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Family-Centered Care in Neonatal and Pediatric Intensive Care: Implementation Models, Parental Outcomes, and Healthcare Professional Perspectives

Perawatan Yang Berpusat Pada Keluarga Dalam Perawatan Intensif Neonatal Dan Anak: Model Implementasi, Hasil Orang Tua, Dan Perspektif Profesional Kesehatan

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ABSTRACT

Background: Global neonatal deaths reached 2.28 million in 2023, with high prevalence of stress, anxiety, and depression among parents of infants in Neonatal Intensive Care Units (NICUs) and Pediatric Intensive Care Units (PICUs). Family-Centered Care (FCC) is needed to address the fragmentation of implementation models, parental outcomes, and health professional perspectives. **Objective:** To map FCC implementation models, evaluate the impact on parental stress, and summarize experiences and barriers of healthcare workers in NICU/PICU. **Methods:** Systematic literature review using PRISMA 2020 on PubMed, Scopus, Web of Science, and Google Scholar (2020-2025), with PICOS framework. From 3,047 articles screened, 16 mixed-methods, qualitative, and RCT studies were included. **Results:** FCC models such as FICare and Close Collaboration improved parental participation, infant growth, and satisfaction; however, mothers are at higher risk of distress despite high participation. Structural barriers (space, staff) dominate. **Conclusions:** Structured FCC effectively improves clinical and family outcomes, but persistent parental distress occurs due to limited resources. **Suggestion:** Adopt contextual FCC with organizational support, framework standardization, long-term evaluation, and cost analysis.

ABSTRAK

Latar Belakang: Kematian neonatal global mencapai 2,28 juta pada tahun 2023, dengan prevalensi stres, kecemasan, dan depresi yang tinggi di antara orang tua bayi di Unit Perawatan Intensif Neonatal (NICU) dan Unit Perawatan Intensif Anak (PICU). Perawatan yang Berpusat pada Keluarga (FCC) diperlukan untuk mengatasi fragmentasi model implementasi, hasil orang tua, dan perspektif profesional kesehatan. **Tujuan:** Untuk memetakan model implementasi FCC, mengevaluasi dampak pada stres orang tua, dan merangkum pengalaman dan hambatan petugas kesehatan di NICU/PICU. **Metode:** Tinjauan literatur sistematis menggunakan PRISMA 2020 pada PubMed, Scopus, Web of Science, dan Google Scholar (2020-2025), dengan kerangka kerja PICOS. Dari 3,047 artikel yang disaring, 16 studi metode campuran, kualitatif, dan RCT dimasukkan. **Hasil:** Model FCC seperti FICare dan Kolaborasi Erat meningkatkan partisipasi orang tua, pertumbuhan bayi, dan kepuasan orang tua; Namun, ibu berisiko lebih tinggi mengalami tekanan meskipun partisipasi tinggi. Hambatan struktural (ruang, staf) mendominasi. **Kesimpulan:** FCC terstruktur secara efektif meningkatkan hasil klinis dan keluarga, tetapi tekanan orang tua yang terus-menerus terjadi karena sumber daya yang terbatas. **Saran:** Mengadopsi FCC kontekstual dengan dukungan organisasi, standarisasi kerangka kerja, evaluasi jangka panjang, dan analisis biaya.

INTRODUCTION

Neonatal and infant mortality rates are critical indicators of global public health that reflect the quality of a country's health care system. Based on the latest data fromCountdown 2030, globally there will be 2.28 million neonatal deaths in 2023, with Neonatal Mortality Rate (NMR) reached 17.33 per 1,000 live births [1]. Although there has been a decline of 56.42% since 1990, this figure is still far from the targetSustainable Development Goals(SDGs) 3.2 which targets NMR below 12 per 1,000 live births by 2030 [2]. World Health Organization (WHO) reports that in 2022, nearly half (47%) of all deaths in children under 5 occurred in the neonatal period (the first 28 days of life)[3].

In Indonesia, the neonatal mortality situation is still concerning. Data from the Ministry of Health of the Republic of Indonesia in 2024 shows that there were 33,131 deaths of infants and toddlers, with 26,657 deaths (80.46%) occurring in the neonatal period (0-28 days)[4]. The main causes of neonatal mortality include respiratory and cardiovascular disorders (24.6%), low birth weight and prematurity (22.8%), infections (18.4%), and congenital malformations (12.5%)[5]. Hospitalization of an infant or child in an intensive care unit is a very stressful and traumatic experience for parents[6, 7]. Studies have shown that parents of babies admitted to the NICU experience significantly higher levels of stress, anxiety, and depression than parents of healthy babies[8].

On the other hand, healthcare professionals, particularly nurses in the NICU and PICU, face a variety of complex challenges in implementing optimal care for critical patients and their families. High workloads, non-ideal nurse-patient ratios, limited material and infrastructure resources, and lack of organizational support are factors affecting nursing practices in intensive care units [9]. In addition, health workers also experience significant emotional distress in dealing with critical situations, uncertain patient prognosis, and the need to communicate effectively with families who are experiencing distress [10, 11]. In this context, the Family-Centered Care (FCC) is becoming increasingly relevant and urgent as a strategy to improve patient and family outcomes[12].

