Nursing in Critical Care

SCOPING REVIEW OPEN ACCESS

Interventions to Support Psychological Health Outcomes for Children and Families Experiencing Paediatric Intensive Care Unit (PICU) Admission: A Scoping Review

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Received: 2 January 2025 | **Revised:** 1 April 2025 | **Accepted:** 18 April 2025

Funding: The authors received no specific funding for this work.

Keywords: intensive care | intervention | paediatric | PICU | psychological

ABSTRACT

Background: Admission to a Paediatric Intensive Care Unit (PICU) can be a traumatic experience for children and their families. Most children admitted to a PICU will survive; however, a significant proportion of children and their parents will experience serious psychosocial difficulties before, during and after PICU admission. There remains a knowledge gap concerning effective interventions for preventing or reducing adverse psychological outcomes for children and their caregivers.

Aim: This study aimed to identify and describe the types and characteristics of psychosocial interventions for the prevention, early detection and/or treatment of adverse psychological outcomes in children and/or their families before, during and after experiencing PICU admission and to identify gaps in the current literature.

Study Design: A scoping review was conducted through PsycINFO, PubMed, CINAHL and Scopus. English-language peer-reviewed and grey literature were searched from the earliest available records to July 2024. Key search domains included interventions and efficacy, feasibility, measurement instruments and psychological outcome variables.

Results: Of 3137 studies initially identified through database searching, 10 were included for full review. The findings from included articles describe nine universal interventions that include information provision and psychoeducational approaches, and one targeted psychotherapeutic intervention. There exists a significant paucity of targeted and clinical interventions for those patients and families at high risk of poor psychological outcomes. The Creating Opportunities for Parent Empowerment (COPE) programme emerged as a notable intervention, demonstrating reductions in parental stress, improved emotional coping and increased parental engagement in their child's care.

Conclusions: The existing literature examining the efficacy and effectiveness of psychosocial interventions to prevent or treat poor psychological outcomes before, during and after PICU admission is limited. Although a diverse range of interventions has been explored, notable discrepancies have emerged between these interventions and the actual needs and preferences of children and their families. Challenges related to standardisation and intervention type, setting, timing, scope and target must be carefully addressed in future research.

Grace Scott and Leigh M. Dunn shared joint first authorship.

Nursing in Critical Care, 2025; 30:e70057
https://doi.org/10.1111/nicc.70057

Relevance to Clinical Practice: This review highlights the need for targeted and clinical evidence-based psychosocial interventions in PICUs to address psychosocial outcomes including posttraumatic stress symptoms (PTSS) and posttraumatic stress disorder (PTSD) in children and families. Critical care nurses are uniquely positioned to identify early signs of psychological distress and should advocate for and actively participate in the development and delivery of tailored interventions with families to improve outcomes and recovery.

1 | Introduction

The emotional and psychological well-being of children admitted to a Paediatric Intensive Care Unit (PICU) has long been a topic of clinical concern [1, 2]. Most children admitted to a PICU will survive; however, a significant proportion will develop serious emotional, cognitive, social or physical challenges as a result [3]. These sequelae are more prevalent in PICU than in other paediatric ward settings [4] and are often referred to as Post-Intensive Care Syndrome in paediatrics (PICS-p) [5]. Vital progress has been made in understanding PICS-p; however, a critical knowledge gap remains regarding effective interventions aimed at preventing or mitigating adverse psychological outcomes.

2 | Background/Justification

While adverse effects following PICU admission can impact the child's long-term development [6], they can also have profound consequences for their families [2, 7, 8]. It is well established that parents experience heightened levels of stress and anxiety when their child is admitted to PICU [1] and are vulnerable to persistent symptoms that extend well beyond the child's discharge [2, 9, 10]. These symptoms span psychological, social and physical domains, leading to substantial morbidity in the family unit [7]. Several reviews have synthesised existing research on the development of posttraumatic stress symptoms (PTSS), posttraumatic stress disorder (PTSD) and other long-term psychological outcomes for children and/or their parents. Although related, PTSS is a term used to describe traumatic stress symptoms following a traumatic event, while a clinical diagnosis of PTSD, as per the DSM-5, requires a constellation of symptoms across different clusters or domains that persist for at least one month and cause significant distress or impairment in functioning [11]. Tang et al. [12] examined the prevalence and risk factors for PTSD in predominantly school-aged children 6–16 years old, discharged from PICU. Clinically significant PTSS, prevalent at varying intervals from one week to one year post PICU, ranged from 13% to 84.6%. Moreover, Abela et al. [7] found 30% of parents are affected by subclinical PTSS and clinical PTSD up to three years after their child's illness, emphasising the urgent need for family-centred interventions. Hordijk et al. [13] systematically reviewed neurocognitive function of mostly school-aged children and health-related quality of life (HRQoL) in children up to 18 years admitted to intensive care. Seventy-five studies of varying quality were examined and found that survivors of PICU suffer worse scores in neurocognitive function and lower physical and psychosocial HRQoL than the general population.

As our understanding of the psychological impact of PICU admission expands, the need for tailored, evidence-based interventions is clear. A review by Baker and Gledhill [14] examined interventions aimed at reducing psychiatric morbidity in children and/or their parents after PICU discharge, finding only six studies. The review focussed narrowly on intervention components without exploring measurement instruments or feasibility. This highlights the limited existing research, warranting an updated and comprehensive review. Whilst research examining the aetiology of PTSD [15–17] and diagnostic tools is slowly increasing [10, 12, 18, 19], this review will focus on interventions for preventing and treating adverse psychological outcomes which include 'PTSS', 'PTSD' and 'anxiety' and other 'psychological distress'; address the effectiveness, feasibility and acceptability of these interventions; and detail measurement outcomes and instruments utilised. In this context, 'intervention' refers to actions before, during or after PICU admission to address psychological distress, while 'follow-up' focuses on post-discharge care, addressing long-term challenges through tailored outpatient or specialised clinics.

This review is underpinned by the Paediatric Psychosocial Preventative Health Model (PPPHM), developed by Kazak [20] and adapted to the PICU context. The PPPHM is a three-tier framework that categorises family psychosocial risk levels to direct tailored intervention strategies in paediatric healthcare. It offers a systematic approach to care, ranging from universal, broad-based support to targeted and intensive interventions based on the family's specific level of need (see Figure 1). The Universal tier focuses on all families entering the PICU. These families are typically resilient but face significant stress. Primary intervention strategies may include general support and/or information provision. The Targeted tier addresses families with moderate risk, such as those suffering acute stress or pre-existing stressors. Psychoeducation and more targeted support are vital for this population. Finally, the Clinical tier focuses on families at very high risk for persistent psychological distress, including severe anxiety, PTSS and PTSD that is unresponsive to universal and targeted strategies. Interventions are typically intensive and may include psychotherapy and/or specialist clinician support.

