What is known about paediatric nurse burnout: a scoping review
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Abstract
Burnout in healthcare providers has impacts at the level of the individual provider, patient, and organization. While there is a substantial body of literature on burnout in healthcare providers, burnout in pediatric nurses has received less attention. This subpopulation may be unique from adult care nurses because of the specialized nature of providing care to children who are typically seen as a vulnerable population, the high potential for empathetic engagement, and the inherent complexities in the relationships with families. Thus, the aim of this scoping review was to investigate, among pediatric nurses, (i) the prevalence and/or degree of burnout, (ii) the factors related to burnout, (iii) the outcomes of burnout, and (iv) the interventions that have been applied to prevent and/or mitigate burnout. This scoping review was performed according to the PRISMA Guidelines Scoping Review Extension. CINAHL, EMBASE, MEDLINE, PsycINFO, ASSIA, and The Cochrane Library were searched on 3 November 2018 to identify relevant quantitative, qualitative, and mixed-method studies on pediatric nurse burnout. Our search identified 78 studies for inclusion in the analysis. Across the included studies, burnout was prevalent in pediatric nurses. A number of factors were identified as impacting burnout including nurse demographics, work environment, and work attitudes. Similarly, a number of outcomes of burnout were identified including nurse retention, nurse well-being, patient safety, and patient-family satisfaction. Unfortunately, there was little evidence of effective interventions to address pediatric nurse burnout. Given the prevalence and impact of burnout on a variety of important outcomes, it is imperative that nursing schools, nursing management, healthcare organizations, and nursing professional associations work to develop and test the interventions to address key attitudinal and environmental factors that are most relevant to pediatric nurses.

Keywords: Burnout, Work stress, Pediatric nurses, Pediatrics, Nurses

Burnout has been a widely studied topic of interest over the last 40 years, with significant resources devoted toward investigating its causes, impacts, and strategies for mitigation [1]. Burnout is a work outcome, defined by prolonged occupational stress in an individual that presents as emotional exhaustion, depersonalization, and diminished personal accomplishment [2]. The study of burnout in healthcare professionals is important as it has impacts at the level of the individual provider [3–5], the patient [6–9], and the organization [5, 10–12]. As nurses make up the largest group of healthcare professionals, there have been a number of studies that have explored contributing factors [13] and interventions for their burnout [14]. Pediatric nurses are a lesser-studied population, perhaps due to the relatively small number of pediatric nurses compared to general service nurses and the broader population of healthcare professionals. Burnout in pediatric nurses may be unique from adult care nurses because of the specialized nature of providing care to children who are typically seen as a vulnerable population, the high potential for empathetic engagement, and the inherent complexities in the relationships with families [15, 16]. Only one literature review could be located on the topic of pediatric nurse burnout; it mainly focused on burnout prevalence, which was found to be moderate to high [17]. Further synthesis of the literature in other domains of the topic is needed to explore factors associated with pediatric nurse burnout, the associated outcomes, and interventions.

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The purpose of this scoping review is to explore what is known about pediatric nurse burnout to guide future research on this highly specialized population and, ultimately, improve both pediatric nurse and patient well-being. More specifically, the aim of this scoping review was to investigate, among pediatric nurses, (i) the prevalence and/or degree of burnout, (ii) the factors related to burnout, (iii) the outcomes of burnout, and (iv) the interventions that have been applied to prevent and/or mitigate burnout.

**Methods**

**Protocol registration**

This scoping review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines scoping review extension [18]. The protocol was registered on Open Science Framework on 25 March 2019 and can be accessed at https://osf.io/5xrkg/.

**Information sources and search strategy**

In consultation with an experienced librarian, the following electronic databases were searched on 3 November 2018 without limitation to a publication date range in order to maximize inclusion: The Cochrane Library, CINAHL, EMBASE, MEDLINE, PsycINFO, and ASSIA. All electronic database search strategies used in this review can be found in Appendix A. The term “pediatrics” was not part of the electronic database search to avoid inadvertently excluding studies that contained pediatric nurses as a non-primary subject group. The selected articles from the electronic database search were screened for inclusion of the pediatric nurse population. For the purposes of this review, the pediatric patient population is defined as newborn to age 21 as defined by the American Academy of Pediatrics, acknowledging that this age range may be slightly extended based on the country and patient needs [19].

**Eligibility criteria**

All qualitative, quantitative, or mixed-methods studies published in English that examined the prevalence and/or degree of burnout in pediatric nurses using self-identification or self-report assessment tools were included. Commentaries, letters, and editorials were excluded as these are not peer-reviewed and often referred to colloquial definitions, not the clinical definition of burnout of interest in this scoping review. Dissertations were excluded, but their corresponding publications were screened for inclusion. Conference abstracts were excluded as they are often inconsistent with their corresponding full reports [20]. Systematic or scoping reviews and meta-synthesis were excluded, but references were hand-screened for suitable studies.

**Selection of sources of evidence**

All citations retrieved from the databases were uploaded into Endnote with duplicates removed as per protocol [21]. The remaining citations were uploaded into Covidence for review by the research team (LB, CM, KW). Titles and abstracts were independently reviewed against the selection criteria in a blinded process by two reviewers (LB and CM). The remaining citations were then reviewed as full-text articles for inclusion against the selection criteria in a blinded process by two reviewers (LB and CM). Disagreements were resolved by a third reviewer (KW).

**Data charting process**

Data were extracted from included articles and entered into a Microsoft Excel spreadsheet. Extraction was performed by one researcher (LB). The following data items were extracted: title, journal, authors, year of publication, country of publication, sample size, study aim, study design, tool used to measure burnout, burnout prevalence and scores, factors that contribute to the development of burnout in pediatric nurses, factors that prevent or mitigate burnout in pediatric nurses, the impact of burnout in pediatric nurses, and interventions for pediatric nurse burnout.

**Synthesis of results**

A quantitative synthesis specific to the prevalence and degree of burnout was completed based on the included articles that reported raw scores for any of the Maslach Burnout Inventory (MBI) subscales. A mean score was calculated by hand across studies for each subscale, by totaling the raw scores and dividing by the total number of studies that included a raw score for that subscale. The resulting mean was also categorized as low, moderate, or high burnout based on published cutoff scores [22]. Other data were synthesized qualitatively to map current evidence available to address the remaining study aims. Aims ii and iii were analyzed using directed content analysis [23] following the themes outlined by Berta et al. [24], work environment, work attitudes, and work outcomes. Aim iv data was synthesized by grouping together similar interventions and descriptively summarizing the interventions that were effective in reducing burnout. Given that the overall purpose of the review was to explore the breadth of what is currently known about burnout in pediatric nurses, a quality assessment of individual studies was not conducted [18].

**Results**

**Description of the search and demographics of studies included**

Through the initial database search, 16,909 possible papers were identified. After deduplication, 8,629 titles/
abstracts were screened and 1206 articles were assessed for eligibility at the level of full-text screening. After applying the inclusion and exclusion criteria, a total of 78 studies [16, 25–101] were deemed relevant and retained for analysis (Fig. 1). The characteristics of included studies are provided in Table 1. Publication dates ranged from 1981 to 2018, with the majority published between 2009 and 2017. The number of pediatric nurses who participated as either a primary or sub-sample ranged from five to 3710. The most common study design was cross-sectional \((n=60)\), with 10 studies using multi- or mixed methods, seven using an interventional design, and one each using case-control, exploratory prospective, and longitudinal designs. Only 45 of the 78 studies reviewed used exclusive samples of pediatric nurses; the remaining studies only included pediatric nurses as a subpopulation of a larger sample. The results in this review are reported for pediatric nurse samples and sub-samples only. Almost half (46%) of the included studies were conducted in the USA, followed by Canada \((n=7)\), China \((n=5)\), Turkey \((n=3)\), Brazil \((n=3)\), Taiwan \((n=2)\), Australia \((n=2)\), and Switzerland \((n=2)\), plus 18 other countries where only a study was conducted. Out of the 78 studies included, 53 (68%) used some form (either complete or abbreviated) of the MBI to measure burnout (see Table 1).