Family-Centered Care (FCC) is a comprehensive paradigm that emphasizes collaboration between health professionals, patients, and families to meet the emotional, social, and developmental needs of pediatric patients[13]. The FCC model is built on four core principles: (1)Respect and Dignity(respect family values, beliefs, and choices), (2)Information Sharing(complete, accurate, and unbiased communication), (3)Participation(encourage family participation in care and decision-making), and (4)Collaboration(collaboration between healthcare workers, patients, and families at all levels of care)[9]. The concept of FCC in NICU and PICU has evolved drastically in recent decades, with key attributes including: care taking of family, equal family participation, collaboration, respect and dignity, and knowledge transformation[14].

The implementation of FCC principles has been shown to have a significant positive impact on various aspects of child health care. From a patient perspective, FCC is associated with increased Outcome clinically measurable, including weight gain in premature infants, increased rates of exclusive breastfeeding, improved physiological stability, and decreased length of stay (LOS) in hospital[15]. A Scoping Review 2023 against 11 studies on Family Integrated Care (FICare) suggests that this intervention has a positive effect on an increase in breastfeeding rates on discharge from the NICU, with seven studies reporting significant results[16].

Recent literature reviews show that research on FCC in the NICU and PICU still tends to be fragmented. The heterogeneity of the types of interventions, the definition of FCC elements, and the variety of indicators and outcome instruments used in the various studies also make it difficult to draw strong conclusions and hinder the development of a standard implementation framework. This gap underscores the urgency of the preparation of a Systematic Literature Review (SLR) that specifically integrates the three main dimensions of the FCC in the NICU and PICU, namely the implementation model, outcomes in the elderly, and the perspective of health professionals.

This SLR is designed to map and compare FCC implementation models that have been tested in NICU and PICUs, assess their impact on parental stress, anxiety, depression, satisfaction, and participation, and summarize the experiences, barriers, and needs of healthcare workers in implementing the FCC. The comprehensive synthesis is expected to serve as a scientific basis for the preparation of practical recommendations, the development of implementation standards, and the planning of follow-up intervention research that is more targeted and contextual, so that the FCC can

truly be operationalized as a viable approach to improve the quality of care and family welfare in neonatal and pediatric intensive care units.

METHODS

This systematic review is designed to identify, evaluate, and synthesize scientific evidence related to the application of family-centered care in neonatal and pediatric intensive care, including implementation models, outcomes in parents, and the perspective of health professionals. Literature searches are conducted through international electronic databases that include PubMed, Elsevier, ScienceDirect and Google Scholar. This review includes any type of study design that describes or evaluates the application of family-centered care in neonatal intensive care units (NICUs) and pediatric intensive care units (PICUs).

During the process of identifying and selecting relevant studies, we use the PICOS framework to ensure consistency and conduct thorough research. The following are the components included in the framework:

Table 1. PICOS Method

	PICOS Components
P (Population)	Neonatal infants (0-28 days) and children (<18 years) who are admitted to the NICU (Neonatal Intensive Care Unit) or PICU (Pediatric Intensive Care Unit)- Families/parents (mothers and fathers) of infants/children treated in intensive care units- Health professionals (nurses, doctors, and other medical personnel) who work in the NICU and PICU.
I (Intervention)	Family-Centered Care (FCC) implementation models in NICU and PICU- FCC intervention.
C (Comparison)	Standard/usual care without FCC intervention, alternative/different FCC implementation models, conventional care without a family-centered approach
O (Outcome)	**Parents:** Stress, anxiety, depression, parental satisfaction and participation parental experiences and perceptions. **Infants/Children:** Weight, exclusive breastfeeding, physiological stability, Length Of Stay (LOS). **Healthcare Workers:** Experience, barriers, and factors facilitating FCC implementation, job satisfaction and workload.
S (Study Defign)	Mixed-methods, Qualitative (Ethnography, Case Studies, Descriptive), Randomized Controlled Trials (RCT), Quasi-Experimental, and Cross-sectional Studies.

The literature search strategy is comprehensively compiled by combining relevant search terms using Boolean operators (AND, OR, NOT) to optimize the sensitivity and specificity of search results. Searches were conducted on electronic databases including PubMed, Elsevier, ScienceDirect and Google Scholar with a publication time range from January 2020 to December 2025 to ensure the relevance and novelty of scientific evidence on the progress of the implementation of Family-Centered Care in NICU and PICU.