3 | Aims and Objectives

The primary objective of this review is to examine the types and characteristics of psychosocial interventions aimed at preventing, detecting and treating adverse psychological outcomes in children and/or their families before, during or after PICU admission. The review addresses two core questions: (a) What is known about the range of PICU psychosocial interventions, including their timing, target population, scope, delivery mode, efficacy, feasibility (e.g., recruitment, retention and treatment adherence) and challenges identified by authors? (b) What psychological outcomes are examined in these studies, and how are they measured?

Summary

- What is known about the topic?
  - Admission to paediatric intensive care can be a highly traumatic experience for children and their families.
  - Adverse psychological outcomes in children and their families during and after discharge from a paediatric intensive care unit are a well-documented phenomenon.
- What this paper adds?
  - No widely applied standardised intervention exists for the prevention, detection or treatment of psychological morbidity in the challenging PICU setting.
  - Multi-component interventions, targeting both children and parents, and incorporating active participation, psychoeducation and personalised resources play a critical role in addressing psychological morbidity.
  - There is a need for more child-focused, targeted and clinical interventions. Involving parents enhances the effectiveness of these interventions in achieving lasting changes, as compared to simple information provision programmes.
  - Research is urgently needed to develop and evaluate interventions that are effective, acceptable and feasible and meet the needs of infants, children and adolescents and their families.

4 | Design and Methods

Methodology of the current review was informed by the Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping reviews (PRISMA-ScR) guidelines (Table S1) [21] and JBI guidelines for scoping reviews [22].

4.1 | Eligibility Criteria

Studies evaluating psychosocial interventions addressing psychological morbidity in children admitted to intensive care (and/or their family members) conducted within PICUs or delivered after the child's discharge were included. This scoping review included a range of study designs, such as experimental and quasi-experimental studies (randomised control trials (RCT), non-RCTs, pre-post studies and interrupted time-series studies), descriptive observational studies (case series and case reports) and qualitative studies.

Predetermined inclusion criteria included (a) participants were children or family members of children (primary caregivers, parents, siblings) admitted to PICU; (b) patients aged 0–18 years when admitted to PICU; (c) intervention for the prevention, detection and/or treatment of poor psychological outcomes after PICU. Studies were excluded based on one or more of the following: (a) patients older than 18 years of age when admitted to an intensive care unit; (b) no analysis of PICU patients or their families (e.g., age); (c) publication types that were recommendations, guidelines or research letters without patient data, news reports, editorials, commentaries or review articles; (d) articles not available in English; (e) non peer-reviewed; (f) no full-text availability.

4.2 | Search Strategy

A three-step search strategy was implemented following JBI guidance [22]. The search formula was reviewed by a nursing liaison librarian with expertise in scoping reviews. The librarian provided guidance on optimising keywords and database selection. Initially, a limited search of PsycInfo and PubMed was conducted (from earliest available records up to July 2024) using an electronic search strategy based on PRISMA

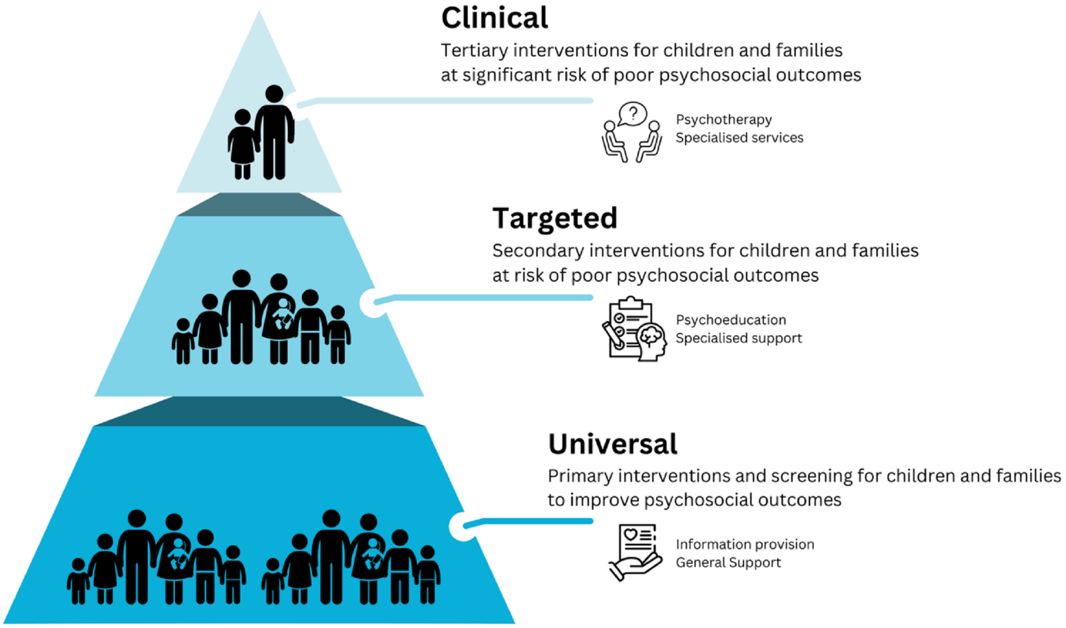


FIGURE 1 | PICU psychosocial preventative health model. Figure inspired by the paediatric psychological preventative health model (PPPHM). Kazak [20] Centre for Paediatric Traumatic Stress, Children's Hospital of Philadelphia.

extension for scoping review [21] and peer review for electronic search strategy (PRESS) [23] guidelines. Search terms included those related to population (e.g., child*, adol* and family), intervention (e.g., interven* and prevent*), outcomes (e.g., PTSD and psychological morbidity) and setting (e.g., ICU and PICU). Titles and abstracts of obtained articles were reviewed to identify articles meeting inclusion criteria. Key terms were extracted from the title, abstract and keywords of those articles, resulting in the addition of the following search terms: aftercare, quality of life, stress disorder, which were incorporated into a broader search across PsycINFO, PubMed, CINAHL and Scopus. A systematic search of these databases was conducted, and duplicate records were removed. Two independent reviewers (GS, LD) conducted the title and abstract screening to exclude studies that did not meet inclusion criteria. Finally, reference lists of included articles were searched for additional studies meeting inclusion criteria (see Tables S2 and S3 for full search strategy). The full text of relevant studies was assessed independently by the reviewers (G.S., L.D.) using the predefined eligibility criteria. Disagreements between researchers were resolved through collaborative discussion with D.A.L. If consensus could not be reached, the research team was consulted to make the final determination.

