Greenglass, 2001). This study reviewed research on pediatric nurses' burnout. It's vital to notice how the articles conceptualized burnout, even though the precise instruments used to measure it are described in depth in the data extraction section. All of included studies used a quantitative methodology and standardized burnout measures, such as the Maslach Burnout Inventory (MBI) individual's experience of BO (Kristensen et al., 2005). MBI assesses three scopes of burnout: emotional exhaustion, dehumanization, and personal accomplishment (Kristensen et al., 2005). Additionally, the Copenhagen Burnout Inventory (CBI) is another valid measure that assesses three sub-types of burnout: personal burnout, work-related burnout, and client-related burnout among professionals dealing with people (Kristensen et al., 2005). Other measures of

burnout are the Oldenburg Burnout Inventory (Reis et al., 2015) and the Shirom–Melamed Burnout Questionnaire (Schilling et al., 2019).

Factors Contributing to Burnout

Demographic Traits

Several demographic traits were discussed in the included studies as covariates of burnout among pediatric nurses. For example, pediatric nurses younger than 30 years showed higher levels of burnout than their colleagues (Lawrence et al., 2021). Similarly, two studies found that older pediatric nurses show lower burnout than younger pediatric nurses (Akman et al., 2016; Khatatbeh et al., 2022). Likewise, burnout among younger pediatric nurses with less experience was higher than among older and experienced colleagues (Kaya & İşler Dalgıç, 2021; Khatatbeh et al., 2022). These findings look logical, since older nurses may have more effective coping mechanisms that they have acquired over time, while younger nurses may have

difficulties adjusting to the profession's demands. Marital status is another demographic trait associated with burnout, where married pediatric nurses reported lower levels of burnout (Akman et al., 2016). This finding is understandable, because one's spouse can provide social support and a sense of belonging, which can be a safeguard against burnout.

The Covid-19 Pandemic

The emerging COVID-19 pandemic exaggerated pediatric nurses' burnout (Khatatbeh et al., 2022; Peck & Sonney, 2021). According to recent studies, the COVID-19 pandemic worsened nurses' burnout because of the associated stressful work environment (Lasater et al., 2021) and the ambiguity of the pandemic (Khatatbeh et al., 2021). The pandemic-related factors that exacerbated pediatric nurses' burnout include the fear of being infected, the fear of transmitting the disease to the nurse's family, the high workload, and the separation from the nurse's family (Khatatbeh et al., 2021). In China, a large-scale study showed that more than 91% of the nurses had moderate to high levels of fear as a result of working with COVID-19 patients (Hu et al., 2020). The chronic fear of the pandemic, together with the high workload and the separation from the family, probably exhausted coping mechanisms and led to increased feelings of burnout.

Occupational Commitment

Significant relationships were also found between pediatric nurses' occupational commitment and burnout. For instance, it was found that occupational commitment is significantly correlated with the three dimensions of burnout among pediatric nurses in China (Liao et al., 2022). Pediatric nurses with higher occupational commitment demonstrated lower dehumanization and emotional tiredness, and higher personal achievement than those with lower occupational commitment (Liao et al., 2022). Furthermore, occupational commitment was found to mediate the relationship between work stress and personal achievement; the third dimension of burnout in MBI (Liao et al., 2022). These results demonstrate the value of a career commitment in fostering well-being and possibly reducing burnout in pediatric nurses. This finding looks logical, as nurses with higher occupational commitment probably have a stronger connection with their patients and their work, which helps them avoid

dehumanization and emotional tiredness, which are key dimensions of burnout.

Personality and Behavioral Traits

Previous studies found several personality and behavioral traits associated with burnout among pediatric nurses. For example, engaging with patients and families is negatively correlated with pediatric nurses' burnout. Engaging with patients and families can be defined as effective collaboration among healthcare providers with patients and families in every way to enhance healthcare outcomes (Buckley et al., 2019). In their study, they found that engaging with patients and families is negatively correlated with pediatric nurses' burnout (Buckley et al., 2019). This correlation seems reasonable, because when nurses witness how their work directly affects their patients' well-being, nurses will be motivated to fight the apathy that burnout is usually associated with.