Search keywords in English include a combination of the following terms: ("family-centered care" OR "family-centred care" OR "family-integrated care" OR "Close Collaboration with Parents") AND ("neonatal intensive care unit" OR NICU OR "pediatric intensive care unit" OR TRIGGER) AND ("parental stress" OR depression OR anxiety OR "parent participation" OR "parent satisfaction" OR "family presence" OR nurse OR "healthcare professional" OR barrier* OR facilitator* OR implementation). The search was also conducted in Indonesian using the terms: ("Perawatan berpusat keluarga" OR "Perawatan terintegrasi keluarga") AND ("Unit perawatan intensif neonatal" OR "NICU" OR "Unit perawatan intensif anak" OR "PICU") AND ("Implementasi" OR "Model" OR "Hasil orang tua").

After initial identification, a total of 3,047 articles were found, with the following distributions: PubMed 293, Elsevie 347, Google Scholar 1,860, and ScienceDirect 574. After screening based on inclusion-exclusion criteria to determine the relevance and quality of the article, a total of 16 articles were selected for full-text review. To ensure systematic identification and inclusion of studies, the selection method adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency, reproducibility, and completeness of reporting of review results. The PRISMA flowchart used throughout this procedure is illustrated in the following figure 1:

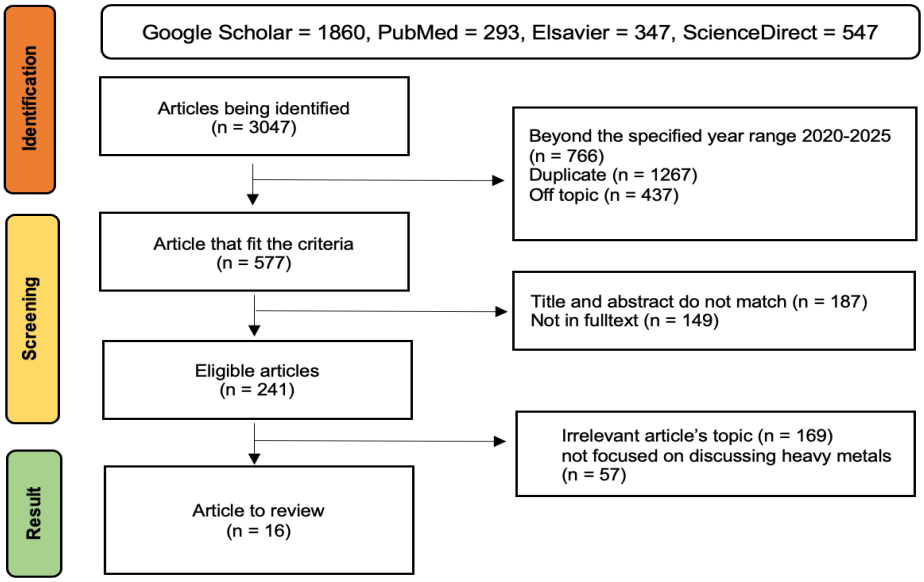

Figure 1. PRISMA Flowchart

RESULTS

Table 2. Analysis Results

Yes	Author (Year)	Title	Country	Sample	Purpose, Method, Design & Instrument	Key Results (Brief, to the point)	Database
1	[17]	Close Collaboration with Parents intervention improves familycentered care in different neonatal unit contexts: a pre–post study	Finland	Staff and parents in 8 level II–III NICUs	Pre–post mixedmethod study. Educational intervention "Close Collaboration with Parents" for all multiprofessional teams. Quantitative data using the Bliss Baby Charter audit tool, equipped with semi-structured interviews with staff and parents.	After the intervention, the FCC's quality score (information, collaboration, support, parental involvement) increased significantly in all NICUs; Learning staff trust parents' ability to care for babies even in intensive phases, and parents are more present and involved in decision-making.	PubMed
2	[18]	Effectiveness of the Close Collaboration with Parents intervention on parentinfant closeness in NICU	Finland	Parents of infants treated in 9 NICUs (pre- and post-intervention periods)	Pre–post quantitative study. Measuring parental attendance and duration of skintoskin contact (SSC) before and after the Close Collaboration with Parents program. Data are taken from parents' diaries and staff records.	Interventions improved parent-infant closeness: average SSC increased from 76 to 114 minutes/day; in the adjusted model, SSC increased ±24 minutes/day (p≈0.04). Parental presence in the NICU is also increasing, supporting the hypothesis that physical proximity is mediating the benefits of FCC-based interventions.	PubMed
3	[19]	Assessment of feasibility and acceptability of familycentered care implemented at a neonatal intensive care unit in India	India	395 parents and health workers in 1 tertiary NICU New Delhi	Prospective cohort. Testing the FCC model based on parental participation: audiovisual training, involvement in KMC, breastfeeding, developmental care, and home readiness.	The FCC proved to be feasible and acceptable: the majority of parents completed all training modules and were able to perform basic infant maintenance; Staff reported that the new standard of conduct	PubMed