4.3 | Evidence Selection

Covidence software [24] was used to collate and manage records obtained, including screening and data extraction. After removal of duplicate records, screening of titles and abstracts were completed, and ineligible studies were removed. Reasons for exclusion were recorded in Table S4.

4.4 | Data Extraction

Data were extracted from eligible sources using a data extraction template (see Table S5). Extracted items included: author, publication year, study aim/design, setting, participant demographics (age/sex and sample size), intervention characteristics (content, format, number of sessions), primary and secondary outcomes, psychological outcome measurement tools, feasibility factors (e.g., recruitment and retention rates) and key findings.

4.5 | Data Analysis

The extracted data were presented using a narrative approach, guided by the PPPHM framework [20]. This framework categorises interventions across a spectrum: universal (addressing the entire PICU population), targeted (supporting families in need) and clinical (focussing on high-risk families). Adapting the PPPHM to the PICU context provided a clear classification system for interventions [20] (see Figure 1). We determined universal interventions as those provided to all families and/or children without prior risk or assessment screening for acute stress. Targeted interventions were classified as those provided only after participants were screened and identified as moderate risk of elevated acute stress. Finally, clinical interventions were classified as those provided by specialist clinicians to participants who were screened and identified as very high risk for persistent elevated distress failing to improve or resolve after discharge. Accordingly, participant eligibility criteria (screening of psychological status) and the type and level of intervention (general support (e.g., connecting families with hospital resources), information provision, education and psychotherapy) were scrutinised to inform the appropriate category for each study. Full text review of the included studies was conducted by G.S. and L.D. to classify each intervention. Data were organised into tables based on the data extraction template, with common themes summarised and linked to the research questions.

To ensure accuracy in data synthesis, key terms ‘intervention’ and ‘follow-up’ were defined based on existing literature and research team consensus. The study authors' original terminology was retained to maintain contextual integrity and prevent misrepresentation when describing interventions, psychological outcomes and population characteristics. For example, some studies referred to psychological distress as ‘acute stress’, while others used terms such as ‘posttraumatic stress symptoms’ or ‘posttraumatic stress disorder’. Furthermore, because of the methodological heterogeneity across studies, direct comparisons of interventions and outcomes were avoided. Instead, a narrative synthesis approach was applied to identify overarching themes within the literature and intervention classification.

5 | Results

A total of 3137 records were retrieved through database searching and other sources. After duplicate removal, 2366 records were retained for screening. Following title and abstract screening, 43 articles remained for full text review, of which 33 were excluded for not meeting inclusion criteria (Figure 2 PRISMA flow diagram). Ultimately, 10 studies met all criteria, representing a diverse range of interventions aimed at addressing psychological morbidity before, during and after PICU admission. Papers included RCT ($n = 8$) and quasi-experimental ($n = 2$) designs, published between 1997 and 2024, involving 621 participants. Studies were conducted in the United States ($n = 6$), Canada ($n = 1$), United Kingdom ($n = 1$), Italy ($n = 1$) and Australia ($n = 1$).

This review aimed to explore the breadth, effectiveness and feasibility of available interventions targeting adverse psychological outcomes before, during or following PICU admission. Characteristics and findings of the included studies are listed in Table 1. Given the substantial variability across studies, interventions were grouped thematically based on the PPPHM framework (universal, targeted, clinical) and according to participant eligibility criteria and type and level of intervention. Nine out of ten studies reported on universal interventions commencing before (1/10), during (7/10) or after (2/10) PICU admission and a single targeted intervention focused on parent outcomes. Of these, eight studies measured outcomes after PICU, four during PICU and just one prior to admission (see Table S7). Within the PPPHM tiers, we further sub-categorised the outcome target (parent and/or child) and type of intervention (e.g., information provision, psychoeducation and psychotherapy). A summary of the findings is presented in Figure 3.

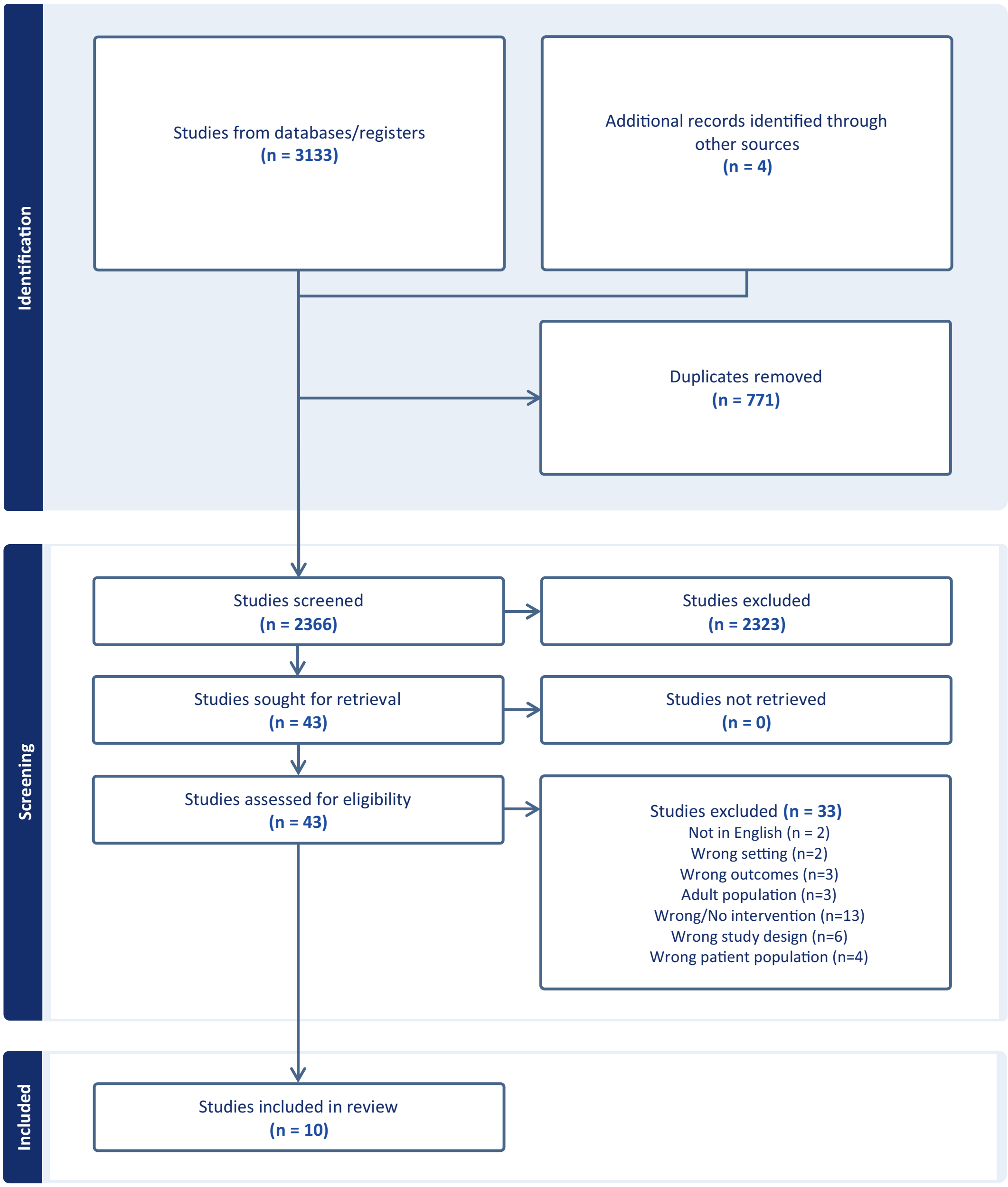


FIGURE 2 | PRISMA flow diagram for selection of papers.