**Burnout prevalence and scores**

Although all of the included studies measured burnout using a self-report assessment tool or binary self-identification, only 65 reported burnout scores for a sample of pediatric nurses (Table 2). In total, 53 studies used the MBI, 34 reported on the *Emotional Exhaustion* subscale with 24 reporting raw scores [25, 27, 29, 39, 42,
| Author(s), year, country | Sample | Study design | Burnout measurement tool |
|--------------------------|--------|-------------|--------------------------|
| Adwan, 2014 [25] (USA)   | 120 nurses from a large academic medical center, from four pediatric patient care units and pediatric float pool nurses | Cross-sectional correlational design | MBI-HSS |
| Akman et al., 2016 [26] (Turkey) | 165 nurses who had worked at least 1 month in pediatric clinics, surgery clinics, PICU, NICU | A descriptive, comparative, correlational cross-sectional design | MBI-HSS |
| Alves and Guirardello, 2016 [27] (Brazil) | 267 nurses from 15 inpatient wards and three intensive care units of two pediatric hospitals | Cross-sectional correlational design | EE-HSS |
| Amin et al., 2015 [28] (India) | 129 nurses with at least 1-year experience working in NICU | Cross-sectional design | ProQOLS |
| Aytekin, 2013 [29] (Turkey) | 85 nurses working in two NICUs | Descriptive and correlational study (multi-methods) | MBI-HSS |
| Barr, 2018 [30] (Australia) | 142 nurses from four NICUs | Cross-sectional cohort study | ProQOLS |
| Barr, 2018 [31] (Australia) | 140 nurses from four NICUs | Cross-sectional survey design | ProQOLS |
| Berger et al., 2015 [32] (USA) | 239 pediatric nurses working in a five-hospital system which included an urban pediatric tertiary care teaching hospital | Cross-sectional survey design | ProQOLS |
| Bilal et al., 2017 [33] (Pakistan) | 113 pediatric nurses working in Punjab’s largest state-run hospital | Cross-sectional survey design | Five items adapted from the Camp scale (1994) |
| Bourbonnais et al., 1998 [34] (Canada) | 1 891; 57 pediatric nurses employed at six acute care hospitals | Cross-sectional survey design (phase 1 of a longitudinal study) | MBI; only separated out EE |
| Branch and Klinkenberg, 2015 [35] (USA) | 296; 179 pediatric nurses on ED, PICU, CICU, haem-onc, and cardiology units | Cross-sectional survey design | ProQOLS |
| Bursch et al., 2018 [36] (USA) | 115 nurses working in an urban children’s hospital PICU or NICU | Cross-sectional survey design | Abbreviated MBI |
| Czaja et al., 2012 [37] (USA) | 173 nurses on general medical, surgical and oncology wards, PICU, and ED at a tertiary care children’s hospital | Cross-sectional survey design | MBI-HSS |
| Davis et al., 2013 [38] (USA) | 74, 15 pediatric oncology nurses from two major medical centers | Cross-sectional survey design (observational, descriptive research design) | MBI |
| Dos Santos Alves et al., 2017 [39] (Brazil) | 267 nurses, nursing technicians, and nursing assistants on 15 in-patient units and three ICUs in two pediatric hospitals | Cross-sectional survey design | MBI: EE |
| Downey et al., 1995 [40] (USA) | 59 NICU nurses from a single state | Multi-methods design (surveys and open-ended questions) | Adaptation of Popoff and Funkhouser’s survey of nurses |
| Duxbury et al., 1984 [41] (USA) | 283 nurses from 14 level 3 NICUs | Cross-sectional survey design | The Tedium Scale |
| Edmonds et al., 2012 [42] (Canada) | 182; 88 pediatric oncology nurses from four major hospital centers | Interventional, pre/post-design | MBI |
| Estabrooks et al., 2011 [43] (Canada) | 844 nurses from 32 units across eight pediatric hospitals | Cross-sectional survey design | MBI-GS |
| Faller et al., 2011 [44] (USA) | 976; 117 pediatric/neonatal travel nurses employed by a large healthcare staffing company | Cross-sectional survey design | CBI |
| Favrod et al., 2018 [45] (Switzerland) | 213; 91 NICU nurses from two university hospitals | Concurrent triangulation, mixed-methods cross-sectional study | MBI |
| Gallagher and Gormley, 2009 [46] (USA) | 30 BMT nurses from a large pediatric medical center | Descriptive non-experimental design multi-method design (survey + an open-ended question) | MBI |
| Gauthier et al., 2015 [47] (Canada) | 45 PICU nurses at an urban pediatric academic hospital | Interventional, pre/post-design | MBI-HSS |
Table 1  Characteristics of 78 studies exploring pediatric nurse burnout included in the scoping review (Continued)