					Feasibility & acceptability is measured through training engagement, implementation compliance, and staff & parent feedback.	(not separating infants from parents) could be implemented without interfering with clinical care. The study supports FCC scaling in Indian NICUs.	
4	[20]	Effectiveness of Alberta Family-Integrated Care on Neonatal Outcomes: A Cluster Randomized Controlled Trial	Canada	10 NICU level II; 353 infants & 308 FICare mothers, 365 infants & 306 control mothers	RCT cluster. The Family-Integrated Care (FICare) model that places parents as the main partners; components: intensive education, parental attendance of at least 6 hours/day, participation in rounds, and joint documentation. Outcomes: growth, breastfeeding, infection, length of care, and maternal stress/anxiety (PSS: NICU, STAI).	FICare was safe and improved several outcomes: daily weight gain and higher proportion of exclusive breastfeeding at home; there was a downward trend in nosocomial infections and shortening length of stay; mothers reported lower NICU stress than controls.	PubMed
5	[21]	Effect of family integrated care on physical growth and language development of premature infants: a retrospective study	China	238 preterm infants (215 followups; 115 FICare, 100 controls) and mothers	A retrospective study of cohorts in a university NICU. FICare: mothers are trained in 13 non-invasive skills-(skin care, KMC, breastfeeding, simple monitoring) and are required to participate ≥3 hours/day. Outcome: weight, length, head circumference 1–18 months of age; developmental score (Gesell DQ) and Early Language Milestone (ELM).	FICare improved linear growth and head circumference at all follow-up points, as well as DQ and ELM scores at 6–18 months of age compared to controls. Multivariate analysis showed that FICare remained positively associated with body length, head circumference, and language development after controlling for confounding factors.	Elsevier
6	[22]	Parental Stress, Depression, and Participation in Care Before and During the COVID19 Pandemic: A Prospective Observational Study in an Italian NICU	Italy	152 parents (91 mothers, 61 fathers) in 1 tertiary NICU; divided into 3 periods: pre-pandemic, low COVID incidence, high	Descriptive design of repeated latitude cuts (3 periods). Instruments: PSS:NICU (stress), Edinburgh Postnatal Depression Scale/EPDS (depression), Index of Parental Participation/IPP (participation).	Overall, median stress, depression, and participation scores did not differ significantly between periods; only the "role of parents" subscore and the item of separation from infants increased slightly when COVID incidence was high. This shows that NICUs with strong FCC policies can maintain parental well-being and participation despite pandemic restrictions.	Elsevier
7	[23]	Parental stress, depression, anxiety and participation in care in neonatal intensive care unit: a crosssectional study in Italy comparing mothers versus fathers	Italy	191 parents (112 mothers, 79 fathers) from 123 NICU babies	Cross-section studies (part of the EPiNICU project). Instruments: PSS:NICU, EPDS, STAIY1/Y2 (ansietas state & trait), IPP. Analysis: median Mood's test, z-proportion test, multivariate logistic regression.	Mothers had significantly higher levels of distress: "high stress" in 45.5% of mothers vs. 24.1% of fathers; depression (EPDS≥12) 43.8% vs. 19.0%; 20% of mothers experienced a combination of stress, depression, and anxiety at the same time. However, mothers also had higher care participation scores (median IPP 19 vs 15).	Elsevier

						The differences remained significant after infant clinical factor control, confirming the need for gender-sensitive psychosocial screening and support in the NICU.	
8	[24]	Parental stress, depression, anxiety and participation to care in neonatal intensive care units: results of a prospective study in Italy, Brazil and Tanzania	Italy, Brazil, Tanzania	742 parents/care givers of 674 infants in 8 NICUs (Brazil=327, Italy=191, Tanzania=224)	Multi-flashlight prospective study. Instruments: PSS:NICU, EPDS, EPDSA (ansietas), STAI (subsample), IPPNICU. Comparing the prevalence of stress, depression, anxiety, and participation rates between countries.	The prevalence of mental disorders is very high in all countries (a combination of 52–65%). Depression is highest in Tanzania, severe stress is highest in Brazil. Treatment participation was highest in Tanzania (median IPP 24), lowest in Italy (18). No consistent association was found between participation rates and low distress; This means that increased participation needs to be accompanied by structured psychological support.	Elsevier
9	[25]	Parent and interdisciplinary professional perceptions of familycentered care in Thai NICU: A qualitative study	Thailand	9 parents and 8 healthcare workers (nurses, doctors, pharmacists) in 1 level IV NICU	Qualitative exploratory studies before COVID19. Face-to-face semi-structured interviews; Inductive Thematic Analysis. Focus on the three elements of the FCC: respect, collaboration, support.	Four main themes: (1) recognizing the unique needs, rights, and values of each family; (2) the need for interdisciplinary parent-team partnerships; (3) limited resources & motivation; (4) understanding the needs of the family and providing assistance/sympathy. Health care workers recognize the importance of the FCC but often view parental involvement as a barrier due to workloads and strict visitation policies.	Science-Direct
10	[26]	Family-centred care change during COVID19	Thailand	185 parents (85 pre, 100 post) and 20 healthcare workers in the same NICU	Quasi-experimental (pre-post) design in a 20-bed NICU during and before COVID19. FCC innovations: information book updates (including ebooks-), flexible 1-hour/day visit schedules, structured phone calls ≥3×/week, and interdisciplinary family meetings. Instruments: Perceptions of Family Centred Care–Parent (PFCCP) and –Staff (PFCCS).	Although physical access was restricted, parents' perceptions of respect, collaboration, support, and FCC's total score increased significantly (median total 2.50→3.43; $p<0.001$). The perception of the staff has not changed meaningfully. This means that communication innovations and procedural flexibility are able to maintain and even improve the FCC experience for families in the context of a pandemic.	Science-Direct
11	[27]	Nurses' perceptions about neonatal intensive care units	Canada & France	202 NICU nurses in 4 university	Secondary analysis of international comparative studies. SSCF questionnaire	The total FCC score of nurses was relatively high (64.8/80). The perception that the unit	Science-Direct