Children's liking is another covariate studied concerning burnout among pediatric nurses. A negative correlation was found between pediatric nurses' burnout and liking of children (Calisir et al., 2020). The liking of children is an acceptable type of unrequited love (Calisir et al., 2020). Pediatric nurses with high scores of liking children showed lower burnout scores than their colleagues. It is worth mentioning that burnout in the study of Calisir et al. (2020) was measured as a sub-scale of the Professional Quality of Life Scale. This result means that nurses enjoying working with children have lower levels of burnout. A possible explanation is that nurses who enjoy working with children might find their work more meaningful, leading to higher satisfaction and lower burnout.

Also, resilience was studied in relation to burnout among pediatric nurses in New Zealand (Waterworth & Grace, 2021). Pediatric nurses with high scores of resilience showed lower levels of burnout and *vice versa* (Waterworth & Grace, 2021). Resilience is defined by Waterworth & Grace (2021) as the ability to deal with and recover quickly from difficulties. This correlation is reasonable, as resilient nurses have better coping strategies to handle stress, such as following a healthy lifestyle and engaging in positive conversations with themselves.

Also, moral distress significantly predicted burnout among pediatric nurses in the United States (Karakachian et al., 2021). Moral distress happens when

a nurse feels that the ethically acceptable action is different from what he or she is required to accomplish. A moral challenge arises when policies hinder a nurse from acting in a way that he or she believes is right. The moral dilemma can make nurses feel helpless, nervous, and depressed (Olson & Stokes, 2016). Pediatric nurses provide care for children who are not able to speak up for themselves, which intensifies the emotional effect of moral distress. Pediatric nurses who repeatedly suffer from moral distress will be prone to emotional tiredness, which is a main dimension of burnout.

In the study of Lin et al. (2016), depression level was another variable that was correlated with burnout among pediatric nurses. Pediatric nurses with high occupational burnout showed higher depression levels than their colleagues and *vice versa* (Lin et al., 2016). The low energy and motivation associated with nurses' depression can make it difficult to accomplish their duties and cope with the emotional challenges of caring for sick children.

Meyer et al. (2015) found a positive relationship between compassion fatigue and pediatric nurses' burnout, two sub-scales of CSFT. In their study, Meyer et al. (2015) found that compassion fatigue is positively associated with pediatric nurses' burnout. Compassion fatigue is usually defined as the psychological strain that results from being close to a trauma sufferer (Meyer et al., 2015). This finding is expected, because both compassion fatigue and burnout share the core elements of emotional tiredness, with compassion fatigue potentially performing as an antecedent to burnout.

Feeling sorrow because of patients' deaths was among those variables correlated with pediatric nurses' burnout (Adwan, 2014). Furthermore, regression results showed that feeling sorrow because of a patient's death explained the divergence in the levels of pediatric nurses' burnout. This relationship is reasonable, as pediatric death is usually shocking and emotionally exhausting more than adult death.

Work Environment

Different variables related to the work environment predicted pediatric nurses' burnout. Examples of these variables are work stress, rotating work shifts, manager support, participation in quality improvement, work engagement, quality of work-life, and organizational structure. It was found that work stress is significantly correlated with the three dimensions of burnout among

pediatric nurses in China (Liao et al., 2022). Pediatric nurses with higher work stress demonstrated higher depersonalization and emotional exhaustion, and lower personal achievement than those with lower work stress (Liao et al., 2022). In Taiwan, a similar relationship was found between occupational burnout and work stress among pediatric nurses (Lin et al., 2016). A third study that established a positive relationship between stress and burnout was a longitudinal study conducted in the United States (Meyer et al., 2015). A sample of registered pediatric nurses, enrolled in an internship program, responded to questionnaires about burnout and exposure to stress. In their study, Meyer et al. (2015) found that stress experience is positively associated with pediatric nurses' burnout. It is noteworthy that Meyer and colleagues (2015) have measured burnout as a sub-scale of the compassion Fatigue Self-Test (CSFT). These results about stress are logical, as work stress can stem from various factors like high patient-to-nurse ratios and complex medical cases, which finally depletes a nurse's emotional resources, leading to feelings of burnout.

