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A review of Challenges Associated with the Implementation of Family- Centered Care in the NICUs of Developing Countries: Challenges and Solutions

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Abstract

Background and Aim: Over the past two decades, the Family-Centered Care (FCC) approach has introduced a new framework for enhancing the quality of healthcare services, especially in Neonatal Intensive Care Units (NICUs). Through the active participation of families in decision-making and care planning, this approach not only strengthens the emotional bond between parents and newborns, but also improves clinical outcomes such as weight gain and reduces medical complications. The aim of this study is to determine the challenges of implementing FCC in the NICUs of developing countries and the role of nurses in addressing these challenges.

Materials and methods: This research was designed as a review article, utilizing PRISMA guidelines for article search and selection. PubMed, Scopus, Web of Science, CINAHL, and Embase databases were used to identify relevant studies published between 2011 and 2024. Ultimately, 45 articles from low- and middle-income countries were selected for final analysis.

Results: The findings indicated that implementing FCC in developing countries faces numerous obstacles and challenges, including limited financial resources, shortages of trained personnel, inadequate healthcare infrastructure, and cultural differences. Studies conducted in these countries show that such limitations hinder the provision of appropriate services to families and their active involvement in neonatal care. Furthermore, the lack of specialized training for nurses and insufficient support from policymakers and hospital administrators pose additional barriers to effective implementation of this approach.

Conclusion: To successfully implement FCC in NICUs of developing countries, it is essential to invest in nurse education and empowerment, strengthen managerial and policy support, and address cultural differences. Providing targeted training programs and establishing suitable infrastructure can help mitigate existing barriers, thereby ensuring better neonatal health outcomes and greater family satisfaction.

Keywords: Family Nursing, Intensive Care Units, Neonatal, Developing Countries, Nurses' Role, Challenges, Solutions.

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Introduction

Family-Centered Care (FCC) is recognized as one of the key approaches to improving health services. Under this model, the family is regarded as a central pillar of care and, rather than merely receiving services, takes an active part in the decision-making and care-planning processes. Over the past two decades, this definition of FCC has notably expanded in specialized fields such as NICUs [1]. Given the importance of early stages of life for healthy infant growth and development, focusing on enhancing care quality during this period is considered essential from social, emotional, and clinical perspectives [2]. In fact, the main goal of FCC in NICUs is to meet infants' emotional and physiological needs more effectively by fostering greater empathy, collaboration, and interaction between healthcare providers and parents [3]. Such interaction has been found to positively influence infants' brain development—a vital and complex process with profound effects on cognitive, social, and emotional growth, particularly in hospitalized neonates. This development is shaped by sensory and social experiences that help to form neural pathways and cognitive skills [4]. The presence of parents and emotional bonding enriches the sensory environment, aiding in neural pathway formation, reduction of stress and anxiety in infants, and provision of a supportive atmosphere. FCC also facilitates cognitive stimulation, as parents can engage in suitable activities to promote their infants' cognitive and motor skills [5].

Evidence further indicates that parental presence and effective skin-to-skin contact, apart from alleviating parental anxiety, increase the secretion of hormones responsible for breastfeeding and improve feeding patterns, ultimately leading to better weight gain in preterm infants. Moreover, parents' close involvement in quickly identifying and responding to an infant's hunger cues enhances feeding frequency and effectiveness. These positive changes set the stage for improved physiological growth and stable infant health, preventing complications associated with inadequate nutrition in preterm infants. Strengthening the emotional bond between parents and infants within the FCC model not only improves parents' psychological well-being, but also markedly affects care quality and overall satisfaction [6-8].