		providing familycentered care are associated with skintoskin contact implementation		level III NICU	(knowledge, attitude, training, implementation of skintoskin contact) and FCC questionnaire (respect, collaboration, support). Pearson correlation analysis between-subscales.	provides FCC is positively correlated with knowledge, attitudes, training, and implementation of SSC (r≈0.17–0.30). The strongest relationship between the "support to family" subscale and SSC training and SSC implementation. The findings show that a strong FCC culture goes hand in hand with good SSC training and practices.	
12	[28]	Perceived barriers of familycentred care in neonatal intensive care units: A qualitative study	Ghana	42 family members, 33 nurses/mid wives, 9 doctors in 2 public tertiary NICUs	Descriptive qualitative design. Data were collected through 24 structured interviews and 12 focus group discussions; thematic analysis using MAXQDA.	Two major themes: barriers from the family side (stress and anxiety, lack of information/education, culture & religion) and barriers from the facilities side (inadequate space & logistics, workload & staff shortage, visitation restrictions, negative attitude of staff). The study confirms that FCC implementation in low-resource NICUs requires structural interventions (space design, staff ratios, visitation policies) as well as communication interventions.	Science-Direct
13	[29]	Parenting in the Neonatal Intensive Care Unit: A Qualitative Study	Turkey	15 parent pairs (30 in-depth interviews, twice per couple)	A descriptive qualitative study with a Gadamerian hermeneutic approach in the secondary level NICU. Data was collected through repeated in-depth interviews (upon entry and before discharge); Thematic Content Analysis.	Six themes: "trust & cocoon effect", "anxiety & conflicting emotions", "bonding & breastfeeding", "fear of taking care of the baby", "ready/not ready to go home", and "need support & recommendations". Parents feel protected by the staff but are very anxious and afraid of touching the baby; Readiness to go home is highly dependent on the education and emotional support of the individual from the nurse. The study confirms the importance of the FCC gradually independent parents while maintaining a sense of security.	Google Scholar
14	[30]	Parents' Views of Family-Centered Care at a Pediatric Intensive Care Unit—A Qualitative Study	Sweden	70 parents of children treated ≥48 hours at 2 PICU	Descriptive qualitative analysis based on free answers to 5 open-ended questions in the questionnaire EMPATHIC30. Deductive–inductive thematic analysis using the framework of Patient and Family-Centred Care	The umbrella theme of "incomplete partnerships": parents are generally satisfied and feel supported and appreciated, but want to be more involved in decision-making and communication that is truly-person-centered. Continuity of staff and	Google Scholar

					(dignity & respect, information sharing, participation, collaboration).	consistent information is a weak point that lowers the family's sense of security at PICU.	
15	[6]	Family Presence at the Pediatric Intensive Care Unit Bedside: A SingleCenter Retrospective Cohort Study	United States	523 PICU patients (<18 years) and family at 1 tertiary children's hospital (Seattle)	Mixedmethods study. Quantitative: secondary analysis of Outcomes Assessment Program data; family attendance was documented per 2 hours in the medical record, analyzed as <80% vs ≥80% of the PICU time by logistic regression (Firth correction). Qualitative: thematic analysis of social worker records in 48 cases with low attendance and 48 cases with high attendance.	Overall, 90.8% of families attended ≥80% of hours of care; however, low attendance (<80%) was more frequent in children with longer care lengths, complex chronic illnesses, and public insurance. In non-white families, the influence of these factors is stronger (e.g., public insurance OR≈4.5 for low attendance). The qualitative analysis shows the main obstacles: previous bad experiences with the health system, lack of social support, and financial pressures. Studies propose family presence as an indicator to target extra support and reduce inequality.	Google Scholar
16	[31]	The Effectiveness of Implementing Family-Centered Rounds in the PICU on Parental Satisfaction	Indonesia	64 patient parents (32 intervention s, 32 controls)	To analyze the effectiveness of the implementation of Family-Centered Rounds (FCR) on patient parental satisfaction in PICU. Design: RCT (Randomized Controlled Trial) with post-test only control group. Method: Consecutive sampling. Instrument: Pediatric Family Satisfaction in intensive care Unit 24 (pFS-ICU 24). Duration: 2 days of intervention. Analysis: Independent t-test to test differences in satisfaction scores between groups	There was a significant difference in the average parental satisfaction score between the FCR group and no FCR (p=0.001, p<0.05). FCR is highly effective in improving patient parental satisfaction in PICU	Google Scholar

