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Burnout and Coping Strategies in Pediatric and Neonatal Intensive Care Staff

Isabelle Butcher[1], Rachael Morrison[2], Omobolanle Balogun[3], Heather Duncan[2], Kate St Louis[2], Sarah Webb[2], and Rachel Shaw[3]

[1] Department of Psychiatry, University of Oxford

[2] Paediatric Intensive Care Unit, Birmingham Women's and Children's NHS Foundation Trust, Birmingham, United Kingdom

[3] School of Psychology, College of Health & Life Sciences, Aston University

Objective: Staff in pediatric and neonatal intensive care units (PICU and NICU) experience high rates of burnout due to the highly stressful environment. There is growing literature describing stress and burnout, but to date, no review of the evidence specific to pediatric and neonatal intensive care. For the development of interventions to reduce and prevent burnout, there needs to be a better understanding of this evidence. Little is known about coping strategies employed by critical care staff; it is important to collate and critique this literature to inform interventions. The objective of this systematic review was to examine burnout occurrence and coping strategies among staff working in PICU and NICU. ***Methods:*** A systematic search of Web of Science (WoS), Scopus, Medline, AMED, PsycINFO, CINAHL, Nice Evidence, and EMBASE was conducted following PRISMA guidelines. ***Results:*** Studies measuring burnout and/or coping in PICU and NICU were included in the review. Twenty-two studies met the inclusion criteria, the majority of which used a quantitative cross-sectional design. Of the included studies, 14 measured burnout, and 17 measured coping. ***Conclusion:*** Staff working in pediatric and neonatal intensive care settings experience high rates of burnout. While staff may have the ability to use coping strategies, often time and lack of awareness mean they don't. Psychologically informed interventions are required to prevent burnout and to provide staff with the tools and resources to develop healthy coping strategies in order to boost their well-being. Those interventions must then be formally evaluated to determine their impact on staff psychological outcomes.

Rachel Shaw https://orcid.org/0000-0002-0438-7666

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The authors declare no conflicts of interest in conducting this research.

Rachael Morrison, Rachel Shaw, Sarah Webb, Isabelle Butcher, and Heather Duncan conceptualized the study. Rachael Morrison, Sarah Webb, Omobolanle Balogun, Kate St Louis, and Isabelle Butcher took part in the data analysis. Isabelle Butcher, Rachael Morrison, Rachel Shaw, Sarah Webb, Kate St Louis, and Omobolanle Balogun contributed to data analysis and synthesis. All authors reviewed the manuscript.

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Correspondence concerning this article should be addressed to Rachel Shaw, School of Psychology, College of Health & Life Sciences, Aston University, Aston Triangle, Birmingham, B4 7ET, United Kingdom. Email: r.l.shaw@aston.ac.uk

Implications for Impact Statement
This work offers insight into avenues for future research to further describe the nature of burnout and to identify the predictors of successful coping. The literature review shows that there is variation in the way burnout and compassion fatigue are measured; working toward a consensus for a "gold standard" measurement would help synthesize the evidence. Coping is less well described and measures are not always appropriate; further work is required to identify and measure the impact of coping strategies to develop the evidence base.

Keywords: pediatric intensive care, neonatal care, burnout, coping strategies, systematic review

Supplemental materials: https://doi.org/10.1037/cpp0000474.supp

"Burnout syndrome" was defined in the 1970s as a state of emotional, mental, and physical exhaustion as a result of prolonged stress (Freudenberger, 1974). Freudenberger identified three components; emotional exhaustion, depersonalization, and reduced personal accomplishments (Freudenberger, 1974). As research progressed, it became clear that a preoccupation with emotional and/or physical exhaustion or distress, coupled with prolonged exposure to individualized trauma or secondary traumatic stress could combine to create what was described as compassion fatigue (Cocker & Joss, 2016; Figley, 1995). As such, burnout and compassion fatigue are overlapping and interacting conditions that can coexist. This makes it difficult to distinguish between them. Following this, our working definition of burnout for this review is:

> Burnout is a state of emotional, mental and physical exhaustion which results from a period of prolonged stress and/or prolonged exposure to traumatic stress. Cumulative burnout can result in compassion fatigue which manifests as a depleted ability to cope with one's everyday environment. Burnout and compassion fatigue can impact individuals' ability to care and can lead to serious mental health conditions such as posttraumatic stress disorder, anxiety or depression.