| Author(s), year, country | Sample | Study design | Burnout measurement tool |
|--------------------------|--------|--------------|--------------------------|
| 2015 [47] (USA)          | 117 pediatric nurses caring for children with chronic illness at an urban children’s public hospital from critical care, CV surgery, oncology, premature care, neonatal care, and burn care | Mixed-methods design (cross-sectional survey + interviews) | MBI |
| Günlü et al., 2018 [48] (Turkey) | 120; 22 pediatric nurses working in an academic hospital including pediatric ward, NICU, and PICU | Cross-sectional survey design | MBI-HSS |
| Habadi et al., 2018 [49] (Saudi Arabia) | 11 pediatric mental health nurses from a nine-bed child psychiatric unit | Interventional mixed-methods design (supervisory sessions, surveys + open ended questions) | MBI and the Tedium Measure |
| Hallberg, 1994 [50] (Sweden) | 347 nurses at two urban academic tertiary care free-standing pediatric hospitals and three inpatient units were studied at each hospital: PICU hematology and oncology transplant and general medical/surgical | Cross-sectional survey design | MBI: EE |
| Holden et al., 2011 [51] (USA) | 121; five pediatric nurses found through the National Union of Nurses’ Associations Republic of China database | Cross-sectional survey design | Occupational Burnout Scale |
| Hyston et al., 2015 [52] (USA) | 114; 20 pediatric nurses from two pediatric/neonatal units | Cross-sectional survey design | MBI |
| Jacobs et al., 2018 [54] (USA) | 206; 47 nurses from six companies of the pediatric healthcare system and included employees from the medical center, primary care, home health, and other supporting departments in the system | Cross-sectional survey design | MBI and CBI |
| Kase et al., 2018 [55] (USA) | 150; 43 pediatric palliative care nurses identified through the American Academy of Pediatrics | Cross-sectional survey design | The Compassion Fatigue and Satisfaction Self-Test for Helpers |
| Klein et al., 2017 [56] (Switzerland) | 398; 302 nurses from nine level 3 NICUs | Cross-sectional survey design | A selection of 10 questions from the MBI covering each subscale |
| Koivula et al., 2000 [57] (Finland) | 723; 21 pediatric nurses from two hospitals | Cross-sectional survey design | Paunonen’s instrument |
| Latimer et al., 2017 [58] (Canada) | 51; 27 female NICU and PICU nurses at large tertiary pediatric hospital | Cross-sectional design (survey + fMRI) | Compassion Fatigue Scale |
| Lewiston et al., 1981 [59] (USA) | 96; 38 nurses attending a workshop for health professionals who work with children with chronic illness | Cross-sectional survey design | MBI |
| Li et al., 2014 [60] (USA) | 251 new nurses entering a residency program at an urban children’s hospital | Cross-sectional survey design | Compassion satisfaction and fatigue test |
| Liakopoulou et al., 2008 [61] (Greece) | 113; 71 nurses from two pediatric departments | Cross-sectional, comparative, and correlational descriptive design | MBI |
| Lin et al., 2009 [62] (China) | 249; 14 pediatric nurses working in a large public teaching hospital | Cross-sectional survey design | MBI-HSS |
| Lin et al., 2016 [63] (Taiwan) | 144 female PICU nurses from seven regional teaching hospitals or higher-level medical institutions | Cross-sectional, correlational, survey design | Occupational Burnout Inventory (Chinese) MBI-GS |
| Liu et al., 2018 [64] (China) | 1 761; 101 nurses from nine public tertiary hospitals in four provinces | Cross-sectional survey design | Self-identification |
| Maytum et al., 2004 [65] (USA) | 20 nurses recruited from throughout the state with extensive nursing expertise working with children with chronic conditions | Descriptive, qualitative study | ProQL |
| Meadors et al., 2009 [66] (USA) | 167; 23 nurses located nationwide working in PICU, NICU, or general pediatrics | Cross-sectional, correlational survey design | The Maslach Burnout Inventory (MBI) |
| Author(s), year, country | Sample | Study design | Burnout measurement tool |
|--------------------------|--------|--------------|--------------------------|
| Meyer et al., 2015 [16] (USA) | 251 nurses entering an RN residency program at an urban children's hospital | Longitudinal study | Compassion Fatigue Self-Test |
| Moody et al., 2013 [68] (USA and Israel) | 47; 25 pediatric oncology nurses from two urban academic pediatric hematology/oncology programs | Interventional, mixed methods (survey + journal), pre/post-design | MBI |
| Morellus et al., 2013 [69] (Sweden) | 47 nurses from two departments at a university hospital, a level 3 NICU, and a child and adolescent psychiatry inpatient ward | An exploratory, prospective design | CBI |
| Morrison Wyde et al., 2017 [70] (USA) | 95 nurses entering a pediatric nurse residency program in a children's hospital in an urban area | Interventional pre/post-design | The Compassion Fatigue Self-Test |
| Moussa and Mahmood, 2013 [71] (Egypt) | 55 PICU nurses | Cross-sectional, descriptive, correlational design | MBI-HSS |
| Mudallal et al., 2017 [72] (Jordan) | 407; 39 pediatric nurses, total sample from 11 hospitals | Cross-sectional, correlational design | MBI-HSS |
| Murphy-Oikonen et al., 2010 [73] (Canada) | 14 NICU nurses at a regional hospital | Qualitative exploratory study; computer-assisted personal interview format | Self-identification |
| Neumann et al., 2018 [74] (USA) | 914; 238 pediatric hematopoietic cell transplant nurses | Cross-sectional survey design | MBI |
| Nguyen et al., 2018 [75] (Vietnam) | 500; 78 pediatric nurses from a general hospital, children's hospital and obstetric hospital | Cross-sectional survey design | MBI:GS |
| Oehler et al., 1991 [77] (USA) | 49 nurses in PICU, NICU, and intermediate care unit at a large tertiary medical center | Cross-sectional survey design | MBI |
| Oehler and Davidson, 1992 [76] (USA) | 121 nurses working in a level 3 NICU | Cross-sectional correlational design | MBI |
| Ohue et al., 2011 [78] (Japan) | 336; 27 pediatric nurses from three acute care hospitals | Cross-sectional survey design | MBI (revised version) |
| Pagel and Wittmann, 1986 [79] (USA) | 74 nurses working in 13 acute care pediatric settings across three large medical centers and 10 community hospitals | Multi-methods survey design | The Tedium Measure |
| Paula Vega et al., 2017 [80] (Chile) | 153 nurses working in pediatric oncology or PICU | Cross-sectional design | MBI |
| Profit et al., 2014 [81] (USA) | 2 073; 1 499 RNs/NPs from 44 NICUs | Cross-sectional survey study | Four-item EE scale, based on the MBI |
| Richter et al., 2012 [82] (South Africa) | 17 nurses working in the pediatric ward of an overburdened public hospital where intervention was rolled out | Interventional pre/post-design | MBI-HSS |
| Robins et al., 2009 [83] (USA) | 314; 136 nurses from the Divisions of Oncology, Cardiology, Nephrology, Emergency Services, Intensive Care Units, Rehabilitation/Child Development, Psychology, Social Work, and Anesthesiology. General medical nurses who provided care on the medical/surgical and critical care floors but did not belong to a specific pediatric division were also recruited. | Cross-sectional design | Compassion Satisfaction and Fatigue Test |
| Rochefort and Clarke, 2010 [84] (Canada) | 339 NICU nurses working in nine large urban, publicly-administered teaching hospitals | Cross-sectional correlational survey design | MBI: EE |
| Rodrigues et al., 2018 [85] (USA) | 32 and 41; study 1: 32 nurses working in a 44-bed pediatric inpatient care unit at a large urban hospital; study 2: participants included 41 nurses working in general pediatric inpatient units at two large urban children's hospitals (27 from site 1 and 14 from site 2) | Mixed methods (focus groups + surveys) | Study 1: self-report; study 2: MBI: EE, DP |
| Rodrigues et al., 2018 [85] (USA) | 33 nurses working on a 44-bed pediatric inpatient care unit at a large urban hospital | Interventional, post-intervention, | MBI: EE, DP |
and 16 reporting proportions and/or severity of those with scores indicating emotional exhaustion (e.g., low, moderate, high). The mean of the reported raw Emotional Exhaustion scores was 22.45 (SD = 6.54) which indicates moderate burnout [22]. Out of the 14 studies reporting the proportion of respondents with scores indicating high emotional exhaustion, the mean proportion was 38.7%. The mean of the reported raw Depersonalization scores [25, 29, 42, 45, 47, 48, 53, 61, 62, 72, 75, 77, 78, 84–86, 89, 90, 94, 97, 99, 100] was 6.95 (SD = 3.38) which indicates moderate burnout [22].

The mean of the reported raw Personal Accomplishment scores [25, 29, 42, 45, 47, 48, 53, 61, 62, 72, 75, 77, 78, 84–86, 89, 90, 94, 97, 99, 100] was 29.15 (SD = 11.48) which indicates high personal accomplishment [22].

Factors related to burnout
Of the included studies, 47 (60%) addressed factors associated with pediatric nurse burnout (Table 3). Factors related to pediatric nurse burnout were classified into the following categories: nurse demographics, work
| Author(s)                  | Number of pediatric nurses | Adaption to the tool | Additional results | Personal Accomplishment subscale | Depersonalization Subscale | Emotional Exhaustion Subscale |
|---------------------------|-----------------------------|----------------------|--------------------|----------------------------------|----------------------------|------------------------------|
| Adwan [25]                | 120                         | No                   |                    | PA: min-max, 13–48, avg. 38, SD = 5.7 (moderate) | DP: 0–19, avg. 5.8, SD = 4.7 (low) | EE: 5–45, avg. 21, SD = 8.58 (moderate) |
| Akman et al. [26]         | 165                         | No                   |                    | PA: high                      | DP: low                     | EE: low                      |
| Alves and Guirardello [27]| 267                         | Yes                  | EE only            | PA: min-max, 1–22, avg. = 11.43, SD = 4.63 | DP: min-max, 0–13, avg. = 3.87, SD = 2.77 | EE: min-max, 3–27, avg. = 14.9, SD = 5.53 |
| Aytekin et al. [29]       | 85                          | No                   |                    | 46% low PA                     | 38% had high DP             | High EE: 20 (35%)             |
| Bourbounnais et al. [34]  | 57                          | Yes                  | Separated out EE only |                    |                            |                              |
| Caja et al. [37]          | 173                         | No                   |                    | 66.7% low, 53.3% mod, 40% high |                            |                              |
| Davis et al. [38]         | 15                          | No                   |                    |                                |                            |                              |
| Dos Santos Alves et al. [39]| 267                        | No                   |                    |                                |                            |                              |
| Edmonds et al. [42]       | 88                          | No                   |                    | Pre-intervention: PA: mean 35.9 (6.4), 30.7% low PA | Pre-intervention: DP: mean 6.1(4.8), 25% high |                              |
| Favrod et al. [45]        | 91                          | No                   |                    | PA: mean 31.6 (5.5), high = 3.6%, mod. = 35.7%, low = 60.7% | DP: mean 4.8 (4.1), low = 64.3%, mod. = 29.8%, high = 6.0% | EE: mean = 23(0.9), low = 31%, mod = 47.6%, high = 21.4% |
| Gallagher and Gormley [46]| 30                          | No                   |                    | PA: low = 16.7%, mod. = 33.3%, high = 50% | DP: low = 63.3%, mod. = 33.3%, high = 3.3% | EE: low = 26.7%, mod. = 46.7%, High = 26.7% |
| Gauthier et al. [47]      | 45                          | No                   | Pre/post-intervention trends: significant quadratic trajectory of PA in which PA increased at time 2 and decreased at time 3 (F(1, 35) 5.43, P = 0.03), with no significant trends for EE and DP | Baseline: high PA mean 47.29 (7.43) | Baseline: High DP, mean = 13.33 (5.84) |                              |
| Günüşen et al. [48]       | 117                         | No                   |                    | PA: 19.20 (4.18)               | DP: 6.14 (2.98),            | EE: 18.85 (6.21)           |
| Habadi et al. [49]        | 22                          | No                   | Burnout = 0.55%    | Low PA: 36.4%                  | High DP: 22.7%              | High EE: 59%                |
| Hylton et al. [53]        | 20                          | No                   |                    | EE: 39.9 (7.1)                 | DP: 12.5 (6.2)              | EE: 33 (13.8)               |
| Jacobs et al. [54]        | 47                          | Yes                  | Analysis of subgroup differences between nurses and non-nurses indicated a trend toward nurses reporting higher |                              |                            |                              |
Table 2 Pediatric nurse burnout scores by tool (Continued)