Table 3. Important Findings In Literature Review

Determination	Important Findings	Source
Structured FCC Program Implementation Model (FICare, Close Collaboration, FCC India)	Structured programs such as Close Collaboration with Parents and Family-Integrated Care (FICare) that include staff training, intensive parent education, and parental attendance of at least a few hours per day consistently improve the quality of FCC practices, parent–infant closeness, and family involvement in decision-making.	Toivonen 2020; It's 2021; Mary 2021; Murphy 2021; Liang 2022
FICare/FCC Key Component Implementation Model	The components that most determine the success of the model are: structured education for parents, participation in daily care (feeding, KMC, basic care), involvement in the plan of care, peer support, family-friendly environment, and use of educational media (videos, booklets,-e-books). The more complete these components are, the stronger the effect on clinical and psychosocial outcomes.	Mary 2021; Murphy 2021; Liang 2022; Vetcho 2022
Impact Implementation Model on Infant/Child Outcomes	The application of FICare/FCC in the NICU improves the clinical outcomes of infants: better daily weight gain, more optimal linear growth and head circumference, higher language development and developmental scores	Murphy 2021; Liang 2022

	(DQ/ELM), and a tendency to decrease the length of treatment and nosocomial infections compared to standard care.	
Adaptation Implementation Model at low resource settings	The implementation of the FCC in resource-constrained settings (India, Ghana, Tanzania, Brazil) is feasible and acceptable if accompanied by local adaptations: brief training, use of KMCs, simple space arrangements, and hospital policy support. However, limited space, logistics, and nurse-patient ratios remain a major challenge.	Mary 2021; Lazzerini 2024; Abukari & Schmollgruber 2024
FCC Change Implementation Model at COVID19	The pandemic COVID19 initially reduced the physical presence of the family, but innovations (structured visitation schedules, regular phone/video, informational-e-books, interdisciplinary family meetings) were able to maintain and even increase parents' perceptions of the dimensions of respect, collaboration, and support within the FCC, without compromising clinical safety.	Bua 2021; Vetcho 2022
Family-Centered Rounds Implementation Model at PICU	The implementation of Family-Centered Rounds (FCR) at PICU (engaging parents in daily rounds, therapeutic discussions, and decision-making) significantly increased parental satisfaction with care and communication compared to conventional rounds.	Novianti 2023
Parental Outcomes High prevalence of stress, depression, and anxiety	Parents of infants/children in the NICU/PICU show very high prevalence of stress, depression, and anxiety; Up to almost half of the mothers meet the criteria of "high stress" and depressive symptoms, while fathers show lower but still significant numbers. This condition occurs in various countries, both high-income and middle-low.	Bua 2021; Bua 2024; Lazzerini 2024; Yildiz & Besirik 2025
Parent Output Difference between mother vs father	Mothers consistently show higher levels of stress, depression, and anxiety than fathers, but are also more actively involved in infant care. This signifies a double burden: high involvement but also greater risk of psychological distress, so gender-sensitive psychosocial interventions are needed.	Bua 2024; Lazzerini 2024
External Parental Participation vs psychological well-being	Parental participation in care (high IPP score) does not necessarily automatically reduce stress/depression; In some settings, high participation rates actually coexist with high levels of distress. This means that increased participation must be accompanied by structured emotional/psychological support, not just "telling" parents to be more active.	Bua 2021; Bua 2024; Lazzerini 2024
External Parents Physical Proximity & Bonding	Interventions that increase physical closeness (skintoskin contact, longer parental presence in the NICU) improve parent-infant bonding, increase parental confidence, and reduce fear of touching the baby. This proximity is also an important mediator of the FCC's benefits to infant development.	It's 2021; Yildiz & Besirik 2025; Not 2024
External Parents Emotional experience & readiness to return home	Parents describe the NICU/PICU experience as an emotional "roller coaster": a combination of fear, helplessness, gratitude, and hope. Readiness to go home is largely determined by the quality of education, the opportunity to practice caring for the baby in the NICU, and the individual emotional support of the nurse. Without it, many parents feel unprepared, even though the baby is medically stable.	Yildiz & Besirik 2025; Terp 2021
External Parents Family presence at the bedside PICU	In the ICU, the majority of families can attend >80% of the time of care, but children with complex chronic illnesses, long hospital stays, and publicly insured families are at risk of having lower family attendance. In non-white families, the effect of these socioeconomic factors is stronger, indicating structural inequalities that need to be addressed.	Smith 2023
Healthcare Worker Perspectives Positive perceptions of FCC & SSC	Nurses who rated their units "very family-centered" tended to have better skintoskin contact (SSC) knowledge, attitudes, and practices , and were more likely to integrate parents into care. That is, a strong FCC culture goes hand in hand with consistent implementation of SSC as part of developmental maintenance.	Not 2024
Healthcare Worker Perspectives Structural barriers in the NICU	The main obstacles to the implementation of FCC in the NICU are mainly related: inadequate space and facilities for families, high nurse-patient ratios, time constraints, restrictive visitation policies, and the attitude of some staff who still see families as "disruptions" of workflow. Family cultural and religious values can also be an obstacle if they are not accommodated.	Abukari & Schmollgruber 2024; Vetcho 2023
Healthcare Worker Perspective Partnership and communication needs	Health workers and parents in the NICU/PICU emphasize the importance of true partnership: staff value parents' knowledge of the child, involve them in decisions, and communicate openly. When communication is one-way and decisions are dominated by staff, parents feel marginalized and the FCC's concept becomes an "incomplete partnership."	Vetcho 2023; Terp 2021
Perspectives of Health Workers The impact of policy changes (COVID19)	Policy changes during the pandemic required staff to develop new ways to maintain the FCC (e.g., structured calls, limited but consistent visitation schedules, online family meetings). In successful units, staff see that family involvement can be maintained without sacrificing safety, provided there is organisational support and clear guidance.	Bua 2021; Vetcho 2022
Healthcare Workforce Ratio Workload and organizational support ratio	Nurse assessed that the success of the FCC was largely determined by organizational support: clear policies, regular training, adequate staffing, and adequate physical facilities. Without it, even though they personally support the FCC, day-to-day practice remains a revert to the "professionalcentred care" model due to workload pressures.	Not 2024; Abukari & Schmollgruber 2024; Maria 2021