Healthcare professionals working in pediatric and neonatal intensive care units (PICU and NICU) are often subject to stressful and traumatic experiences on a daily basis due to the nature of care they provide. Evidence shows that staff working in pediatric critical care have higher levels of burnout than healthcare professionals in other areas due to the constant exposure to high-risk situations, the intensity of the work, and exposure to infant and child deaths that take a toll on their physical and mental well-being (Colville, 2018; Colville et al., 2017; Garcia et al., 2014; Jones et al., 2020; Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ramos, & Olmedilla, 2019). It is also clear from the evidence that compassion fatigue affects up to 40% of staff in PICU (Richardson & MacKenzie Greenle, 2020) and 27% in NICU (Tawfik et al., 2017) and that this has been a problem for some time (Meandors, M. & Lamson, 2008; Sacco et al., 2015). More recently, the COVID-19 pandemic further challenged healthcare workers across the world (Feeley et al., 2021). While most concerns identified preexisted during the pandemic, COVID-19 added an extra layer of stress (Balistreri et al., 2021). There is evidence to suggest that levels of burnout and compassion fatigue are higher among healthcare professionals working in pediatric settings (PICU and NICU; Jones et al., 2020) but the reasons for this are unclear. Qualitative evidence has shown that staff working in pediatric critical care find acute illness and death of infants and children particularly distressing (Hudson et al., 2015). This review offers an opportunity to explore this evidence in more depth.

The components of burnout not only have an impact on the individual but can also cause a detrimental effect on their performance in the workplace. The reduction in personal accomplishments can cause a lack of motivation in the individual, resulting in reduced levels of productivity and a poorer performance in the workplace (Salvagioni et al., 2017). This often causes an increased level of staff turnover due to lower job satisfaction in the workplace (Adwan, 2014). As well as this, in fields such as healthcare where the quality of care patients receive is of great importance, having high levels of burnout is extremely

harmful to the quality of work staff are able to provide (West & Coia, 2019). Burnout in healthcare professionals can result in a loss of compassion toward patients due to depersonalization and can therefore reduce the quality of care patients receive on the unit (Cocker & Joss, 2016). Detachment between the patient and staff member can contribute to impersonal treatment of the patient by the staff member (Reader et al., 2008).

As healthcare professionals working in PICU and NICU experience a high level of emotional strain and work-related stress, it is important to consider the various strategies used to cope in such a demanding work environment. Coping can be defined as cognitive and behavioral strategies which may be used to alleviate stressful situations (Leiter, 1991). Coping strategies can either focus on the problem faced by the individual or on the emotions the individual is experiencing. Research has found that healthcare professionals use active or avoidant coping strategies to deal with the nature of their work (Hudson, 2014; Lee et al., 2008; Wei et al., 2020). Active coping focuses on reducing stress levels through conscious attempts, whereas avoidant coping involves ignoring the issue(s). The type of coping style adopted by an individual is significant to their susceptibility to burnout (Colville et al., 2017). Indeed, support-seeking (approach) coping strategies have been shown to moderate the impact of secondary distress and burnout on healthcare professionals in the NICU (Moore & Schellinger, 2018).

This review of literature aims to explore what is currently known about burnout occurrence among pediatric and neonatal intensive care staff and seeks to understand possible coping strategies used by this target group in order to promote good well-being. Specifically, this review aimed to answer two primary questions:

1. What is currently known about burnout among staff in pediatric and neonatal intensive care units?
2. What is currently known about coping strategies used by staff in pediatric and neonatal intensive care units?

Method

No ethical review was required for this study as it involved no human participants.[1] The work constituted a systematic review of published literature.

Eligibility Criteria

To focus on the review objectives it was necessary to restrict included studies to those based in PICU and NICU settings and for the review to be effective in determining the levels and nature of burnout and coping strategies employed, included studies were required to include measures of one or the other or both. Inclusion criteria were: studies that involved staff members working in PICU and NICU and focused on burnout prevalence and/or coping strategies for burnout; published in English; including a measure of burnout and/or coping; using quantitative and mixed-methods studies.

Exclusion criteria were: studies not involving staff members or included adult intensive care or pediatric/neonatal settings that were not intensive care; posters, letters, and systematic reviews.

Information Sources and Search Strategy

The following databases were searched in December 2020: Web of Science (WoS), Scopus, Medline, AMED, PsycINFO, CINAHL, Nice Evidence, and EMBASE. The search terms used in this review can be seen in Table A in the online supplemental materials.