5.1 | Universal Interventions

5.1.1 | Interventions Focused on Parent Outcomes

Two of ten studies included universal information provision interventions, specifically delivering education to parents via a PICU nurse [25] or letters [26]. Educational strategies in healthcare aim to build knowledge and skills for informed decision-making. Simeone et al. [25] examined a nurse-led educational intervention for parents just prior to their child undergoing heart surgery, to evaluate its impact on alleviating parent anxiety and stress. This involved training nurses to explain medical devices and simulate case scenarios, resulting in reduced parental anxiety, especially in mothers, compared with treatment as usual (TAU). While feasibility and acceptability were not directly assessed, the study highlighted the importance of well-trained nurses and recommended multi-centre research to explore parent perspectives and effectiveness in varied settings.

Bouvé et al. [26] examined how a transfer-preparation letter, accompanied by a verbal explanation provided by nurses 24–48 h before transferring a child from the PICU to a general paediatric ward, influenced parental stress levels. This approach significantly reduced anxiety in parents compared with the group who received no such preparation. The authors found the intervention was well integrated into hospital procedures, simple and cost-effective, making it a practical option for reducing parent anxiety during this transition period.

A feasibility study by Board [27] investigated the impact of daily expressive writing on parental stress during their child's PICU stay. This psychotherapeutic intervention aimed to help parents

TABLE 1 | Characteristics and findings of the included intervention studies.

							Intervention			
							Type			
Author (year), country	**Design**	**Target (age)**	**Setting, mode of delivery**	**Timing**	**Sample (delivered to)**	**Outcome measures**	**Theoretical framework**	**Results**	**Feasibility**	**Strengths and limitations**
Universal interventions										
Bouve et al. (1999), United States	RCT	Parents	PICU Written communication	Prior to transfer to ward	Parents with a child in PICU $N = 50$	*Parent* Anxiety (STAI)	**Anticipatory Information Provision** Parent education letter with transfer preparation information. Lazarus Stress and Coping Model.	*Parent* Parents who received the intervention experienced lower state anxiety, and greater reduction in anxiety than the group that did not.	Simple, cost-effective, adaptable across institutions and other contexts	*Strengths* Enables open communication between clinicians and parents. *Limitations* Small sample size, possible spillover of intervention to control group
Simeone et al. (2017), Italy	Non-randomised experimental study	Parents	Cardiac ward	Pre-PICU 24 h prior to planned admission	Parents of a child with planned PICU admission (cardiac surgery) Intervention $N = 60$	*Parent* Anxiety (STAI)	**Information Provision** Nurse-led educational intervention pre-surgery. Parent education on what to expect before, during and after their child's cardiac surgery. Based on empirical studies of paediatric CHD.	*Parent* Average anxiety score of intervention group was lower than control group measured at a single time point.	Not discussed	*Strengths* Intervention preventative rather than treatment *Limitations* Not generalisable, patient characteristics were homogeneous (similar age and non-emergency surgery)
Als, et al. (2015), United Kingdom	Pilot RCT	Parent and child (4–16 years)	Post PICU, Handbook Phone call	Handbook provided within 7 days of discharge, phone call within 14 days of handbook	Parents with a child (4–16 years) admitted to PICU $N = 31$	*Parent* PTSS (IES), depression (HADS). *Child* Emotional and behavioural difficulties (SDQ).	**Anticipatory Psychoeducation** Handbook about what to expect post PICU, for example, emotional and behavioural recovery, getting back to normal. Support information, and follow-up phone contact from researcher Based on empirical studies of PICU mental health outcomes	*Parent* Fewer PTSS and depressive symptoms than TAU group *Child* Fewer emotional and behavioural difficulties than TAU group	Likely cost-effective and does not require hospital attendance	*Strengths* Strong evidence base scaffolded intervention, psychoeducation tool co-designed by clinicians and families with lived experience. *Limitations* Small sample size in one centre

(Continues)

TABLE 1 | (Continued)

							Intervention			
							Type			
Author (year), country	**Design**	**Target (age)**	**Setting, mode of delivery**	**Timing**	**Sample (delivered to)**	**Outcome measures**	**Theoretical framework**	**Results**	**Feasibility**	**Strengths and limitations**
Melnyk et al. (1997), United States	Pilot RCT	Mother and child (1–6 years)	PICU, ward In person, written materials	Phase 1 conducted upon admission to PICU Phase 2 conducted upon transfer to ward.	Mothers with a child (1–6 years) admitted to PICU. $N=30$	*Parent (Mother only)* State anxiety (STAI), negative mood state (POMS), stress (PSS: PICU), PTSS (PSI-P), role change (PRQ). *Child* Adjustment (PHBQ), PTSD (PSI-C).	**Psychoeducation** COPE programme; Two phase intervention targeting child behavioural information, parental role in facilitating adjustment and activities to enhance child coping. Phase 1: psychoeducation Phase 2: psychoeducation and parent–child activity workbook (included (a) puppet play; (b) therapeutic medical play; and (c) creating an "I am special book"). Self-regulation theory, control theory, emotional contagion hypothesis.	*Parent* Less maternal negative mood state, less stress related to their children's emotions and behaviours. Less PTSS and role change 4 weeks following hospitalisation. *Child* Less negative behavioural change during hospitalisation.	Interventions are practical, reproducible and time efficient.	*Strengths* Diverse sample and multiple sites, longitudinal follow-up, attrition analysis to account for potential impact. *Limitations* Small sample size, not all outcome measures were conducted at designated time periods.