Rotating work shifts were among the covariates of pediatric nurses' burnout. Pediatric nurses who work on rotating shifts were found to show higher levels of burnout than their colleagues (Lawrence et al., 2021). Another study found a moderating effect of the common work shift on the relationship between burnout and perceived health (Khatatbeh et al., 2022). This finding is explained by the disrupted circadian rhythms that the rotating work schedules can cause, leading to sleep disturbances, tiredness, reduced performance, and stress.

Higher unit capacity was positively correlated with pediatric nurses in Jordan (Khatatbeh et al., 2022). This finding might be explained by the high workload on pediatric nurses associated with higher unit capacity.

Manager support was among those variables that were studied in pediatric nurses' burnout (Khatatbeh et al., 2021). Burnout scores were lower among pediatric nurses getting more co-worker and manager support than their counterparts with less support (Khatatbeh et al., 2021). This finding seems logical, because support from managers and coworkers acts as an armor against the challenging job and fosters a sense of cooperation and shared accountability.

Studies rarely examined the relationship between participation in quality improvement-related activities

and pediatric nurses' burnout. However, a study detailed that pediatric nurses being involved in quality improvement work are not burned out compared to their counterparts who are not involved in quality improvement work (Quigley et al., 2022). This finding is reasonable, because when nurses are involved in quality improvement work, they will feel owning and controlling their work. Furthermore, they can spot quality failures, suggest solutions, and see their suggestions being implemented. This feeling of autonomy will motivate them and reduce feelings of helplessness that can finally lead to burnout.

Buckley et al. (2021) studied both the quality of work-life and work engagement in relation to pediatric nurses' burnout. The largest impact for the two variables was mainly on personal achievement, the MBI sub-scale. Moreover, they found that the quality of work-life indirectly impacts pediatric nurses' burnout through work engagement (Buckley et al., 2021). This is because when nurses feel that they are behaviorally engaged, they will feel passionate about their job, find their work meaningful, and will be dedicated to their work and patients.

Organizational structure is another related variable that was correlated to pediatric nurses' burnout. However, a study reported that organizational structure is correlated with pediatric nurses' burnout. To assess organizational structure, Bilal & Ahmed (2017) studied some variables, such as involvement in decision-making, formalization, and preferment chance. They ultimately concluded that organizational structure is correlated with burnout among pediatric nurses in Pakistan (Bilal & Ahmed, 2017). This relationship seems logical, because organizational structure is a broad concept that affects staffing, manager support, co-worker support, wages, delegation, communication, collaboration, flexibility, and many more.

Social Life/Support

Relationship distress can be defined as a harmful issue that many couples face as a result of emotional withdrawal and insecurity (Foran et al., 2015). It was studied in just one article of those included in this systematic review. Interestingly, pediatric nurses with relationship distress demonstrated higher burnout scores than their counterparts (Lawrence et al., 2021). This relationship looks reasonable, because relationship distress impacts emotions and sleep quality, making

nurses more susceptible to burnout compared to nurses with stronger relationships.

Social support is described as any type of help or guard given to another person (Khatatbeh et al., 2021). Pediatric nurses can get social support from their families, co-workers, and managers (Khatatbeh et al., 2021). Previous studies have examined the relationships between pediatric nurses' social support and burnout (Khatatbeh et al., 2021; Liao et al., 2022). According to Liao et al. (2022), higher social support reduces the impact of work stress on burnout (Liao et al., 2022). As discussed previously, social support acts as an armor against the challenging job and fosters a sense of cooperation and shared accountability.