DISCUSSION

FCC Implementation Model in NICU and PICU :

Effectiveness of structured FCC programs

Various FCC interventions are structured such asClose Collaboration with ParentsandFamily-Integrated Care(FICare) shows consistent improvements in the key dimensions of the FCC and family involvement. Multi-professional team training program and parents inClose Collaboration with Parentsimproved FCC quality scores (information, collaboration, support, and parental engagement) across eight tier II–III NICUs and strengthened staff confidence in parents' ability to care for critical infants [17]. The same intervention at the individual level improved parent–infant physical closeness, indicated by an increase in durationSkintoskin Contactand parental presence in the NICU [18]. The FICare model in Canada and China also has a positive impact on growth, language development, breastfeeding success, and the likelihood of a decrease in length of care and nosocomial infections [20, 21]. The results of this SLR are in line withScoping Reviewwhich shows that FICare consistently improves breastfeeding rates and family experiences in NICUs, confirming that the FCC is not just a concept, but an interventional framework that can be operationalized and the results are measured [12, 15, 16].

Key components of success and standardization needs

Cross-study analysis confirms that the effectiveness of the FCC model is highly dependent on the completeness of the intervention components. Structured education for parents, active participation in basic care and medical plans, peer support, family-friendly physical environment, and use of educational media (videos, booklets, etc.)-book) emerged as the ultimate determinant of success [19, 20, 26]. However, the variation in terms and content of interventions between studies was very high; Some programs emphasize physical presence and hands-on care roles, while others focus on communication and emotional support. This heterogeneity complicates direct comparisons and underscores the need for a more standardized and standardized implementation framework for the FCC in child-intensive settings, as well as criticized byMixedMethods Systematic ReviewLatest on Family Partnerships in Pediatric Hospitals [15, 32].

Adaptation in low- and middle-income countries

This SLR makes an important contribution by raising evidence from low- and middle-income countries. Studies in India show that a relatively simple parental participation-based FCC model includes audio training-visual, involvement in KMC, breastfeeding, and homeward preparation can be implemented well and accepted by parents and healthcare workers alike, without interfering with clinical care [19]. Multinational studies in Italy, Brazil, and Tanzania confirm that adaptation of local contexts is decisive, for example the utilization of KMCs and the role of extended families in Tanzania that contribute to the highest participation rates among the three countries [24]. In Ghana, structural barriers such as limited space, staff shortages, and visitation restrictions are major challenges, so FCC intervention requires policy changes and infrastructure improvements, not just staff behavior training [28]. This finding is important for Indonesia, which has similar resource characteristics and requires an FCC model thatfeasibleand sensitive to local culture.

Parental Externalities in the Context of the FCC :

High psychological burden and mother-father differences

These three studies and several qualitative studies in SLR consistently show that parents of NICU infants are at high risk of stress, depression, and anxiety, with the prevalence of a combination of psychological disorders reaching more than half of respondents in some countries [8, 22, 24, 29]. Mothers consistently have higher rates of stress and depression than fathers, as well as higher levels of participation in care, thus bearing the biological and social double burden asprimary caregiver. This pattern is in line with the meta-Recent reviews confirm that psychological distress of NICU parents remains high despite advances in developmental and communication practices, and that women tend to be more susceptible to depressive symptoms and postpartum anxiety [7, 11, 33].