(Continues)

TABLE 1 | (Continued)

							Intervention			
							Type			
Author (year), country	**Design**	**Target (age)**	**Setting, mode of delivery**	**Timing**	**Sample (delivered to)**	**Outcome measures**	**Theoretical framework**	**Results**	**Feasibility**	**Strengths and limitations**
Melnyk et al. (2004), United States	RCT	Mother and child (2–7 years)	PICU, ward In person, written materials and telephone call	In PICU: Phase 1–6 to 16 h after admission to PICU. Post PICU: Phase 2–2 to 16 h of transfer to the ward. Phase 3–2 to 3 days after discharge from the hospital.	Mothers and their child (2–7 years) admitted to PICU $N = 163$	*Parent* Stress (PSS: PICU), negative mood state (POMS), PTSD (PSI-P), depression, anxiety. *Child* Child behaviour and coping (BASC).	**Psychoeducation** Three phase intervention. Phase 1: psychoeducation Phase 2: psychoeducation and parent–child activity workbook (included (a) puppet play; (b) therapeutic medical play; and (c) creating an "I am special book") Phase 3: Telephone call reinforcing expectations of child behaviour and emotions and parenting tips to enhance child coping. Self-regulation theory, control theory, emotional contagion hypothesis.	*Parent* Less maternal stress and more participation in child's physical and emotional care, less negative mood state, less depression, fewer PTSD symptoms post discharge, stronger beliefs regarding their child's likely responses to hospitalisation. *Child* Fewer withdrawal behaviour symptoms at 6 months and fewer negative and externalising behaviours 12 months post discharge.	Interventions are practical, reproducible and time efficient.	*Strengths* RCT design *Limitations* High attrition rate over 12 months may affect validity

(Continues)

TABLE 1 | (Continued)

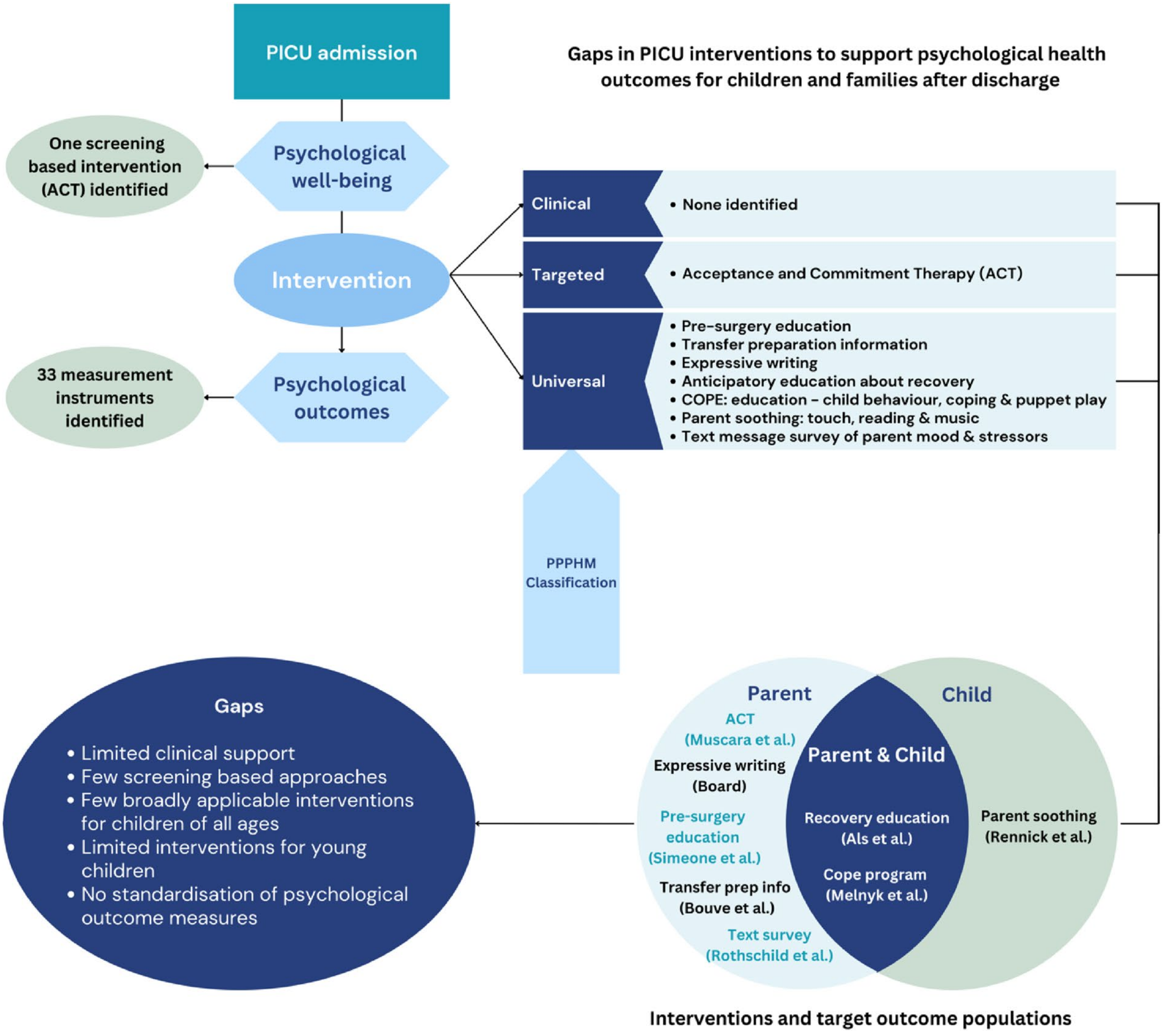
							Intervention			
							Type			
Author (year), country	**Design**	**Target (age)**	**Setting, mode of delivery**	**Timing**	**Sample (delivered to)**	**Outcome measures**	**Theoretical framework**	**Results**	**Feasibility**	**Strengths and limitations**
Melnyk et al. (2007), United States	RCT	Mother and child (2–7 years)	PICU, ward In person, written materials and telephone call	During and post PICU admission	Mothers with a child 2–7 years old admitted to PICU. $N=143$	*Parent* State anxiety (STAI), negative mood state (POMS), beliefs about their role and child's response to hospitalisation (PBS) *Child* behaviour (BASC)	**Psychoeducation** Tested theoretical model of the COPE intervention described above (data from 2004 RCT). Self-regulation theory, control theory, emotional contagion hypothesis.	*Parent* More participation in child's physical and emotional care, less negative mood state *Child* Parent participation in the COPE program resulted in better child adjustment.	Intervention is easy to administer, reproducible and time efficient	*Strengths* RCT design *Limitations* Intervention tested in two PICUs in same region- findings not generalisable, mother reported outcome measures may lack objectivity
Board (2021), United States	Longitudinal, Quasi experimental	Parents	NICU PICU Paper based journal or electronic diary	During PICU and post NICU admission	Parents with a child (1 month to 21 years) $N=28$	*Parent* Stress (PSS: PICU)	**Psychotherapy** Expressive writing- Parent journalling to aid in assimilation and processing of traumatic event. Cognitive Processing Theory	*Parent* Parental stress was similar for both intervention and control group	Feasible and acceptable, with most parents recommending its use for future PICU parents; easy to use; cost-effective	*Strengths* Easy to use, cost-effective *Limitations* Limited to Caucasian participants, small sample size
Rennick et al. (2018), Canada	RCT	Child (2–17 years)	PICU ward In person, questionnaire, sleep diary and actigraphy in hospital and at home	During PICU and ward admission	Child–parent dyads, parents of a child (2–17 years) admitted to PICU Control = 10 intervention = 10 $N=20$	*Parent* Anxiety (STAI), *Child* Child anxiety (RCMAS)	**Psychotherapy** Soothing intervention consisted of parental comforting (touch and reading) and a quiet period with music via soft headbands delivered while in PICU, general ward and home. Based on Developmental Care literature.	*Parent* Decreased anxiety after transfer from PICU to a ward. 70% and 100% of intervention group parents responded positively to comforting and music. *Child* Decreased anxiety after transfer to ward.	Acceptable and feasible by nurses, parents and child.	*Strengths* Simple and likely cost-effective. *Limitations* Small sample size, 90% of patient participants were < 12 years old despite being targeted at 2–17 years old, high refusal rate in adolescents.