Selection Process

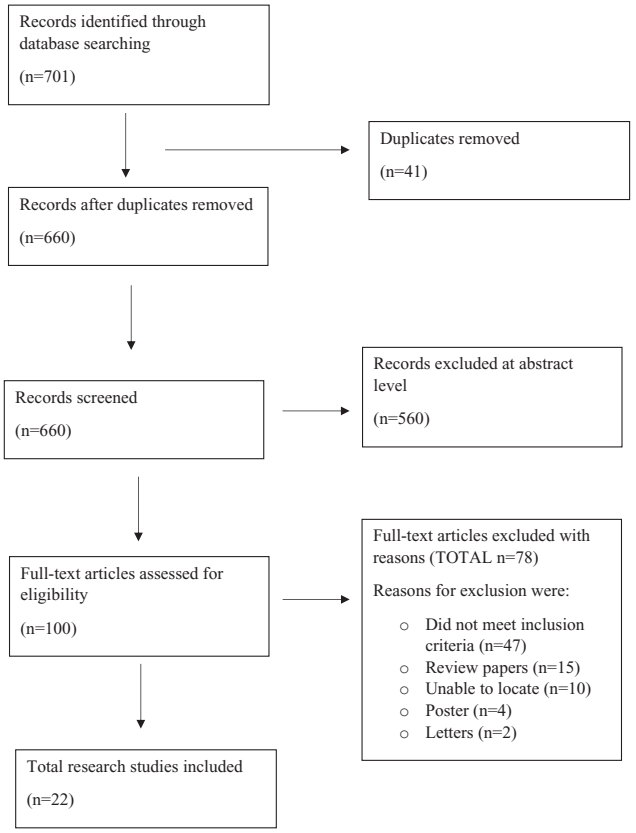
All citations from the searched databases were uploaded to EndNote and duplicates were removed. The remaining citations were exported, and their title and abstracts were reviewed by members of the research team (IB, OB, RM, and SW). Each author independently screened 25% of titles. Title and abstract were screened against the inclusion criteria and the remaining citations were then full text screened independently against the inclusion criteria by two members of the research team (IB and OB) and a third independent reviewer (KSL). Where there were discrepancies, these were discussed together and resolved. Figure 1 shows the PRISMA flow diagram.

Data Collection Process

The data extraction was performed by two researchers (IB and OB). The following data

[1] No IRB approval was required and informed consent not necessary because this work did not involve any human participants; it was a systematic review of the evidence only.

Figure 1
PRISMA Flow Diagram



Note. Adapted from "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," by M. J. Page, J. E. McKenzie, P. M. Bossuyt, I. Boutron, T. C. Hoffman, C. D. Mulrow, et al., 2021, *BMJ*, 372(71) (https://www.bmj.com/content/372/bmj.n71). CC BY 4.0.

items were extracted: title, author, methods, sample, the country where the study was conducted, sampling technique, study design, study setting, aim of the study, measures of burnout, measures of coping strategies, outcomes of the study, and the strengths and limitations as reported in the paper and key findings.

Quality Assessment

All studies were quality assessed using the Mixed Methods Appraisal Tool (MMAT; Pluye et al., 2009) tool (by IB and OB independently). A third author (KSL) independently assessed 50% of these studies. Where there were discrepancies, these were resolved by a discussion. The MMAT is ideal for systematic reviews which include studies using a range of different designs, like this one (Pluye et al., 2009). This means it is possible to rate case–control studies, randomized controlled trials, and mixed-methods studies using the same framework because it includes tailored criteria for a number of designs.

Results

Study Characteristics

The studies included in the review represent the state of the evidence base related to burnout and coping among PICU and NICU workforces worldwide. There are clear gaps in evidence in low- and middle-income countries (LMIC) with the majority in North America and Europe.

There is a range of standardized, validated questionnaires used to measure prevalence of burnout and to identify successful coping, which indicates an immediate challenge in synthesizing findings because the constructs are defined and measured differently. This is more apparent in coping than burnout (where there is one measure used more frequently than any other). Coping is variously measured through resilience, quality of life, empowerment, acceptance, recovery after work, and self-care. Others listed coping strategies to be identified by participants.

The evidence confirmed that burnout was higher among the PICU workforce compared to NICU. Protective factors against burnout include having worked in PICU for over 10 years, being able to put work into perspective while being empathic, and being in a significant intimate relationship. The evidence on coping is mixed, but a key message is that talking about and making sense of events at work in the forms of peer support, talking to senior colleagues, talking to people outside work as well as formal discussions of cases and patient deaths are common coping strategies. Whether these indicate successful coping, that is, reduce burnout and compassion fatigue, is less clear. Further details of the individual studies are below.

Of the 22 studies, 12 were conducted in North America, and 11 of these were conducted in the United States. Seven were conducted in Europe, three of which were in Spain by the same authors Rodríguez-Rey and colleagues (Rodríguez-Rey et al., 2017; Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ordóñez, & Llorente, 2019; Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ramos, & Olmedilla, 2019). The remaining three studies were conducted in Japan, Brazil, and Australia (see Table 1). The majority, 12 studies, employed a cross-sectional design, 4 studies were prospective, 3 longitudinal, and the remaining 3 studies employed retrospective, interventional and observational designs. Thirteen studies took place in PICU, and nine in NICU. Only one study (Bursch et al., 2018) looked at both NICU and PICU in one hospital in Canada. One study took place in the community with palliative care providers. Sample sizes range from 13 participants to 2,073. The majority of participants were female with an average ratio over all the studies of 88.6% female to 11.4% male. Ffrench-O'Carroll et al. (2019) was the only study that included slightly more males ($n = 15$) than females ($n = 13$). One study only included female staff working in PICU (Latimer et al., 2017).