Participation and physical proximity as dual aspects

This SLR highlights an important paradox: parental participation in care increases in many units that implement FCC/FICare, but this is not always accompanied by a decrease in stress and depression. Multinational studies show that although the median participation score is highest in Tanzania, the prevalence of depression remains high, and the relationship between participation and low distress is statistically inconsistent [24]. Similarly, in Italy the participation of mothers is higher than that of fathers, but the rate of distress is also much greater [8].

This indicates that increasing parental roles without adequate psychosocial support can actually reinforce feelings of responsibility and anxiety, especially when families feel less competent or unsupported. On the other hand, interventions that improve physical proximity throughSkintoskin Contactand longer parental presence has been shown to improve parental bonding and confidence, and is associated with better infant developmental outcomes [18, 27, 29]. These findings confirm that the FCC must combine increased participation with emotional mentoring and competency enhancement strategies, rather than simply shifting the burden of care to families.

Emotional experience, readiness to return home, and family presence at PICU

A qualitative study in Turkey described the emotional journey of parents as a "roller coaster" marked by fear, helplessness, and hope, in which readiness to return home depends heavily on the quality of education, training opportunities for caring for the baby, and emotional support from caregivers [29]. In the PICU, studies in Sweden and the United States show that although families generally feel supported, there is still a great need for consistent communication, involvement in decision-making, and a reduction in structural barriers to family attendance at the bedside, particularly for families with low socioeconomic status or previous negative experiences with the health system [6, 30]. These results reinforce evidence from stressor studies at PICU that lack of information, uncertain prognosis, and limited access to children are the greatest sources of stress for parents, so FCC interventions need to explicitly target these dimensions [10, 11].

Health Worker Perspectives and Contextual Factors :

FCC culture and clinical practice

Health care workers' perceptions of the FCC have been shown to be related to more family-oriented clinical practices. International studies involving nurses in Canada and France show that perceived units are highlyFamilyCenteredalso have a level of knowledge, positive attitude, training, and implementationSkinto-Skin Contacthigher [27]. In other words, the FCC's culture is not only reflected in written policies, but is manifested in the daily behaviors that allow for physical and emotional closeness between parents and infants. This is in line with concept analysispatient and familycentered carethat puts knowledge transformation and partnerships at the heart of practice change, not just adding tasks to families [14, 15].

Barriers to health workers

In many low- and medium-resource NICUs, the main barriers to FCC implementation are structural and organizational. Cramped spaces, minimal facilities for families, restrictions on visiting hours, staff shortages, and high workloads make some nurses view parental involvement as an additional burden that interferes with work efficiency [25, 26]. Even in NICUs with stronger FCC cultures, such as in Italy and Thailand, staff still require managerial support, training, and written guidance to maintain FCC practices during crises such as the COVID19 pandemic [22, 26]. These findings are consistent with a narrative study that highlights that the success of the FCC is largely determined by institutional policies, resource allocation, and leadership commitment, not just individual caregiver motivations [9, 12]

The need for true partnership and two-way communication

Qualitative studies in Thailand and Sweden emphasized that parents and health workers alike want a true partnership, where families are seen as experts in recognizing the child's needs, while staff provide clinical expertise and professional support [25, 30]. However, in practice, medical decisions are still often dominated by health workers, and communication tends to be one-way, so parents feel that

they are not fully involved. When continuity of information and consistency of messages between staff is weak, family trust decreases and stress increases, even though the technical aspects of care are good [10, 30]. This indicates the need for FCC intervention that explicitly includes communications training,shared decisionmaking, and ethical reflection for interdisciplinary teams, not just nursing skills training or technical education for parents.

CONCLUSIONS AND SUGGESTIONS

The structured Family-Centered Care (FCC) model in NICU and PICU settings has in many studies been associated with improvements in certain aspects of family-centered practice, parental satisfaction, and parent–infant closeness. However, evidence regarding clinical outcomes for infants and children remains varied, given the heterogeneity in study settings, designs, instruments, and outcome measures. Findings from randomized controlled trials (RCTs) tend to show more robust effects on parental satisfaction and communication quality, while observational and qualitative studies primarily highlight enhanced family engagement and perceived support. Despite these positive indications, parental stress, anxiety, and depression remain high, and implementation continues to face challenges related to structural barriers, organizational culture, and limited resources. Therefore, hospitals need to adopt an FCC model that is contextually adapted, emphasizing education, meaningful participation, two-way communication, psychosocial support, and organizational commitment. Further research should aim to standardize the FCC implementation framework, evaluate its long-term impacts, strengthen the evidence base in PICU and complex cases, and incorporate cost-effectiveness analyses to enable FCC integration into neonatal and pediatric intensive care quality policies.

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