| Study                                      | Sample Size | Selection | Mean (SD)       | Note                                                                 |
|--------------------------------------------|-------------|-----------|-----------------|----------------------------------------------------------------------|
| Klein et al. [56]                          | 302         | Yes—selection of 10 questions of the Maslach Burnout Inventory: MBI covering each subscale | Inventory work-related burnout (39.92 vs. 35.86, *P* < .067) and client-related burnout (23.88 vs. 18.96, *P* < .061). |
| Lewiston et al. [59]                        | 38          | No        | 9 RNs had burnout greater than the mean (high burnout) and 11 had burnout below the mean (low burnout) | PA mean = 37.8 (5.8)                   DP mean = 5.2 (4.9)      EE mean = 27.5 (9.5) |
| Liakopoulou et al. [61]                     | 71          | No        | mean = 7.09 (3.23) (lower job burnout) | PA mean = 34.5 (7.1)                   DP mean = 3.6 (4.0)      EE mean = 24.2 (15.6) (moderate) |
| Lin et al. [62]                             | 14          | No        |                  | PA = 4.06 (0.61)                                      DP mean = 2.86 (0.73)    EE mean = 3.12 (0.95) (moderate) |
| Liu et al. [64]                             | 101         | No        |                  | PA: high level burnout 14.5%, low level burnout 85.5%                   DP: high level burnout 74.5%, low level burnout 25.5% EE: high level burnout 56.4%, low level burnout 43.6% |
| Moussa and Mahmood [71]                     | 55          | No        |                  | PA: mean = 31.23 (12.14)                                     DP: mean = 12.74 (4.89)    EE: mean = 28.33 (12.63) (low) |
| Mudallal et al. [72]                         | 39          | No        |                  | PA = 4.06 (0.61)                                      DP mean = 2.86 (0.73)    EE mean = 3.12 (0.95) (moderate) |
| Nguyen et al. [75]                          | 78          | No        |                  | 16.7% burned out, 14.1% exhausted, 3.8% depressed, 65.4% healthy | PA mean = 32.8 (20.6)                   DP mean = 7.2 (4.9)      EE mean = 24.1 (10.1) (moderate) |
| Oehler and Davidson [76]                    | 121         | No        | Overall, scores represent moderate EE, DP, and high lack of PA | low PA mean = 36.6, mod PA mean = 32.8, high PA mean = 30.6                  low DP mean = 2.7, mod DP mean = 7.2, high DP mean = 11.9 Low EE mean = 12.2, mod EE mean = 24.2, high EE mean = 32.7 |
| Oehler et al. [77]                          | 49          | No        |                  | PA mean = 32.1 (6.9)                                      DP mean = 6.9 (4.9) (moderate)    EE mean = 24.1 (10.1) (moderate) |
| Ohue et al. [78]                            | 27          | Yes—revised version of MBI | 79.7% (*n* = 122) showed medium to low level of PA, and it was more | PA mean = 14.44 (4.26)                                      DP mean = 12.44 (4.21)    EE mean = 17.44 (3.61) (moderate) |
| Paula Vega et al. [98]                      | 153         | No        |                  | 16% (*n* = 11) had a high level of DP, 48.4% (*n* = 74) of participants had a medium or high level of |
Table 2  Pediatric nurse burnout scores by tool (Continued)

| Study                                | Sample Size | Setting                      | Tool                        | PA mean | SD  | DP mean | SD  | EE mean |
|--------------------------------------|-------------|------------------------------|-----------------------------|---------|-----|---------|-----|---------|
| Profit et al. [80]                   | 499         | Oncology professionals      | Four-item Emotional Exhaustion scale, based on the MBI | 26.9%   | 11.4 | 6.24    | 4.67| 24.39   |
| Richter et al. [81]                  | 17          | No                           | Nurses reporting burnout mean = 26.9%, SD = 11.4, P = 0.0004 (based on the authors determined cutoff) | 26.9%   | 11.4 | 6.24    | 4.67| 24.39   |
| Rochefort and Clarke [83]            | 339         | Yes—only EE subscale         | Nurses in the pilot study experienced average levels of PA during the pilot phase of the study. No changes across the pre/post-intervention phases. | 35.7%   | 11.6 | 6.24    | 4.67| 24.39   |
| Rodrigues et al. [85]                | 73          | Yes—only EE and DP subscales | Nurses in the pilot study experienced low levels of DP and no changes across the pre/post-intervention phases. | 6.24    | 4.67| 3.80    | 2.37| EE mean = 21.74 (9.17) |
| Rodriguez-Rey et al. [86]            | 281         | No                           | Nurses reporting burnout mean = 26.9%, SD = 11.4, P = 0.0004 (based on the authors determined cutoff) | 6.24    | 4.67| 3.80    | 2.37| EE mean = 21.74 (9.17) |
| Skorobogatova et al. [89]            | 94          | No                           | Nurses in the pilot study experienced high levels of EE and no changes across the pre/post-intervention phases. | 6.24    | 4.67| 3.80    | 2.37| EE mean = 21.74 (9.17) |
| Soroush et al. [90]                  | 86          | No                           | Nurses who work 8 h shifts: 25% burned out; nurses who work 12 h shifts: 24% burned out; nurses who work > 13 h shifts: 46% burned out | 22.6    | 5.4  | 2.6     | 3.1  | EE mean = 21.28 (8.1 (mod)) |
| Stimpfel et al. [92]                 | 3710        | No                           | Nurses reporting burnout mean = 26.9%, SD = 11.4, P = 0.0004 (based on the authors determined cutoff) | 22.6    | 5.4  | 2.6     | 3.1  | EE mean = 21.28 (8.1 (mod)) |
| Sun et al. [93]                      | 51          | No                           | Nurses in the pilot study experienced low levels of DP and no changes across the pre/post-intervention phases. | 22.6    | 5.4  | 2.6     | 3.1  | EE mean = 21.28 (8.1 (mod)) |
| Sun et al. [94]                      | 277         | No                           | Nurses in the pilot study experienced high levels of EE and no changes across the pre/post-intervention phases. | 22.6    | 5.4  | 2.6     | 3.1  | EE mean = 21.28 (8.1 (mod)) |
| Vicentic et al. [97]                 | 60          | No                           | Nurses in the pilot study experienced low levels of DP and no changes across the pre/post-intervention phases. | 22.6    | 5.4  | 2.6     | 3.1  | EE mean = 21.28 (8.1 (mod)) |
### Table 2: Pediatric nurse burnout scores by tool (Continued)

| Author(s) | Number of pediatric nurses | Results | PA | DP | EE |
|-----------|----------------------------|---------|----|----|----|
| Watson and Feld [99] | 14 | No | mean = 34.93 (4.53) | mean = 4.47 (4.58) | mean = 4.17 (4.11) |
| Yao et al. [100] | 44 | No | mean = 11.0 (9.7) | mean = 7.0 (6.1) | mean = 3.28 (1.55) |
| Zanatta and Lucca [101] | 57 | No | PA: high 24.6%, mod 52.6%, low 22.8% | DP: high 29.8%, mod 43.9%, low 26.3% | EE: high 24.6%, mod 49.1%, low 26.3% |

#### Professional Quality of Life Scale

| Author(s) | Number of pediatric nurses | Results | Low: 26.4% (34) | Moderate: 50.4% (65) | High: 23.3% (30) |
|-----------|----------------------------|---------|-----------------|---------------------|-----------------|
| Amin et al. [28] | 129 | | mean = 2.4, SD = .52 | | |
| Barr [30] | 142 | | Low: 23% (55) | Moderate: 47.7% (114) | High: 29.3 (70) |
| Berger et al. [32] | 239 | | Mean = 49.7 (9.6) | Mean = 14.82 (4.33) | |
| Branch and Klinkenberg [35] | 179 | | The 25th percentile ranking for the Burnout subscale of the Professional Quality of Life (ProQOL) measure was 43.45, the 50th percentile ranking was 49.22, and the 75th percentile was 56.92. | The average score on the burnout subscale is 50, which is higher than the 50th percentile ranking in this current study (slightly lower than average levels of burnout). | |
| Meadors et al. [66] | 23 | | Surgical unit burnout = 24.5 (5.1); medical unit burnout = 22.8 (4.7); critical care unit burnout = 23.0 (4.7); hematology/oncology unit burnout = 20.2 (3.9) | | |
| Roney and Acri [87] | 318 | | | | |
| Sekol and Kim [88] | 240 | | | | |