Study Quality

An overall quality score was given to each study using the MMAT scoring system which includes quality questions for qualitative, quantitative randomized controlled trials, quantitative non-randomized; quantitative descriptive; and mixed-methods study designs. Each question is answered: yes, no, can't tell, and appraisers are given space to comment. Responses are counted up to reach a quality score of unclassified, 25%, 50%, 75%, or 100% depending on how many of the criteria that they met (Pluye et al., 2009; see Tables B and C in the online supplemental materials).

Eight studies with quantitative designs were rated at 100% meaning that all quality criteria were met; 11 were rated at 75% meaning one criterion was either not met or not reported clearly. The majority of studies at 75% were missing information relating to the nonresponse bias (see Table D in the online supplemental materials for a summary of poorer elements of included studies). One quantitative study was rated at 50% with three items not clear enough in the paper to be confirmed. Both non-randomized studies were rated at 75% and both either did not or did not report whether confounders were accounted for in the design and analysis.

Burnout: Description of Measures and Results

Of the 22 studies included in this systematic review, 14 measured burnout with self-report measures. Seven did not measure burnout, and one did not report on burnout (details of measures used are in Table 1). The most popular instrument used to assess burnout was the Maslach Burnout Inventory (MBI) either in its full form or the abbreviated version. The MBI (Maslach et al., 1996) consists of 22 items which focus on emotional exhaustion, depersonalization, and professional accomplishment. The inventory asks participants to rate on a 7-point Likert scale, ranging from $0 = never$ to $6 = everyday$, the

Table 1
Characteristics of Included Studies

Author (year)	Title	Study design	Setting	Location	Sample size, *n* (male/female)	Measure(s)		Quality score
						Burnout	Coping	
Barr (2018)	The five-factor model of personality, work stress and professional quality of life in neonatal care unit nurses	Cross-sectional	NICU	Australia	140 (4/136)	Professional Quality of Life (ProQoL)	NM	Quantitative design score: 75%
Bursch et al. (2018)	Feasibility of online mental wellness self-assessment and feedback for pediatric and neonatal critical care nurses	Longitudinal	NICU	United States	119 (6/113)	Abbreviated Maslach Burnout Inventory (MBI)	Brief Resilience Scale	Quantitative design score: 75%
Colville et al. (2017)	Coping with staff burnout and work-related posttraumatic stress in intensive care	Cross-sectional	Four PICUs (and three adult ICUs)	United Kingdom	377 (62/311)	Abbreviated MBI	Brief Resilience Scale list of coping strategies	Quantitative design score: 75%
Davis and Batcheller (2020)	Managing moral distress in the workplace: creating a resiliency bundle	Cross-sectional	PICU	United States	47 (NR)	NM	Group Resilience Measure	Quantitative design score: 100%
Eagle et al. (2012)	The effect of facilitated peer support sessions on burnout and grief management among healthcare providers in pediatric intensive care units: a pilot study	Prospective pre/posttest	PICU	United States	50 (NR)	Copenhagen Burnout Inventory	NM	Non-randomized study design score: 75%
Ffrench-O'Carroll et al. (2019)	Grief reactions and coping strategies of trainee doctors working in pediatric intensive care	Cross-sectional	PICU	Ireland	28 (15/13)	NM	Brief COPE Inventory (tool and coping strategies)	Quantitative design score: 100%
Flanders et al. (2020)	Effectiveness of a staff resilience program in a pediatric intensive care unit	Retrospective pre/posttest	PICU	United States	150 (NR)	ProQoL	NM	Quantitative design score: 100%
Fortney et al. (2020)	Perceived infant well-being and self-reported distress in neonatal nurses	Longitudinal	NICU	United States	237 (NR)	NM	Quality of Life (QoL; developed from the nurse Perceptions of Infant Well-Being Survey)	Quantitative design score: 75%
Garcia et al. (2014)	Prevalence of burnout in pediatric intensivists: an observational comparison with general pediatricians	Observational cohort	PICU (and non-PICU)	Brazil	70 (15/55)	MBI	NM	Quantitative design score: 100%

(*table continues*)

Table 1 (*continued*)