(Continues)

TABLE 1 | (Continued)

							Intervention			
							Type			
Author (year), country	**Design**	**Target (age)**	**Setting, mode of delivery**	**Timing**	**Sample (delivered to)**	**Outcome measures**	**Theoretical framework**	**Results**	**Feasibility**	**Strengths and limitations**
Rothschild et al. (2024), United States	Pilot Feasibility study; Prospective cohort study	Parents	PICU Via text message, virtual interview.	In PICU, post PICU 1-, 3-, 6-months post discharge	Parents of children admitted to PICU $N = 15$	*Parent* Acceptability (Likert scale survey), mood assessment, CD-RISC2, PROMIS anxiety/depression short form 4a, PCL-5	**Experiential assessment** Text based surveys consisting of psychological assessments. Daily survey of mood/experiences and optional open-ended questions about stressors. Based on empirical data from previous studies.	*Parent* Participants reported comfort (76%) and benefit (69%) from intervention.	Intervention was found feasible and acceptable.	*Strengths* High survey completion rates 3 months post discharge (79%–94%) *Limitations* Small sample size, initial technical issues, no analysis of psychological outcome measures.
Targeted interventions										
Muscara et al. (2020), Australia	RCT	Parents	Home Online	Delivered 4–6 months post-diagnosis vs. discharge	Parents of a child (0–18 years) admitted to Cardiology ($N = 24$) Oncology ($N = 32$) and PICU ($N = 25$) Total $N = 81$	*Parent* PTSS (PCL-5), anxiety and depression (DASS)	**Psychotherapy** Acceptance and Commitment Therapy (ACT) Take a Breath programme consisting of six parent mediated psychology group sessions over a period of 8 weeks on acceptance, mindfulness, values and goal setting ACT	*Parent* Intervention group-significant improvements in PTSS, psychological flexibility, nonjudgmental awareness, valuing behaviour and committed action. Depression and anxiety showed no significant differences	Feasible to access geographically diverse populations.	*Strengths* Geographically diverse sample *Limitations* Modest sample size, high attrition rate, self-report measures may bias findings, randomisation did not allocate equivalent groups

Abbreviations: BASC, Behavioural Assessment System for Children; COPE, Creating Opportunities for Parent Empowerment; CRIES-13, Children's Impact of Event Scale—13; DASS, Depression Anxiety and Stress Scale; HADS, Hospital Anxiety and Depression Scale; HRQoL, Health Related Quality of Life; IES, Impact of Event Scale; NICU, Neonatal Intensive Care Unit; PAS, Posttraumatic Adjustment Scale; PBS, Parental Beliefs Scale of Hospitalized Children; PCL-5, Posttraumatic Stress Disorder Checklist—Version 5; PedQL, Paediatric Quality of Life Inventory; PHBQ, Post-Hospital Behaviour Questionnaire; PICU, Paediatric Intensive Care Unit; POMS, Profile of Mood States; PROMIS, Patient-Reported Outcomes Measurement Information System; PRQ, Parenting Role Questionnaire; PSI-C, Posthospital Stress Index for Children; PSI-P, Post-Hospital Stress Index for Parents; PSS: PICU, Parental Stressor Scale: PICU; PTSD, Posttraumatic Stress Disorder; PTSS, Posttraumatic Stress Symptoms; RCMAS, Revised Children's Manifest Anxiety Scale; RCT, Randomised Controlled Trial; SDQ, Strength and Difficulties Questionnaire; STAI, State Trait Anxiety Index; TAU, Treatment as usual; WHO, World Health Organisation.



Universal Interventions

FIGURE 3 | Schematic of interventions, PPPHM classification, target population and gaps identified.

process and assimilate traumatic experiences. Experimental group parents were provided a notebook and encouraged to write 'about anything' daily during their child's hospitalisation. Although perceived stress during hospitalisation was significantly associated with PTSS post discharge, no significant stress reduction was observed between the control and experimental groups during hospitalisation. The intervention was considered feasible and acceptable, with recommendations for future implementation to include daily check-ins for additional support and guidance.

Rothschild et al. [10] explored the acceptability and feasibility of a text-message-based interface to capture real-time lived experiences of PICU parents for potential use as a screening tool. Surveys completed at baseline, 1-, 3- and 6-months post PICU discharge assessed experiences, depression, anxiety and PTSD. Additionally, mood and child status assessments were completed every other day during PICU and for one week post discharge. While the therapeutic effects were not analysed, 76% of parents reported benefits and 91% expressed satisfaction with the interface at 3-months post discharge. The tool was deemed acceptable and feasible, though technical issues required troubleshooting. The study's small sample size ($n = 15$) limits the generalisability, highlighting the need for further research to refine the tool and evaluate its potential for early detection of psychological distress.

5.1.2 | Interventions Focused on Child Outcomes

Rennick et al. [28] focused on the feasibility of a psychotherapeutic soothing intervention aimed at improving the psychological well-being in critically ill children, targeting parent–child (2–17 years old) dyads in a pilot RCT. The intervention involved tactile and auditory strategies, such as parents' holding or stroking their child's hand, reading aloud to the child and quiet music time. These were delivered by parents at night to mimic normal sleep routines during the child's hospital admission. Parents and nurses reported that the reading and music components of the intervention had a calming effect on the child, therefore finding it acceptable and feasible, especially for those with children under 12 years old. However, the high refusal rate (> 50%) raised concerns about broader applicability. Adolescents and their parents often declined participation because of lack of interest, while parents of younger children cited concerns about overstimulation or reported feeling overwhelmed. The study emphasised the importance of timing, suggesting that engaging families within 24 h of PICU admission may be inappropriate because of heightened stress levels. Tailored strategies are needed to address these barriers and improve intervention acceptability.