#### Compassion Fatigue Self-Test

| Author(s) | Number of pediatric nurses | Results | 4.7% prevalence | Mean = 23(10.8) (significantly higher than pediatric allied health providers) | Mean = 24.01 (SD = 11.67) |
|-----------|----------------------------|---------|-----------------|---------------------|-----------------|
| Kase et al. [55] | 43 | | | | |
| Latimer et al. [58] | 27 | | | | |
| Li et al. [60] | 251 | | | | |
| Meyer et al. [16] | 251 | | | | |
| Morrison Wylde et al. [70] | 95 | | Score after smartphone-delivered mindfulness: 22.37 (11.90) | Score after traditional delivered mindfulness: 26.14 (11.25) | |
| Robins et al. [82] | 136 | | Mean = 27.8 (10.6)—extremely low risk | | |

#### The Tedium Measure

| Author(s) | Number of pediatric nurses | Results | The burnout scale mean for all subjects was 3.5855 with a standard deviation of .701. The scores ranged from 1.7142 to 5.4766 (signifies evidence of burnout). | | |
|-----------|----------------------------|---------|-----------------|-----------------|-----------------|
| Pagel and Wittmann [79] | 74 | | | | |

#### The Copenhagen Burnout Inventory

| Author(s) | Number of pediatric nurses | Results | Half had high work-related burnout, and half had low work-related burnout. | Analysis of subgroup differences between nurses and non-nurses indicated a trend toward nurses reporting higher work-related burnout (39.92 vs. 35.86, P < .067) and patient-related burnout (23.88 vs. 18.96, P < .061). | *Conducted with MBI |
|-----------|----------------------------|---------|-----------------|-----------------|-----------------|
| Faller et al. [44] | 117 | | NICU nurses: CBI, personal related burnout: 32.4 (13.8); work-related burnout: 24.3 (9.9); client-related burnout: 13.3 (8.1) | | |
| Jacobs et al. [54] | 47 | | Child and adolescent psychiatry nurses: personal-related burnout: 32.4 | | |
environment, work attitudes, work outcomes, and burnout interventions.

**Nurse personal factors**  
Burnout was found to be inversely associated with age; higher burnout was also associated with low/moderate level of experience (5–10 years) [26, 32, 46, 47, 58, 71, 85, 88]. A lack of university-level education or lower self-reported levels of clinical competency were also associated with higher levels of burnout [57, 90]. Being in a nursing supervisory position had ambiguous results on impact on burnout; in some studies, holding supervisory positions correlated with higher reports of burnout while in others, the opposite effects were found [29, 33]. Nurses identifying as not being White or Asian/Pacific Islander ethnicity/race scored significantly lower on the MBI subscale of Personal Accomplishment than respondents identifying as White or Asian/Pacific Islander, and Asian/Pacific Islanders scored lower on Emotional Exhaustion than those identifying as White [36]. High neuroticism and low agreeableness [31] were both associated with higher burnout. Finally, being married had mixed results on impact on burnout, whereas in some studies, being married correlated negatively with burnout, and in others, it correlated positively [26, 36, 101].

**Work environment**  
The work environment is defined by the conditions in which nurses work; it influences work attitudes and, in turn, work outcomes [103]. Burnout was found to be high in certain high-acuity pediatric units including emergency, medical/surgical, surgery, pediatric intensive care unit (PICU), and neonatal intensive care unit (NICU) [26, 32, 35, 36, 76, 88]. Davis et al. [38] found that adult oncology nurses had higher personal accomplishment than pediatric oncology nurses while Neumann et al. [74] found nurses who care for both pediatric and adult patients had lower emotional exhaustion than those who cared for adult patients only. Conversely, Sun et al. [94] found that nurses who worked in adult obstetrics and gynecology units had more burnout than nurses who worked in pediatric units; however, Ohue et al. [78] reported the inverse. Working in hematologic/oncology [88] and unit-level factors such as workload [65, 85], number of assigned patients [26], increased number of admissions, understaffing, and shifts > 8 h were associated with increased burnout [51, 92, 95, 96]. Aytken et al. [29] found working longer years in the NICU was associated with lower levels of personal accomplishment. Brusch et al. [36] found that nurses working exclusively day shifts had higher levels of depersonalization than those working night shifts or a mix of days and nights. Favrod et al. [45] found NICU nurses reported more traumatic stressors in their working environment.

Pediatric nursing workplaces with a strict structure of rules and regulations [33] or nurse leaders who valued structure over staff considerations [41] were found to have nurses with higher burnout. Nurses who had higher perceived organizational support had lower burnout [39]. Higher burnout was generally associated with systems issues such as unreasonable policies, staffing shortages, insurance frustrations, high volumes of paperwork [65], lack of nursing supplies [36], and lack of regular staff meetings [56]. The relationship between resources and facets of burnout was mixed: Rochefort and Clarke [83] found a negative relationship between nurses’ emotional exhaustion and their rating of the adequacy of the resources available to them, while Gallagher and Gormley [46] found that even nurses who reported that

| Table 2 Pediatric nurse burnout scores by tool (Continued) |
|----------------------------------------------------------|
| Occupational Burnout Inventory                         |
| Author(s) | Number of pediatric nurses | Results                        |
| Hsu et al. [52] | 5 | Mean = 60.00 (SD = 11.75) (scale is out of 90, higher = greater burnout) |
| Jacobs et al. [54] | 47 | Analysis of subgroup differences between nurses and non-nurses indicated a trend toward nurses reporting higher work-related burnout (39.92 vs. 35.86, P < .007) and patient-related burnout (23.88 vs. 18.96, P < .001). |
| Paunonen’s instrument                                  |
| Author(s) | Number of pediatric nurses | Results                        |
| Koivula et al. [57] | 21 | Mean = 6.15, SD = (0.71) (mild) |
| Popoff and Funkhouser’s survey of nurses (adapted version) |
| Author(s) | Number of pediatric nurses | Results                        |
| Downey et al. [40] | 59 | Personal Accomplishment subscale PA mean = 1.0 (0.8) |