Author (year)	Title	Study design	Setting	Location	Sample size, *n* (male/female)	Measure(s)		Quality score
						Burnout	Coping	
Gauthier et al. (2015)	An on-the-job mindfulness-based intervention for pediatric ICU nurses: a pilot	Longitudinal	PICU	United States	45 (3/42)	MBI	Self-compassion (using the Self-Compassion Scale)	Quantitative design score: 100%
Kitao et al. (2018)	Associated factors of psychological distress among Japanese NICU nurses in supporting bereaved families who have lost children	Cross-sectional	NICU	Japan	169 (2/167)	NM	Questionnaire (including items on bereavement, coping strategies, acceptance of baby deaths, resting, and distraction)	Quantitative design score: 100%
Latimer et al. (2017)	Empathy in pediatric intensive care nurses part 1: behavioral and psychological correlates	Cross-sectional	PICU	Canada	51 (0/51)	Compassion Fatigue Scale	NM	Quantitative design score: 100%
Moore and Schellinger (2018)	An examination of the moderating effect of proactive coping in NICU nurses	Cross-sectional	NICU	United States	62 (1/61)	NM	Brief COPE Inventory	Quantitative design score: 75%
Mörelius et al. (2013)	Neonatal intensive care and child psychiatry inpatient care: do different working conditions influence stress levels?	Prospective	NICU	Sweden	44 (NR)	Copenhagen Burnout Inventory	Psychological Empowerment Instrument	Quantitative design score: 100%
O'Mahony et al. (2017)	A multimodel mindfulness training to address mental health symptoms in providers who care for and interact with children relation to end-of-life care	Prospective	Pediatric Palliative Care	United States	13 (4/9)	MBI	Acceptance and Action Questionnaire Version III	Non-randomized study design score: 75%
Pannell et al. (2017)	Stress resiliency practices in neonatal nurses	Cross-sectional	NICU	United States	48 (NR)	NM	Stress Resilience Profile	Quantitative design score: 75%
Profit et al. (2014)	Burnout in the NICU setting and its relation to safety culture	Cross-sectional	44 NICUs	United States		Abbreviated Emotional Exhaustion Scale (based on MBI)	Resilience represented as burnout score ≤25	Quantitative design score: 100%

(*table continues*)

Table 1 (*continued*)

Author (year)	Title	Study design	Setting	Location	Sample size, *n* (male/female)	Measure(s)		Quality score
						Burnout	Coping	
Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ramos, and Olmedilla (2019)	Are pediatric critical personnel satisfied with their lives? Prediction of satisfaction with life from burnout, posttraumatic stress, and posttraumatic growth, and comparison with noncritical pediatric staff	Cross-sectional	PICU Non-PICU	Spain	298 (52/246) 189 (30/159)	MBI	Satisfaction with Life Scale	Quantitative design score: 75%
Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ordóñez, and Llorente (2019)	Burnout and posttraumatic stress in pediatric critical care personnel: prediction from resilience and coping styles	Cross-sectional	PICU Non-PICU	Spain	298 (52/246) 189 (30/159)	MBI	Coping Questionnaire for Healthcare Providers Brief Resilience Scale	Quantitative design score: 75%
Rodríguez-Rey et al. (2017)	Posttraumatic growth in pediatric intensive care personnel: dependence on resilience and coping strategies	Cross-sectional	PICU Non-PICU	Spain	298 (52/246) 189 (30/159)	NM	Coping Questionnaire for Healthcare Providers	Quantitative design score: 75%
Sluiter et al. (2005)	Is staff well-being and communication enhanced by multidisciplinary work shift evaluations?	Prospective	PICU	Netherlands	62 (NR)	NM	Need for Recovery After Working Time Scale	Quantitative design score: 50%
Weintraub et al. (2016)	Compassion fatigue, burnout and compassion satisfaction in neonatologists in the United States	Cross-sectional	NICU	United States	433 (212/221)	Compassion Fatigue and Satisfaction Self-Test for Helpers (CEST)	Self-care Strategies listed	Quantitative design score: 75%

Note. NICU = neonatal intensive care unit; NM = no measure; PICU = pediatric intensive care unit; NR = not reported..

frequency with which they have been experiencing certain related feelings for the previous 12 months. The other measure of burnout used in more than one study was the Copenhagen Burnout Inventory (Kristensen et al., 2005). Two studies measured compassion fatigue using the Compassion Fatigue Scale (Figley, 1995) and the Compassion Fatigue and Satisfaction Self-Test for Helpers (CEST; Stamm, 2002).

PICU

Of the 13 studies that were conducted in PICU, 9 measured burnout, 4 of which used the MBI to assess burnout. The remaining five studies used a range of self-report measures to assess burnout. These nine studies ranged in sample size from 45 (Gauthier et al., 2015) participants to 377 (Colville et al., 2017) participants. These studies were conducted in North and South America and Europe. Of these nine studies that measured burnout, one study (Latimer et al., 2017) included only female individuals.