5.1.3 | Interventions Focused on Both Parent and Child Outcomes

Psychoeducation teaches individuals and families about psychological conditions and stress to enhance coping and recovery. Als et al. [29] evaluated a post-discharge psychoeducation handbook on family mental health outcomes in a pilot RCT. The handbook, which provided psychoeducation about emotional and behavioural recovery, getting back to normalcy and support resources, was delivered to parents (of children 4–16 years) seven days after PICU discharge. Parents were encouraged to apply the strategies outlined in the handbook to support the recovery and well-being of their child. A follow-up telephone call 14 days later allowed parents to share their experiences and receive additional support. Parents reported fewer PTSS and emotional and behavioural challenges in their children compared with TAU. While the intervention demonstrated promising results, the brief follow-up period did not allow for the natural recovery of symptoms or for the intervention to take effect, potentially contributing to small effect sizes and little difference in anxiety scores. The study protocol did not meet feasibility criteria and required significant revisions including delivering the psychoeducational tool and gathering consent and baseline data in PICU to improve participation and timeliness; postponing the follow-up call to 3–6 weeks after discharge for logistical and parental preference; broadening the eligible age range of children; reducing assessment measures to ease participant burden and lower dropout rates; and working with consumer groups to clarify the purpose of randomisation, aiming to improve participation [29].

Three psychoeducation and behavioural intervention studies reported on the parent led Creating Opportunities for Personal Empowerment (COPE) programme developed by Melnyk et al. [30–32]. The authors were guided by self-regulation theory that suggests providing patients with concrete information about a stressful event helps them form realistic expectations, thereby reducing anxiety, enhancing coping and boosting confidence [32]. The COPE programme provided written materials, audiotapes and a workbook to help parents understand typical child behaviours and emotions during and after PICU admission. Distributed after transfer to a paediatric ward, the workbook included emotional expression activities, such as puppet play and the story ‘Jenny's Wish’, illustrating effective coping with hospitalisation. The COPE programme, tested in a pilot study [30], an RCT [31], and a structural equation modelling [32] evaluation, significantly reduced parental stress and improved emotional coping for up to 12 months post discharge. It also positively impacted child outcomes, including reduced withdrawal, externalising behaviours (e.g., aggression and attention issues) and hyperactivity, while enhancing adaptive skills. Although efficient and easy to administer, future research should assess its cost effectiveness for broader application.

5.2 | Targeted Interventions

5.2.1 | Intervention Focused on Parent Outcomes

This review defines psychotherapy as a professional treatment aimed at addressing emotional, psychological or behavioural issues through therapeutic techniques. The ‘Take a Breath’ intervention by Muscara et al. [33] based on acceptance and commitment therapy (ACT), recruited parents of seriously ill children with elevated acute stress symptoms (measured by the Acute Stress Disorder Scale). This targeted programme included six group therapy sessions over eight weeks, delivered via videoconference 4–6 months post discharge and supplemented with value cards, a booklet and a mindfulness CD. Results showed significant improvements in PTSS and uncertainty in the intervention group, although no significant changes in depression and anxiety were observed. High attrition rates (64%) highlighted feasibility challenges, indicating the need for strategies to improve participant retention in future research. Although the ‘Take a Breath’ intervention shares characteristics of a clinical intervention—such as the extended period between hospital discharge and programme commencement—it is classified as a targeted intervention. This classification is based on the timing of eligibility screening, which assessed acute parental stress within the first four weeks of admission.

5.3 | Clinical Interventions

None identified.

6 | Psychological Outcome and Measurement Instruments

The final question sought to identify the measurement instruments used in the interventions and the outcome variables they assessed. Parental anxiety and stress, along with child anxiety and distress, were the most frequently reported outcomes. A total of 33 measurement instruments were identified, with 24 used for parents (20 self-reported and 4 observer-reported by PICU staff). For children, nine instruments were identified: two for those under two years, four for children over two years old and three for those above six years (see Table S6). Assessment for children under six years predominantly relied on parent or clinician ratings, while tools for older children included both self- and parent-reported measures.

7 | Discussion

This scoping review examined psychosocial interventions aimed at preventing, identifying and addressing adverse psychological outcomes in children and families experiencing PICU admissions. The findings highlight a diversity of interventions ranging across educational, behavioural, therapeutic and multi-component programmes. However, gaps remain between existing interventions and the needs of families. Specifically, many interventions lack broad application across all ages and stages of child development, with limited accessibility and integration into routine PICU care. Additionally, few interventions address long-term psychological outcomes, leaving families without sustained support post discharge. Key challenges include standardisation, determining optimal timing and tailoring interventions by age, underscoring the need for further research to develop feasible, evidence-based solutions. Out of 3137 records retrieved, 10 studies were retained for full review. The key themes identified from these studies are discussed in relation to their findings.

7.1 | Theoretical Framework

Many of the studies reviewed had a strong theoretical grounding with particular emphasis on the intervention developed by Melnyk et al. [30–32]. The COPE intervention, grounded in self-regulation theory, control theory and the emotional contagion hypothesis, exemplifies the value of robust theoretical foundations, linking mechanisms to outcomes and enabling meaningful results [30]. A clear theoretical rationale enhances trust and stakeholder engagement, critical given high participant attrition rates. However, overreliance on frameworks in the complex PICU context can lead to inflexibility and hinder innovation. Balancing theoretical grounding with practical adaptability is essential to developing effective interventions for critically ill children and their families.

7.2 | Collaborative Design, Accessibility and Timing

While it is crucial to have a strong evidence base for 'the what', it is equally vital that this element extends to 'the where, when and how' of delivery. Als et al. [29], exemplified this approach by co-designing a psychoeducational tool with input from clinicians and families with lived PICU experience. The intervention was designed to eliminate the need for hospital visits, prioritising accessibility and stakeholder engagement during development. Early involvement of parents ensures interventions align with their needs and preferences. Studies where such alignment was lacking reported participant discomfort [27, 28]. Simeone et al. [25] further emphasised the value of incorporating parent perspectives in co-design, addressing key factors like accessibility and timing to enhance future interventions.

Accessibility was a recurring theme, with evidence suggesting that hospital-based or electronic interventions (e.g., text messages, videoconferencing) improve reach and reduce burden for diverse populations. Rothschild et al. [10] developed a widely accepted text-message-based platform while Muscara et al. [33] identified accessibility as both a key barrier and enabler to the uptake of interventions. These findings are consistently supported in the literature, placing responsibility on researchers and clinicians to develop flexible strategies [34, 35]. Doing so would ensure that interventions are effective, equitable and widely available to all families.