MBI Maslach Burnout Inventory; EE Emotional Exhaustion, a subscale of the Maslach Burnout Inventory; DP Depersonalization, a subscale of the Maslach Burnout Inventory; PA Personal Accomplishment, a subscale of the Maslach Burnout Inventory; CP cerebral palsy; ProQOL Professional Quality of Life Scale; CBI Copenhagen Burnout Inventory; SD standard deviation, NICU neonatal intensive care; Mod moderate
| Author(s)                  | Number of pediatric nurses | Factors associated with burnout                                                                                                                                                                                                                                                                                                                                 |
|---------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Akman et al. [26]         | 165                        | Higher EE scores associated with working in emergency and surgery, moderate in internal med, PICU, NICU Low DP scores associated with working in PICU, moderate in all other units High PA, high all units Lower level of burnout associated with a high level of job satisfaction, being married, increased age, and decreased number of assigned patients |
| Amin et al. [28]          | 129                        | Higher burnout associated with greater perceived stress                                                                                                                                                                                                                                                                                                     |
| Aytekin et al. [29]       | 85                         | Higher EE scores associated with being unhappy with their work environment Lower EE associated with working at management level in NICU over other NICU nurses Lower PA scores associated with longer years worked in the NICU |
| Barr [30]                 | 142                        | Core-self evaluations explained 33% variance in burnout Degree of agreeableness, neuroticism, extraversion, and positive affect contributed to variances in burnout Positive affect mediated the effect of core self-evaluations on burnout                                      |
| Barr [31]                 | 140                        | Higher burnout associated with high neuroticism and low agreeableness and work stress, controlled for personality traits Work stress mediated the effect of neuroticism and extraversion on burnout                                                                                                                                  |
| Berger et al. [32]        | 239                        | Higher burnout and lower compassion satisfaction associated with nurses under 40 years of age, with 6–10 years of experience and/or working in a medical-surgical unit                                                                                                                                                                                |
| Bilal et al. [33]         | 113                        | Higher burnout associated with an organizational structure with rules and relations and being a supervisor Lower burnout and burnout prevention associated with participation in decision-making, instrumental communication, and promotional opportunities |
| Branch and Klinkenberg [35]| 179                        | Higher burnout associated with nursing in PICU over other units                                                                                                                                                                                                                                                                                           |
| Bursch et al. [36]        | 115                        | Higher EE associated with nurses working most frequently in the PICU relative to those working most frequently in the NICU, those who found communication with nurses more stressful, and having a lack of necessary nursing supplies Lower EE associated with being married or in a domestic partnership relative to respondents who were unmarried and not in a domestic partnership, identifying as Asian/Pacific Islander relative to respondents identifying as White Higher DP associated with respondents working day shifts relative to those working the night shift or a mix of day and night shifts, nurses working most frequently in the PICU relative to those working most frequently in the NICU, greater endorsement of stress related to communication among nurses, the experience level of colleagues, staffing, and stress associated with the patient population Lower DP associated with respondents working in the NICU relative to those working frequently in the PICU and respondents who reported being married or in a domestic partnership Higher PA reported in individuals identifying as White and individuals identifying as Asian/Pacific Islander relative to individuals identifying as others Lower PA found in nurses who found their own lack of knowledge, skills and/or confidence in themselves stressful and respondents identifying as being of another ethnicity/race relative to respondents identifying as White                                      |
| Czaja et al. [37]         | 173                        | Lack of burnout or PTSD associated with nurses who generally felt more positively about their work environment, with more confidence in their physician and nurse colleagues as well as feeling a part of a team                                                                                                                                                                        |
| Davis et al. [38]         | 15                         | Higher PA associated with working in adult oncology over pediatric oncology nurses                                                                                                                                                                                                                                                                                                                              |
| Dos Santos Alves et al. [39]| 267                        | Lower burnout associated with nurses with a perception of having greater autonomy, greater control, good relationships at work, and organizational support, and are more satisfied with the work and the safety climate is assessed as more positive                          |
| Duxbury et al. [41]       | 283                        | Higher burnout found in staff nurses who have a head nurse with a leadership style of high structure and low consideration                                                                                                                                                                                                                                                                                   |
| Estabrooks et al. [43]    | 844                        | Higher EE associated with lower job satisfaction                                                                                                                                                                                                                                                                                                     |
| Favrod et al. [45]        | 91                         | Similar burnout levels in NICU nurses and midwives                                                                                                                                                                                                                                                                                                      |
| Author(s)                    | Number of pediatric nurses | Factors associated with burnout                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gallagher and Gormley [46]  | 30                          | NICU nurses more likely to reach the severe threshold of the three sub-scales of burnout than midwives. NICU nurses reported more traumatic stressors in their working environment. Higher EE associated with higher DP and low PA. EE still present despite nurses reporting support systems were in place and felt supported. Lower EE associated with increased years as a BMT nurse. Lower DP associated with increased years as a BMT nurse. Higher PA associated with increased years as a BMT nurse. |
| Gauthier et al. [47]        | 45                          | Lower EE associated with self-compassion at time 1 and time 2, but not at time 3. Lower DP associated with self-compassion at time 1 and time 2, but not at time 3. Higher PA associated with self-compassion at all three time points. All subscales of burnout were correlated with job satisfaction at time 1, but not at time 2 and time 3. Lower burnout associated with more years of experience, job satisfaction had a significant positive correlation with stress and burnout only at time 1. |
| Holden et al. [51]          | 347                         | Higher burnout associated with unit-level staffing, task-level external mental workload, and job dissatisfaction. Burnout and job dissatisfaction were not significantly associated with the likelihood of medication error. All burnout subscales were correlated with work-related stress at time 1, but not at time 2 and time 3. All burnout subscales were also correlated with depression at time 1, but not at time 2 and time 3. |
| Klein et al. [56]           | 302                         | Nurses rated lack of regular staff meetings, dissatisfaction with the quality of the decision-making process, and providing futile treatment as significantly more stressful than physicians did. Higher burnout found in nurses with lower education level relative to those with higher education level. |
| Koivula et al. [57]         | 21                          | Higher burnout associated with nurses with less experience. Higher burnout associated with nurses with less experience. |
| Latimer et al. [58]         | 27                          | Higher burnout associated with nurses with less experience. Higher burnout associated with nurses with less experience. |
| Lewiston et al. [59]        | 38                          | Higher EE associated with cystic fibrosis caregivers compared to controls. Higher DP associated with cystic fibrosis caregivers compared to controls. Equal PA from the job in cystic fibrosis caregivers and the control group. |
| Lin et al. [63]             | 144                         | Higher burnout associated with higher work stress (after controlling for the demographics) and depression. Occupational burnout had a mediating effect on the relationship between work stress and depression levels. |
| Maytum et al. [65]          | 20                          | Factors associated with triggering burnout: seeing too many painful procedures done to children, seeing too much sadness, seeing too much death, angry, yelling families, and non-compliant patients/families. Systems triggers: unreasonable policies, staffing shortages, insurance frustrations, paperwork, need to justify their position, and general healthcare system dysfunction. Role-specific triggers: lack of support, feeling you are on your own, less respondents cited unclear expectations, change in role and lack of challenge. Work overload: excessive demands of work. Personal triggers becoming overly involved or crossing professional boundaries. |
| Messmer et al. [67]         | 33                          | Higher burnout associated with lower satisfaction and position. Lower burnout associated with nurses who would recommend their career to others relative to those who would recommend their career with reservation. |
| Meyer et al. [16]           | 251                         | Higher burnout predicted by current stress exposure after controlling for pre-existing stress exposure. Lower burnout associated with “acting with awareness” at time 2. |
| Morrison Wylde et al. [70]  | 95                          | Lower burnout associated with “acting with awareness” at time 2. |
| Moussa and Mahmood [71]     | 55                          | Higher EE associated with lack of access to work information. Lower EE associated with nurses increased age, length of professional experience, and experience on the |
support systems were in place and felt supported still were emotionally exhausted. The lack of access to work information and research information was consistently associated with higher levels of burnout [71, 91], and lower burnout was associated with increased communication [33, 36] and better work relationships [39].

Factors impacting increased pediatric nurse burnout were related to the role of the nurse in patient care.

### Table 3 Factors associated with pediatric nurse burnout (Continued)

| Author(s)                     | Number of pediatric nurses | Factors associated with burnout                                                                 |
|------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------|
| Lower DP                    | associated with nurses increased age, length of professional experience, and experience on the unit |
| Higher PA                   | associated with nurses increased age, length of professional experience, and experience on the unit |
| Murphy-Oikonen et al. [73]  | 14                          | Higher burnout and frustration when caring for infants with neonatal abstinence syndrome         |
| Neumann et al. [74]         | 238                         | Lower EE associated with caring for both pediatric and adult patients had lower relative to those who just cared for adults only |
| Oehler and Davidson [76]    | 121                         | Higher and more frequent burnout found in acute pediatric nurses relative to non-acute pediatric nurses |
| Oehler et al. [77]          | 49                          | Higher burnout associated with increased job stress, workload, conflict with physicians, and uncertainty regarding treatment |
| Oehler et al. [77]          | 49                          | Higher EE predicted by job stress, trait anxiety, and experience on the current unit and explained 55% of the variance |
| Ohue et al. [78]            | 27                          | Higher PA predicted by level of supervisor support and state anxiety                             |
| Pagel and Wittmann [79]     | 74                          | Higher burnout related to higher reporting of the variable “percentage of children on a unit with social of behavioral problems” |
| Rochefort and Clarke [83]   | 339                         | Lower EE associated with higher ratings of nurse staffing and resource adequacy                  |
| Rodrigues et al. [85]       | 73                          | Higher EE associated with greater time on the unit (moderate effect), nurses concern that current standards of care inhibit optimal pain management, negative views of the hospital environment (large effect), barriers to optimal pain management (moderate effect), lower self-efficacy (moderate effect), and moral distress (moderate effect) |
| Sekol and Kim [88]          | 240                         | Higher burnout found in those with 5–9 years of experience working on the surgical unit         |
| Sorosh et al. [90]          | 86                          | Lower burnout associated with working on the hematology/oncology unit, nursing experience of > 20 years, and all levels of experience if working on the hematology/oncology unit |
| Squires et al. [91]         | 735                         | Higher DP associated with lower application of research information in the work context         |
| Stimpfel et al. [92]        | 3,710                       | Higher burnout associated with nurses who worked the longest shifts relative to those working shorter, 8-h shifts |
| Sun et al. [94]             | 277                         | Higher burnout in nurses who worked in obstetrics and gynecology units relative to nurses who worked in the surgery and pediatric units, in that order |
| Tawfik et al. [95]          | 1,374                       | Higher burnout associated with an average number of daily admissions of the NICU                |
| Tawfik et al. [96]          | 1,464                       | Higher burnout in understaffed units                                                           |
| Vicentic et al. [97]        | 60                          | Higher EE associated with higher anxiety and depression variables and higher risk of EE for those who care for children with CP than those who care for children without CP |
| Zanatta and Luca [101]      | 57                          | Higher EE associated with being married and having health problems related to work              |