One of these studies was conducted in both PICU and NICU (Bursch et al., 2018) with a predominantly female sample and using the abbreviated MBI. Bursch et al. (2018) reported that those individuals frequently in PICU had significantly higher emotional exhaustion and higher depersonalization relative to those working most frequently in NICU in the same hospital. Results indicated that those individuals working in NICU had significantly lower levels of depersonalization than those who worked most frequently in PICU. Participants who worked day shifts had higher levels of depersonalization than those working night shifts in PICU. Nurses who indicated having worked in an ICU setting for 10 or fewer years reported higher levels of anxiety than those who indicated that they had worked in an ICU setting for 11 years or more ($m = -4.57$ vs. $m = 2.61$, $p < .01$). Additionally, respondents who reported being married or in a domestic partnership had significantly lower emotional exhaustion ($m = .517$, $p < .05$) relative to those who were unmarried and not in a domestic partnership.

A study conducted in several ICUs and PICUs in the United Kingdom by Colville et al. (2017), which also used the abbreviated MBI, found that in their sample of nurses and doctors, the burnout rate was 37%. 60% of the sample scored at high risk of burnout on at least one of the three dimensions of the abbreviated MBI.

In a study by Flanders et al. (2020), ProQoL was used to assess burnout, compassion fatigue, and compassion satisfaction after the brief implementation of a resilience program. Results identified that there was a positive statistically significant correlation between compassion satisfaction and engagement ($r = .45$, $p < .01$). Further analyses revealed that there was a statistically significant positive correlation between years of experience and engagement ($r = -.27$, $p = +.81$) suggesting that as years of experience increased so did compassion satisfaction and engagement.

The only observational comparison study conducted in PICU in Brazil by Garcia et al. (2014) using the MBI reported that working in PICU was the only independent risk factor associated with burnout ($OR = 5.7$, 95% CI [1.9–16.7]; $p < .01$). Seventy females participated with 15 males. Burnout was present in 50% of the sample and was more frequent among pediatric intensivists than general pediatricians.

In a longitudinal study by Gauthier et al. (2015) in the United States at one PICU, utilizing the MBI, authors reported that years of nursing experience and burnout were significantly correlated with depersonalization at time 1 ($r = -.31$, $p < .01$) and at time 3 with emotional exhaustion ($r = -.36$, $p < .05$). Therefore, nurses with more years of experience tended to have lower levels of burnout.

Latimer et al. (2017) was the study that included only females. The Compassion Fatigue Scale (Adams et al., 2008) found that the traits of perspective-taking and empathic concern ($r = .50$, $p = .007$) were significantly correlated with secondary trauma (.40, $p = .04$).

In a set of three studies conducted by Rodríguez-Rey (Rodríguez-Rey et al., 2017; Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ordóñez, & Llorente, 2019; Rodríguez-Rey, Palacios, Alonso-Tapia, Pérez, Álvarez, Coca, Mencía, Marcos, Mayordomo-Colunga, Fernández, Gómez, Cruz, Ramos, & Olmedilla, 2019) in Spain, in nine different PICUs with a control group of a non-PICU setting, results identified that 36.2% of PICU working staff showed scores over the threshold for emotional exhaustion on the MBI. The percentage of professionals who would like to be transferred to another unit was

significantly higher for PICU workers than for workers in noncritical pediatric units ($X^2 = 4.51$, $p = .334$). Furthermore, burnout and posttraumatic stress disorder were higher when one or more patients had died in the unit or when conflict with colleagues had occurred during the week before completing the MBI.

A study by Eagle et al. (2012) in the United States utilizing the Copenhagen Burnout Inventory on a sample of 50 individuals working in one PICU reported that facilitated peer support group sessions did not reduce grief and burnout scores.

NICU

Of the nine studies that were conducted in NICU, five measured burnout. The sample sizes for these studies ranged from 44 to 2,073 and were conducted in the United States, Australia, and Europe. All of the studies included both male and female individuals. Six of these nine studies were cross-sectional in design, two longitudinal, and one prospective. To assess burnout, one study used the ProQOL, one used Compassion Fatigue Scale, two used the abbreviated version of the MBI, one used the Copenhagen Burnout Inventory.

In a sample of 47 individuals, 33 of whom worked in NICU and 14 who worked in a Child and Adolescent Psychiatry (CAP) unit, and using the Copenhagen Burnout Inventory it was found that NICU nurses had higher social support and more self-determination than the other group of staff (Mörelius et al., 2013).

Barr conducted a study in Australia with 140 individuals of whom 136 were female and after controlling for work stress, found that neuroticism and agreeableness were related to burnout. Work stress mediated the effect of neuroticism and extraversion on burnout (Barr, 2018).

A large study by Profit et al. (2014) which included 2,073 individuals and 44 NICUs in the United States which used the abbreviated version of the MBI found 27.8% reported burnout with a range between 7.5% and 54.4%.

To summarize, the results from this systematic review, indicate that burnout in PICU and NICU settings is high in comparison to other areas such as general pediatric units. This review included 14 studies from across the globe that measured and reported on burnout in staff working in either PICU or NICU settings.