Consequences of Burnout

Intent to Leave

Intent to leave is usually studied as a consequence of pediatric nurses' burnout. A negative relationship was found between pediatric nurses' burnout and intent to leave. It was found that pediatric nurses in Jordan with higher burnout scores tend to quit their jobs more than their colleagues with less burnout scores (Khatatbeh et al., 2021). Similarly, a Turkish study found that pediatric nurses' burnout was among those factors contributing to intention to quit (İşsever & Bektas, 2021).

Pediatric Nurses' Well-being

Quality of life is a general and relatively new term that replaced old expressions, such as well-being and happiness (Serinkan & Kaymakçı, 2013). The World Health Organization (WHO) defined quality of life as a perception of a human's situation in life within his/her environment regarding his/her goals, principles, prospects, and fears (WHO, 1997). Quality of life is usually measured using WHOQOL and WHOQOL-BREF, the WHO-Quality of Life scale, and its shortened form (WHOQOL-Group, 1998). Other tools to measure the quality of life are SF-36 and ProQOL, the *Short-form Health Survey* (Ware Jr. & Sherbourne, 1992), and the *Professional Quality of Life scale*, respectively (Stamm, 2010).

According to the studies that were identified in our systematic review, significant associations between pediatric nurses' quality of life with burnout were identified. As per the literature review that was conducted, pediatric nurses with high scores of burnout demonstrated lower scores of quality of life than their

counterparts (Khatatbeh et al., 2022).

Quality of sleep is another covariate found associated with pediatric nurses' burnout. Pediatric nurses with poor-quality sleep reported moderate to high burnout (Lawrence et al., 2021).

Perceived health means a person's overall perception of his/her health. One of the included studies found a negative relationship between pediatric nurses' burnout and their perceived health (Khatatbeh et al., 2022). High levels of burnout were associated with a poor perception of pediatric nurses' health (Khatatbeh et al., 2022).

Job Satisfaction

Job satisfaction is described as the attitude of employees to their institution, occupation, work colleagues, and other mental aspects in the work setting (Beer, 1964). Usually, nurses' job satisfaction is measured using different instruments, such as the Mueller/McCloskey Satisfaction Scale (Lee et al., 2016) and the Minnesota Satisfaction Questionnaire (Weiss et al., 1967). A study found that highly satisfied pediatric nurses showed lower levels of burnout than their colleagues (Akman et al., 2016). Similarly, a negative correlation was found between pediatric nurses' burnout and their job satisfaction (Adwan, 2014; Kaya & İşler Dalgıç, 2021).

Previous studies have found different associations between nurse satisfaction and several factors, such as manager and co-worker support (Khatatbeh et al., 2021), quality of nursing care (Jafar Jalal et al., 2015), patient safety (Khatatbeh et al., 2021), and retention (Hairr et al., 2014). For example, one study found that pediatric nurses with higher job satisfaction scores reported less frequent adverse events than their counterparts (Khatatbeh et al., 2021). Also, the same study found that pediatric nurses with better social support were more satisfied with their jobs than their counterparts (Khatatbeh et al., 2021).

Adverse Events/ Patient Safety

Adverse events are those unwanted and avoidable health outcomes resulting from wrong health services, not from the disease itself (van den Bos et al., 2011). Adverse events threaten patient safety in every hospital and every country. Around 251,000 people die every year in the United States because of adverse events (Anderson & Abrahamson, 2017). It is believed that adverse events are underreported (Al-zubi et al., 2020),

because reporting adverse events may turn into a medico-legal issue and expose pediatric nurses to disciplinary actions (Braiki et al., 2019; Siman et al., 2017). That's why researchers usually use nurse perceptions rather than incident reports to measure the frequency of adverse events (Kakemam et al., 2021; Li et al., 2021; Nantsupawat et al., 2016b).