*EE* Emotional Exhaustion, a subscale of the Maslach Burnout Inventory; *DP* Depersonalization, a subscale of the Maslach Burnout Inventory; *PA* Personal Accomplishment, a subscale of the Maslach Burnout Inventory; *NICU* neonatal intensive care unit; *PICU* pediatric intensive care unit; *STS* secondary traumatic stress; *PTSD* post-traumatic stress disorder; *CP* cerebral palsy
activities such as decision-making/uncertainty around treatment [33, 39, 56, 76], lack of role clarity, and unclear plan of care [65]. Other factors associated with the development of burnout were related to exposure to suffering, pain, sadness, and death [65]; hopelessness [85]; providing futile care [56]; and overall moral distress [85].

Higher levels of burnout were found in nurses who cared for specific pediatric patient populations such as caring for children with cerebral palsy [97], children with cystic fibrosis [59], and babies with neonatal abstinence syndrome [73]. Another patient factor related to higher burnout involved behavioral issues from patients/families [65, 79].

**Work attitudes**

Work attitudes are factors that impact the positive or negative perceptions of one's work environment [104]. Low self-compassion and low mindfulness [47] were associated with higher burnout. Co-occurring conditions with burnout such as depression [37, 63, 97], anxiety [97], and somatic work-related health problems [101] were correlated with greater burnout whereas positive psychosocial factors and coping strategies such as positive affect [30], acting with awareness [70], self-care, humor, reflection, non-work relationships, and a personal philosophy related to work were found to be associated with lower burnout [65].

Nurses' perceived work stress was positively associated with burnout in several studies [16, 28, 63, 76, 77]. Meyer et al. [16] found that current stress exposure significantly predicted higher levels of burnout after controlling for pre-existing stress exposure, and Holden et al. [51] found that burnout was positively associated with mental workload. Oehler and Davidson [76] found

### Table 4: Burnout's relationship with other work outcomes in pediatric nurses

| Author(s)                     | Number of pediatric nurses | Burnout outcomes                                                                 |
|-------------------------------|----------------------------|----------------------------------------------------------------------------------|
| Alves and Guirardello [27]    | 267                        | Higher EE associated with the outcome of a worse patient safety climate           |
| Aytekin et al. [29]           | 85                         | Higher burnout associated with the outcome of decreased quality of life in the nurse |
| Czaja et al. [37]             | 173                        | Higher burnout and PTSD were found in nurses considering a change of career, more frequently screened positive for anxiety and depression, were more likely to respond negatively regarding their team members, teamwork, and impact of their work. A large portion of nurses with both burnout and significant PTSD symptoms found their symptoms interfered with their work and personal lives |
| Dos Santos Alves et al. [39]  | 267                        | Lower burnout associated with the outcome of positive assessments of the safety climate |
| Günüşen et al. [48]           | 117                        | Secondary traumatic stress (STS) predicted 17% of EE. STS predicted 28% of DP. STS did not predict PA significantly |
| Latimer et al. [58]           | 27                         | Higher burnout associated with nurses with higher secondary trauma               |
| Li et al. [60]                | 251                        | Higher likelihood of burnout with higher levels of PTSD                          |
| Lin et al. [63]               | 144                        | Higher burnout associated with the outcome of statistically significant influence on depression levels |
| Meadors et al. [66]           | 23                         | Higher burnout associated with the outcome of higher levels of compassion fatigue |
| Meyer et al. [16]             | 251                        | Higher burnout predicated by compassion fatigue after controlling for compassion fatigue. Higher burnout predicated by current stress exposure after controlling for pre-existing stress exposure. Mediated association: current stress exposure predicted higher levels of compassion fatigue which then predicted higher levels of burnout after 3 months of bedside exposure. |
| Morrison Wylde et al. [70]    | 95                         | Higher burnout associated with PTSD symptoms and compassion fatigue             |
| Moussa and Mahmood [71]       | 55                         | Increased PA associated with the outcome of an increase in the mother's satisfaction with meeting the child's needs and expectations |
| Skorobogatova et al. [89]     | 94                         | Burnout associated with the symptom of tiredness                                |
| Tawfik et al. [96]            | 1,464                      | Higher burnout found in understaffed units with the outcome of higher infection rates during times when nurses feel overworked (likely when attention to infection prevention decreases) |

EE Emotional Exhaustion, a subscale of the Maslach Burnout Inventory; PA Personal Accomplishment, a subscale of the Maslach Burnout Inventory; PTSD post-traumatic stress disorder.
perceived workload made a significant contribution to feelings of burnout. Job satisfaction was also found to be negatively associated with burnout [26, 29, 39, 43, 47, 51, 67].

**Work outcomes**

Work outcomes refer to occupational performance factors that are influenced by work attitudes and the work environment [24]. Nine studies examined work outcomes associated with burnout including nurse retention, nurse well-being, patient safety, and patient-family satisfaction (Table 4). An increase in burnout was associated with nurses considering a career change [37], decreased quality of life [29], tiredness [89], and feeling negatively toward their teammates and the impact of their work [37]. Work-associated compassion fatigue [16, 66], secondary traumatic stress [48, 58], and post-traumatic stress disorder (PTSD) [37, 60, 70] were all found to be associated with pediatric nurse burnout. However, Li et al. [60] report that high group cohesion may prevent pediatric nurses from developing burnout from PTSD by protecting nurses from the impacts of negative outcomes. Nurse burnout was found to be negatively associated with the safety climate of the hospital in which they work [27, 39] and positively associated with higher infection rates when nurses were feeling overworked [96]. Moussa and Mahmood [71] found that as nurses’ personal accomplishment increased, so did patients’ mothers’ satisfaction with meeting their child’s care needs in the hospital.

**Burnout interventions**

Seven of the 78 studies included interventions to mitigate burnout (Table 5). Interventions included coping workshops [42], mindfulness activities [47, 68, 70], workshops to improve knowledge/understanding of their patient population [81, 85], and clinical supervision [50]. Only three of the seven interventions studied provided varying positive impacts on burnout scores [42, 70, 85]. An in-person day-long retreat resulted in a significant improvement in emotional exhaustion for pediatric nurses. The intervention involved didactic and hands-on trauma, adaptive grief, and coping strategies; half of the subjects were also randomized to a booster session 6 months later [42]. Another intervention involved a 90-min interactive module on clinical skills surrounding the management of pediatric pain and resulted in a significant decrease in emotional exhaustion and depersonalization [85]. Finally, the third study of smartphone-delivered mindfulness interventions showed a marginal decrease in burnout compared to nurses receiving traditional mindfulness interventions [70].

**Discussion**

To our knowledge, this is the first scoping review that focuses on what is known about pediatric nurse burnout. Burnout was measured with a variety of instruments and interpretations, thereby making score comparisons a challenge. Even in those studies that used the MBI, the most commonly used burnout measurement [105], variations of the tool were applied, as were diverse subscale cutoff scores. Similar challenges in synthesizing extremely heterogeneous burnout data were echoed in a 2018 JAMA review of the prevalence of burnout among different types of physicians [106]. Of the MBI Emotional Exhaustion and Depersonalization subscale results that were synthesized, the results showed moderate scores indicating a significant level of burnout in pediatric nurses. Personal Accomplishment subscale results were high, perhaps indicating a factor of pediatric nursing that increases resilience despite moderate burnout in other domains. In studies that compared nurses who work in pediatric units to other in-patient units, burnout results were mixed [26, 32, 35, 36, 38, 74, 78, 94]. The majority of the included studies identified correlational relationships using cross-sectional study designs, which limited causal inferences. Study designs, such as longitudinal approaches, would allow for causal inference and in-depth analysis of this phenomenon in this unique population.