Coping: Description of Measures and Results

Of the 22 studies included in this review, 17 measured coping with a range of measures. Two measures were used in more than one study: the Brief COPE (Carver et al., 1989) and the Brief Resilience Scale (Smith et al., 2008). The Brief COPE is a self-report tool used to assess coping strategies in the domains of positive reframing, religion, use of emotional support, self-distraction, and venting. Scores range from 0 to 5 with 0–1 representing low, 2–3 representing moderate, and 4–5 representing a high use of coping strategies. The Brief Resilience Scale is a 6-item scale, each point is rated on a 5-point scale from 1 indicating *strongly disagree* to 5 indicating *strongly agree* and the scores are averaged. It includes statements on how a person usually adapts to adversity. There was a range of other measures used to assess coping in the remaining 13 studies (see Table 1).

PICU

Of the 17 studies that measured coping strategies, 9 were conducted in PICU. These studies ranged in sample size from 28 to 298. These studies were conducted in the United States and Europe.

In a study by Bursch and colleagues which assessed coping through the use of the Brief Resilience Scale (Smith et al., 2008), participants reported that educational assessments and feedback were helpful in coping. Similarly, a study by Colville et al. (2017) which also used the Brief Resilience Scale found that all participants engaged in coping strategies to manage stress at work. Furthermore, in this study, a list of coping strategies was also generated by the study authors and included personal and organizational strategies. Personal strategies included "speak to people outside work," "try to be cheerful," and "speak to colleagues." Organizational strategies included "talk to seniors" and "attend debriefs."

In their PICU study conducted in the United States, Davis and Batcheller (2020) created a resiliency bundle and conducted pre- and post-intervention measures. They found a statistically significant increase in resilience in the intervention group (79.9–83.4, $p < .0001$). The resiliency bundle included ethical issue resolution process, mindfulness reminders through cell

phone applications, patient death process outline, and case conference discussions. Additionally, structured debriefings with pastoral care, discussions with colleagues and supportive staff, leadership notification, and social events were part of the bundle. Host site educational courses aimed at improved clinician well-being and an employee assistance program were also available to all participants.

A study by Ffrench-O'Carroll et al. (2019) in Ireland using the Brief COPE reported that the majority ($n = 21$) of staff coped with pediatric deaths in PICU by "trying to see the problem in a different light"; some reported spiritual and religious beliefs to be helpful ($n = 10$) and some said that they turned to others for work activities ($n = 13$). Also, within this study coping strategies that were reported included discussions with another person, expressing emotions, reflection, the request for greater support, and a request for follow-up or debriefing.

NICU

Of the 17 that measured coping 8 were conducted in NICU. These eight studies were conducted in the United States, Japan, and Europe. The studies ranged in sample size from 44 to 2,073. All of the eight studies that measured coping in NICU included both male and female individuals. Seven studies were single sites with one study being multisite.

A Japanese study (Kitao et al., 2018) conducted across 64 NICUs utilized a questionnaire on coping designed by Setou and Takada (2012) and reported that nurses were significantly more likely to use coping methods if they experienced high psychological distress compared to if they were not experiencing psychological distress. Coping responses on this questionnaire included talking to colleagues, accepting the death of babies as their fate, and considering it part of their job, resting, and distraction. However, the use of these coping strategies did not always reduce psychological distress.

A study conducted in Sweden compared burnout and coping between staff in NICU and staff in a CAP unit (Mörelius et al., 2013). They assessed coping using biomarkers (salivary cortisol samples), social support (Social Support Scale; Karasek, 1979), and psychological empowerment (Psychological Empowerment Instrument; Spreitzer, 1995). They found positive correlations between the salivary cortisol quotient and social support and between the salivary cortisol quotient and the self-determination subscale of the Psychological Empowerment Instrument. NICU nurses scored more highly on the self-determination subscale compared with nurses in CAP, meaning NICU nurses felt more in charge of their actions. Note that no particular coping strategies were identified.

To summarize, the results from this review confirm that a range of coping strategies are utilized by staff in PICU and NICU units globally with the intention of alleviating symptoms and experiences of burnout. However, the distinction between "just" coping and coping well remains unclear.

Discussion

To the best of our knowledge, this is the first systematic review to focus on the occurrence of burnout and coping strategies used in PICU and NICU globally.

This review identified that a number of studies employing a range of designs have been conducted to understand burnout in PICU and NICU settings. In addition, it provides a review of the evidence to date relating to the role of coping in staff working in these two highly specialized and high-pressure environments. This study also identified that there may be a set of protective factors that mitigate against burnout, for example, being in a relationship, and having more experience working in a critical care setting.