Timing is critical for PICU interventions. While engaging parents during their child's stay may optimise recruitment, early approaches (< 24 h) can be hindered by heightened stress [28]. Recruiting parents before planned admissions or after 24 h also presents challenges, as many admissions are unplanned, and with a median PICU length of stay of 1.4 days in Australia and New Zealand [36], a significant number of families could be excluded. Furthermore, parents' experiences in the PICU strongly affect family stress [37], underscoring the potential of timely interventions to improve long-term outcomes. Prioritising timing and family needs is essential for effective, inclusive interventions.

7.3 | Standardisation of Outcome Measurement Instruments

This review identified 33 validated outcome measurement instruments, highlighting challenges in consistency, comparability and alignment across studies. Standardised measures are essential to address variability, enabling reliable data collection and meaningful conclusions. Progress has been made, with Fink et al. [38] in collaboration with family and clinical stakeholders, developing a core set of outcome measures (COM) for paediatric critical care spanning cognitive, emotional and physical domains. Interestingly, family stakeholders valued outcome measures associated with relationships, PTSS and parent emotional health more than clinical/research stakeholders, suggesting families have recognised these outcomes as an unmet need [38]. Standardisation ensures generalisability, facilitates systematic research and supports the development of effective interventions.

7.4 | Scope of Intervention

The PPPHM model of care identifies three levels of intervention and recognises a dynamic continuum within these levels. This effectively responds and adapts to the evolving needs of families and individuals, which can shift over time and in different contexts [20]. Most interventions are universal, supporting two-thirds of low-risk families post PICU through information provision, psychoeducation and psychotherapeutic approaches. However, one-third of families, experiencing clinical or subclinical PTSD [7], lack access to targeted or clinical interventions [18], severely impacting child and family well-being and burdening the healthcare system. This lack of care can profoundly affect the child's health, quality of life, education and social development, while also impacting the family's well-being, relationships, work and access to support systems. Limited funding has hindered research on long-term outcomes, underscoring the urgent need for evidence-based interventions to support this vulnerable group [38, 39].

7.5 | Target

The target populations of interventions varied, with five studies focusing on parents, particularly mothers, four addressing both parents and child and only one specifically targeting child outcomes. Child-inclusive studies often had restricted age ranges, such as the COPE programmes for mothers of children aged 2–7 years [31, 32] and the psychoeducation tool by Als et al. [29] for parents of children aged 4–16 years. This highlights a concerning lack of broadly applicable, child-specific interventions, particularly for children under five. Psychological distress during childhood, especially after a traumatic experience like PICU admission, can have long-term consequences [6]. Early interventions tailored to children can foster coping mechanisms and reduce future psychological issues [20]. Addressing this gap, especially for young children, must be a research priority.

7.6 | Tailored Approach

Heterogeneity in patients, interventions and outcomes highlights the need for tailored approaches, particularly for young PICU patients with unique developmental needs. In Australian and New Zealand PICUs, the median patient age is three years [36], a group whose developmental, emotional and psychological needs differ significantly from those of older children, adolescents and adults. Researchers must design interventions that are appropriately tailored to address these distinct needs effectively. The variability in intervention characteristics limits direct comparison and evaluation, but some key observations emerge. Parent education and nurse-led interventions are simple to implement but fail to address PTSS/PTSD risk factors effectively when limited to information provision. These approaches often overlook complexities like emergency admissions and trauma-related issues. Without an 'active component', such interventions do not address underlying mechanisms of psychological morbidity, such as creating adaptive trauma narratives or correcting misconceptions. Given that parent and child stress responses are highly interrelated [40, 41], the findings also underscore a need for developing personally relevant, child-focused interventions, that parents facilitate. Importantly, involving parents enhances the effectiveness of these interventions in achieving lasting changes, as compared with simple education programmes. Tailored approaches better support families in navigating the long-term psychological impacts of critical illness.

7.7 | Strengths and Limitations of the Scoping Review

Several limitations of this review were identified which must be considered when interpreting the reported findings, namely inconsistencies in terminology around what constitutes a 'psychosocial intervention', the broad definition of 'intervention' across studies and the potential interchangeable use of 'PTSS' and 'PTSD'. To ensure accuracy, we defined key terms, retained study authors' original terminology and avoided direct comparisons because of study diversity. While the broad scope strengthens the review given the limited research, excluding non-English articles may have missed relevant findings.

7.8 | Implications and Recommendations for Practice

This review emphasises the significant and long-lasting prevalence of psychological distress including PTSS and PTSD in children and families experiencing PICU admissions, with symptoms often persisting well beyond the acute period of illness and potentially for years. Given that young children represent the majority of PICU admissions [36], designing targeted interventions for this vulnerable group is critical. Gaps in current interventions, including standardisation, timing and age-specific focus, underscore the need for targeted approaches.

Critical care nurses are uniquely positioned to identify early signs of psychological distress among children and families during PICU admissions. The nurse-family partnership, enhanced by nurses' ongoing presence and engagement at the bedside, is essential to effective collaboration and intervention development. Nurses should actively participate in designing and delivering targeted and clinical, evidence-based psychosocial interventions, which have shown efficacy in reducing parental stress, improving emotional coping and promoting meaningful engagement in their child's care. Early collaboration involving nurses, clinicians and parents during intervention development may enhance acceptability, uptake and retention of these interventions in clinical practice.

Future research should prioritise child-specific and targeted interventions particularly for those under five, address both child and parent outcomes and expand to include other PICS-p domains, such as physical and cognitive challenges, as well as new psychological morbidities. These emerging psychosocial challenges, such as anxiety and depression, can develop following subclinical or clinical PTSD, even after the resolution of acute PTSD symptoms. By broadening the focus on these areas and integrating sustainable practices early in daily nursing care, research can better support the long-term wellbeing of children recovering from critical illnesses and their families.

8 | Conclusion

This scoping review aimed to identify and describe psychosocial interventions designed to prevent, detect or treat adverse psychological outcomes in children and their families before, during and after a PICU admission. A diverse range of interventions have been explored within the PICU context. These interventions span universal and targeted tiers and include information provision, psychoeducation strategies and psychotherapy. While these interventions collectively contribute to understanding the potential benefits and challenges inherent in improving the PICU experience for patients and families, more research is urgently needed in this setting to identify and rigorously evaluate interventions that meet the needs of patients and family members and can be implemented sustainably into clinical practice.

Acknowledgement

Open access publishing facilitated by Queensland University of Technology, as part of the Wiley - Queensland University of Technology agreement via the Council of Australian University Librarians.

Ethics Statement

The authors have nothing to report.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.