**Nurse personal factors**

Pediatric nurse demographic factors that are associated with burnout, such as age, work experience, and level of education, have been a common area of studied burnout associations across other healthcare populations. Similar burnout associations were found in research studying healthcare providers caring for adults such as younger age (< 31 years) [107, 108] and years of experience (> 7 years) [109]. It is likely that nurses new to the profession are younger, are experiencing the challenges of the nursing profession for the first time, and are less likely to have well-developed skills for resiliency. Given that the start of nurses’ careers is a vulnerable stage for burnout, nursing schools and orientation programs may be well-positioned to highlight burnout prevention and mitigation strategies with students and new hires [107]. Personality traits such as high neuroticism and low agreeableness were found to be associated with pediatric nurse burnout [31]. These results have been supported in other nurse and physician populations, along with conscientiousness, extraversion, and openness contributing to lower levels of burnout [110–113]. Although personality traits appear to have significant correlations with healthcare provider burnout, targeting modulation of personality traits as a mitigation strategy for burnout may be a high-cost, low-yield strategy.
It has been suggested that healthcare provider burnout is not a failure on the part of the individual, rather it is a culmination of impacts stemming from the work environment and the healthcare system as a whole [114]. Responsibility, then, is thought to lie within the individual, the organization, and the profession in general.

Work environment

Job demands and resource variables in pediatric nursing lead to increased burnout, work-life interference, psychosomatic complaints, and intent to leave; these associations are also represented in adult nursing literature [102, 115], including associations with excessive workload, number of assigned patients, admissions, understaffing, and longer shifts [116–119]. Although Bursch et al. [36] found that pediatric nurses who worked straight day shifts had higher depersonalization than those who worked mixed shifts or just night shifts, Poncet et al. [108] found that working more night shifts was associated with higher burnout in adult critical care nurses. Day shift nurses have potentially more strenuous workloads as patients are more wakeful, have diagnostic tests, or consulting services visiting; however, night shifts could be perceived as more strenuous as it requires the provider to work against their natural circadian rhythm and less support staff are available [120]. These results may also be dependent on individuals’ preference and the specific unit on which they work.

Systems issues such as overwhelming clerical work, administrative, and resource issues have impacts on provider burnout in both the pediatric nurse and general physician populations [36, 56, 65, 121]. Poor leadership is associated with pediatric nurse burnout as identified by Bilial and Ahmed [33] and Druxbury et al. [41];
relationship is echoed in research with physicians, nurses, and allied health [122]. In pediatric nurses [39], increased perception of organizational support is associated with lower burnout; this association is supported in general nursing populations [119, 123]. In all populations, the support a healthcare provider perceives they get from the organization is predictive of their level of organizational commitment. When healthcare providers perceive that they have high organizational support, they will exhibit greater organizational citizenship behavior, which are extra-role tasks that ultimately improve the organization [124]. Burnout itself results in reduced organizational commitment on the part of the healthcare provider [125]. The experience of witnessing patient suffering and death [65, 122], uncertainty around plan/utility of care [15, 56, 126], moral distress [15, 85], and behavioral issues with patient families (e.g., aggressive patients/families) [65, 79, 127] were found to be significant factors that contributed to burnout in both pediatric nurses and general population physicians and nurses.

Work attitudes
As might be expected, optimism, self-efficiency, resilience, and positive coping strategies are supported as inversely related to burnout in broader nursing populations [128–130]. The identification and treatment of burnout is particularly important to consider in light of the evidence that burnout is inversely related to job satisfaction and burnout is a contagious phenomenon between nurses; therefore, early intervention is essential to prevent transmission among staff [131–133].

Work outcomes
The association between burnout and patient satisfaction and intent to leave has been reported in non-pediatric nurse populations as well [5, 6, 115, 134–136]. It is likely that as nurses become increasingly burned out their satisfaction with their jobs decreases and their desire to leave their position increases. This linkage highlights the importance of addressing nurse burnout in the organization to retain staff and reduce the financial and tacit knowledge losses associated with high nurse turnover.

Higher work-related burnout is also associated with mental health conditions such as anxiety and depression in pediatric nurses; this is represented in several studies of other healthcare provider populations [113, 137–140]. However, the majority of these associations are correlational; thus, they are left open for further assessment if they impact the development of burnout or if burnout impacted their development. Further research is needed to confirm causal, directional effects.

The relationship of increased clinician burnout and decreased patient safety has been supported in additional studies of healthcare provider burnout [7, 141]. As clinician burnout increases, the detachment from patients and their work does too, which may contribute to negative attitudes toward patient safety, incomplete infection control practices, and decreased patient engagement [7, 141]. Reducing burnout has the potential to impact patient safety; the Quadruple Aim of Healthcare hopes to improve patient outcomes, such as safety, through the addition of clinician well-being as a primary aim in the model [142].

Interventions
Although only seven of the studies analyzed in this review included interventions, there is modest evidence on the efficacy of burnout interventions in the broader healthcare provider population. Similar to the results of Hallberg [50], a study of Swedish district nurses showed no impact of clinical supervision on burnout [143]. While Morrison Wylde et al. [70] found a marginal improvement in pediatric nurse burnout with smartphone-based intervention vs. traditional mindfulness interventions, studies investigating mindfulness interventions in other healthcare populations reported mixed results [144–147]. Similar to pediatric nurses [84], social workers showed a significant decrease in burnout after attending skills development courses [148] suggesting that improving clinical knowledge and skills may reduce burnout. This is supported by the finding that pediatric nurses with lower clinical competency and education level have increased burnout [57, 90]. Although Edmonds et al. [42] showed significant decreases in pediatric nurse burnout using in-person trauma, adaptive grief, and coping sessions with follow-up, similar sessions have shown mixed results in other healthcare provider populations [149–151]. More research is needed to identify reliable interventions for pediatric nurse burnout that can be pre-emptively and routinely implemented by nursing schools and healthcare organizations.

Study limitations
The search strategy was limited to publications in English; thus, potentially relevant studies in other languages were excluded. Gray literature was not included; thus, informal annual surveys conducted at various healthcare institutions may have been missed; however, this was outweighed by the desire to only include peer-reviewed literature to ensure the quality of data reviewed [152]. Third, the definition of “nurses” varies internationally as does their required education and scope of practice; however, the slight variations were outweighed by the need to include thorough, culturally diverse research.
Finally, the extreme heterogeneity of the burnout measurement tools and their application and interpretation inhibited the comparison of results across studies.

**Conclusion**
Our scoping review showed inconsistent measurement and interpretation of pediatric nurse burnout scores. Factors associated with pediatric nurse burnout were similar to those found in other healthcare professional groups and can be separated into the domains of nurse personal factors, work environment, work attitudes, and work outcomes. Only 45 of the 78 studies reviewed studied exclusive populations of pediatric nurses, and most associations identified were correlational. Few interventions to prevent or mitigate pediatric nurse burnout have been undertaken, and the results were mixed, at best. Further studies using mixed methods are needed to expand on these results and incorporate the direct feedback of the nurses. Additional research is needed to develop and test interventions for pediatric nurse burnout. The improvement of pediatric nurse burnout has the potential to improve nurse well-being and, ultimately, patient care.

**Abbreviations**
MBI: Maslach Burnout Inventory; NICU: Neonatal intensive care unit; PICU: Pediatric intensive care unit; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses; PTSD: Post-traumatic stress disorder

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**Authors’ contributions**
LB was involved in the study design, data collection, data analysis, data interpretation, and drafting and finalizing the manuscript. WB and KC were involved in data interpretation and substantively revised the manuscript for important intellectual content. CM was involved in the data collection (title, abstract, and full-text screening) and substantively revised the manuscript for important intellectual content. KW was involved in the study design, data interpretation, and substantively revised the manuscript for important intellectual content. All authors read and approved the final manuscript and agree both to be personally accountable for their own contributions and to ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated, resolved, and the resolution documented in the literature. None of the authors have any competing interests as outlined by BioMed Central.

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**Availability of data and materials**
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The authors declare that they have no competing interests.

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