As per the studies that were identified in our systematic literature review, some have linked patient safety and the rate of adverse events with pediatric nurses' burnout (Bagnasco et al., 2020; Bilal & Sari, 2020; Khatatbeh et al., 2021). A Turkish study found that pediatric nurses' burnout was negatively associated with attitudes toward patient safety (Bilal & Sari, 2020). A Jordanian study found that higher scores of burnout are positively associated with a higher frequency of envisioned adverse events among pediatric nurses (Khatatbeh et al., 2021). Similarly, an Italian study found that pediatric nurses' burnout is associated with more adverse events and poorer patient safety (Bagnasco et al., 2020). This finding can be explained by the reduced cognitive function and concentration that nurses with burnout will have, which can lead to adverse events, such as medication errors. At the organization level, burnout increases nurses' absenteeism leading to workforce shortages and increased workload for other nurses, thereby making them susceptible to commit medical errors.

Conclusions

As an emerging contributing factor, the COVID-19 pandemic shed light again on burnout among pediatric nurses. The suggested model combined findings of empirical studies addressing pediatric nurses' burnout. The suggested model can be beneficial to healthcare organizations and policymakers to establish a supportive work environment by fostering open communication and collaboration. Furthermore, the model may inspire decision makers to implement efficient staffing approaches that warrant appropriate nurse-to-patient ratios and acceptable workloads. Additionally, the model can motivate healthcare organizations to provide counseling services for pediatric nurses, such as teaching stress-management techniques. Also, the model will inform the healthcare organizations and policymakers to monitor burnout rates among pediatric nurses to continuously evaluate the effectiveness of employed interventions. Finally, the model may

encourage healthcare organizations to develop policies that promote nurse retention, such as offering competitive wages.

Limitations

Although this systematic review included peer-reviewed studies conducted in different countries and continents, it has some limitations. For instance, this systematic review was limited to only survey-based studies. Additionally, some studies included small sample sizes.

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Conflict of Interests

The authors declare no conflict of interests.

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This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data Availability

The dataset of the current study is available from the corresponding author upon a reasonable request.

Supplementary file 1: PRISMA Checklist



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria; participants; and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	4-5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5-6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5-6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	NA



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5-6, supplementary file 1
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	NA
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	5-6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	5-6
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	5-6
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	5-7
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	5-6, supplementary file 1
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	7-12
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	15
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	Title page

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: www.prisma-statement.org.

Supplementary file 2: Quality Assessment

Item	Advan (2014)	Akman et al. (2016)	Bagnasco et al. (2020)	Bilal & Ahmed (2017)	Bilal & Sari (2020)	Buckley et al. (2019)	Buckley et al. (2021)	Calisir et al. (2020)	Issever & Bektaş (2021)	Karakuchian et al. (2021)	Kaya & Dalgic (2021)	Khatatbeh et al. (2021)	Khatatbeh, Al-Dwainat et al. (2022)	Khatatbeh, Hammoud et al. (2022)	Lawrence et al. (2021)	Liao et al. (2022)	Lin et al. (2016)	Meyer et al. (2015)	Peck & Sonney (2021)	Quigley et al. (2022)	Waterworth & Grace (2021)
Inclusion and exclusion criteria and selection methods are indicated.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Selection criteria are adequate to answer the study aim.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The study population, define by the selection criteria, contains an adequate spectrum of the population of interest.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
A sample size estimation, confidence level or statistical of the sample was done.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The number of potentially eligible persons is reported, those initially selected, those who accept and those who finally participate.	Y	N	Y	N	N	Y	N	N	N	N	N	Y	Y	Y	N	N	N	N	Y	N	N
The variables of exposure/intervention, result, confusing or modifying are clearly stated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The main variables have an adequate conceptual and operational definition	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The instruments for measuring the main variables have known and adequate validity and reliability	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The measurement and collection techniques of the main variables are sufficiently described	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The statistical analysis was determined from the beginning of the study.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
The statistical tests used are specified and are adequate	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Participants and data lost were correctly analysed.	N	Y	N	N	N	N	Y	N	N	Y	N	N	N	N	Y	Y	Y	Y	N	Y	Y
The main elements of possible confusion in design and analysis were taken into account	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Methodological Quality	H	H	H	M	M	H	H	M	M	H	M	H	H	H	H	H	H	H	H	H	H

Legend: H= High; M= Medium; L= Low; Y= Yes; N= No

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