The results of this review highlight several "gaps" in the current evidence base. There is a lack of research published in the United Kingdom focused on burnout and coping strategies among PICU and NICU staff with the majority of studies being conducted in the United States. This is pertinent to note given that the American healthcare system operates in a different way to the National Health Service (NHS) in the United Kingdom. In the UK NHS, care is free at the point of need, which may lead to differences in how care is financed and accessed, which could have implications for working patterns, workloads, access to healthcare, and funding of resources. The impact of these factors on burnout and coping is currently unknown. Future research on these environmental factors would help identify structural interventions

which might create more resilient healthcare structures in PICU and NICU.

This review identified a paucity of research investigating the impact of interventions on burnout and coping for staff working in PICU and NICU environments, employing a pre- and posttest design. Additionally, this review suggests that staff working in PICU and NICU face similar challenges with regard to well-being at work (although levels of burnout were higher among PICU staff), and thus going forward research should focus on combining interventions for both of these units to reduce burnout and to provide staff with appropriate resources and tools to develop healthy coping strategies to boost their well-being.

The review illustrated that there is a plethora of measures available to assess burnout and coping using self-report measures, and these focus on different dimensions of these constructs. There appears to be no "gold standard" within the literature which impacts the ability to make comparisons across studies. This makes the synthesis of evidence particularly challenging because findings are not directly comparable. Establishing a consensus on which measure is most suited to measuring prevalence of burnout and which measure is best able to identify predictors of successful coping would simplify the evidence base and enable identification of a clearer path for interventions. In addition, this future research needs to test the emerging hypotheses that better coping strategies would reduce burnout and that reduced burnout would not only improve the psychological outcomes (e.g., reduce depression, anxiety, and posttraumatic stress) of PICU and NICU staff, but also improve the quality of care they are able to provide.

It is pertinent to note that all studies except one included nurses and doctors at a range of levels with only one including allied healthcare professionals. There is a need to expand our research communities to include allied healthcare professionals, who provide essential roles in the PICU and NICU environments. To date, it is unknown whether experiences of burnout and coping strategies are similar or different across professional boundaries. Future research would help identify any differences and whether different kinds of interventions are required for different staff groups.

Some studies included free-text responses for staff to name their own coping strategies rather than limiting them to the predetermined options used in the standardized measures. Some of the coping strategies elicited from participants have existing evidence to indicate their success, for example, debriefs (Archibald & O'Curry, 2020; Ffrench-O'Carroll et al., 2019). Others do not yet have an evidence base, for example, talking to a family member. Given that staff describe both of these strategies as a form of support they are clearly well used and taken seriously. This suggests the need for further research to first, identify modes of support used by staff not yet identified in the literature, and second, to establish the effectiveness of simple, self-led interventions, such as talking to family or friends, as well as more formalized or structured interventions such as peer support groups or structured debriefs. It is important to be open-minded about what is experienced as supportive by staff and to examine the likely effectiveness of those strategies for reducing burnout and creating positive coping strategies. It is essential that pre- and posttest studies use psychological outcome measures to determine their impact on staff burnout and well-being.

Limitations

The review was limited to literature in English so may have missed important sources in other languages. Relatedly, the majority of evidence comes from western countries and so may not be representative of LMIC which also have very different healthcare systems. Future LMIC research would help describe the factors which lead to burnout in those contexts and determine the level of similarity of successful coping strategies. Such research would enable us to determine whether burnout and coping can be compared across countries and thus whether interventions to improve PICU and NICU workplaces are transferable across settings. The quality of the review is dependent on the quality of the evidence, and because the studies ranged in quality, the trustworthiness of the findings islimited.

Clinical Applications

This review has identified a significant problem of burnout among PICU and NICU staff across the countries in which research has taken place. It has also revealed a range of coping strategies, with little evidence of the effectiveness of those strategies in terms of reducing the likelihood of burnout. There is some suggestion that

staff may not seek support unless they are critically psychologically affected by burnout; an underlying assumption that burnout is an inherent part of their role was suggested. The findings indicate work is required to evaluate interventions designed to reduce burnout and to provide resources to establish healthy coping strategies.

Psychological research is required to develop evidence-based interventions designed to prevent burnout and improve coping. Evidence exploring the lived experience of staff working in PICU and NICU is required for a better understanding of the nature of their burnout experience. Furthermore, the development of interventions needs to be informed by the psychological literature which will help identify what kinds of behavior change techniques are likely to be successful in improving staff coping. In addition to this, environmental and policy changes are required to facilitate the systemic changes required to create working environments conducive to good well-being. While there is growing recognition of the problem of burnout among critical care staff, much further research is required to determine the effectiveness of interventions in order to win the "buy-in" and financial support from healthcare managers.

Conclusion

Staff burnout in PICU and NICU is an issue that staff working in these environments experience globally. There needs to be greater attention paid to the well-being of staff—nurses, doctors, and allied healthcare professionals—working in these high-stakes, high-pressure environments in order to prevent burnout and to provide them with healthy coping strategies. Further research is urgently needed to evaluate the impact of interventions designed to improve staff well-being.

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