Given these points, FCC—by engaging parents in care processes and clinical decision-making—not only fortifies the emotional bond between parents and preterm infants, but also enhances parental ability to detect and respond to infants' needs, accelerates the acquisition of caregiving skills, and boosts their home care competence after discharge. Evidence from developed countries such as Canada and the United States shows that FCC can shorten NICU stays and facilitate earlier discharge in preterm infants. This is attributed to improved feeding, better management of clinical complications, and reduced parental anxiety, which together make at-home care more feasible[1, 7, 8]. Nevertheless, existing challenges in developing countries—especially limited financial resources, workforce shortages, and inadequate healthcare infrastructure—significantly impact the implementation of FCC in NICUs. For instance, a study by Siva et al. (2023) in India revealed that a lack of nurses and healthcare professionals leads to reduced FCC quality and inability to provide adequate family support [9]. Additionally, a study by Abdul Majid et al. (2018) in Nigeria showed that insufficient infrastructure and limited

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access to proper medical equipment, particularly in rural areas, hinder families' active participation in the care of their newborns [10].

Finally, recent studies indicate that failing to address these challenges can diminish families' trust in the healthcare system, thereby reducing their willingness to collaborate with family-centered care programs [11]. Consequently, to enhance neonatal health outcomes and support families, it is imperative to recognize these challenges and propose effective solutions. Considering the points discussed, it is evident that the family-centered approach in NICUs—particularly in developing countries—holds considerable potential for improving neonatal clinical outcomes, increasing family satisfaction, and alleviating parental stress. However, it seems that there are some challenges that prevent this approach from reaching its full potential [1]. Hence, an examination of nurses' and other healthcare professionals' approaches to these barriers can not only pinpoint the obstacles more accurately, but also provide practical strategies for expanding and implementing this approach.

Methods

This is a review article that was conducted to comprehensively review existing evidence on the family-centered care approach in NICUs in developing countries, as well as the role of nurses in addressing the related challenges and offering strategies to overcome them. In developing the study protocol, standard guidelines, such as the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement, were followed to ensure that processes such as database search, selection, quality assessment, and analysis were conducted in a transparent and systematic manner [12]. To search for articles, several databases recognized for their broad coverage in the fields of medicine and nursing were chosen, including PubMed (incorporating MEDLINE), Scopus, BMC, Web of Science, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Embase. In addition, to broaden the search and locate grey literature or documents not indexed in scientific journals, Google Scholar was also searched for related evidence.

The search strategy was developed using primary keywords and their synonyms in the areas of family-centered care, NICU, developing countries, and nurses' role. For instance, these terms included "Family-Centered Care" OR "Family Integrated Care," "Neonatal Intensive Care Unit" OR "NICU," "Developing Countries" OR "Low- and Middle-Income Countries," and "Nurses' Perspective" OR "Nursing Care" OR "Nurses' Role." Boolean operators such as "AND," "OR," and "NOT" were employed in combination with the keywords to enhance the precision of the search [13]. Moreover, to focus on recent studies, the timeframe for the search was set between 2011 and 2024.

Eligibility Criteria: To be included in this review, studies had to meet the following conditions:

- Type of Study: Systematic or narrative reviews, randomized controlled trials (RCTs), and cross-sectional, descriptive, qualitative, or mixed-methods studies

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addressing family-centered care in NICUs.

- Study Location: Low- or middle-income countries according to the World Bank classification.
- Language of Publication: Articles published in English, Persian or other languages were considered if they had an English abstract.
- Time Period: Articles published from 2011 to 2024.

Studies that specifically focused only on technological aspects or clinical interventions unrelated to nurses' role and approach in family-centered care were excluded. Additionally, duplicate studies and those without full-text availability were removed.

Screening Process: First, the titles and abstracts of retrieved articles were independently reviewed by two researchers, and in cases where the article was deemed relevant or uncertain, it was set aside for a full-text review. In the second stage, the full texts of eligible articles were examined, and suitable studies were finally confirmed based on the inclusion and exclusion criteria. Any disagreement between the two researchers was resolved through discussion and by referring to the predetermined criteria. To extract data, a standardized form was developed according to the study objectives, which included general details of each article (author's name, year of publication, and country of study), the type of study (clinical trial, qualitative, review, etc.), research objectives and questions, the sample and sampling method (if applicable), the main findings related to the barriers and challenges of implementing family-centered care, the role of nurses in family-centered care implementation and the proposed strategies to enhance this approach. Two researchers independently extracted the data from the approved articles, and any consistency or potential discrepancies in the extracted data were then examined.

Results

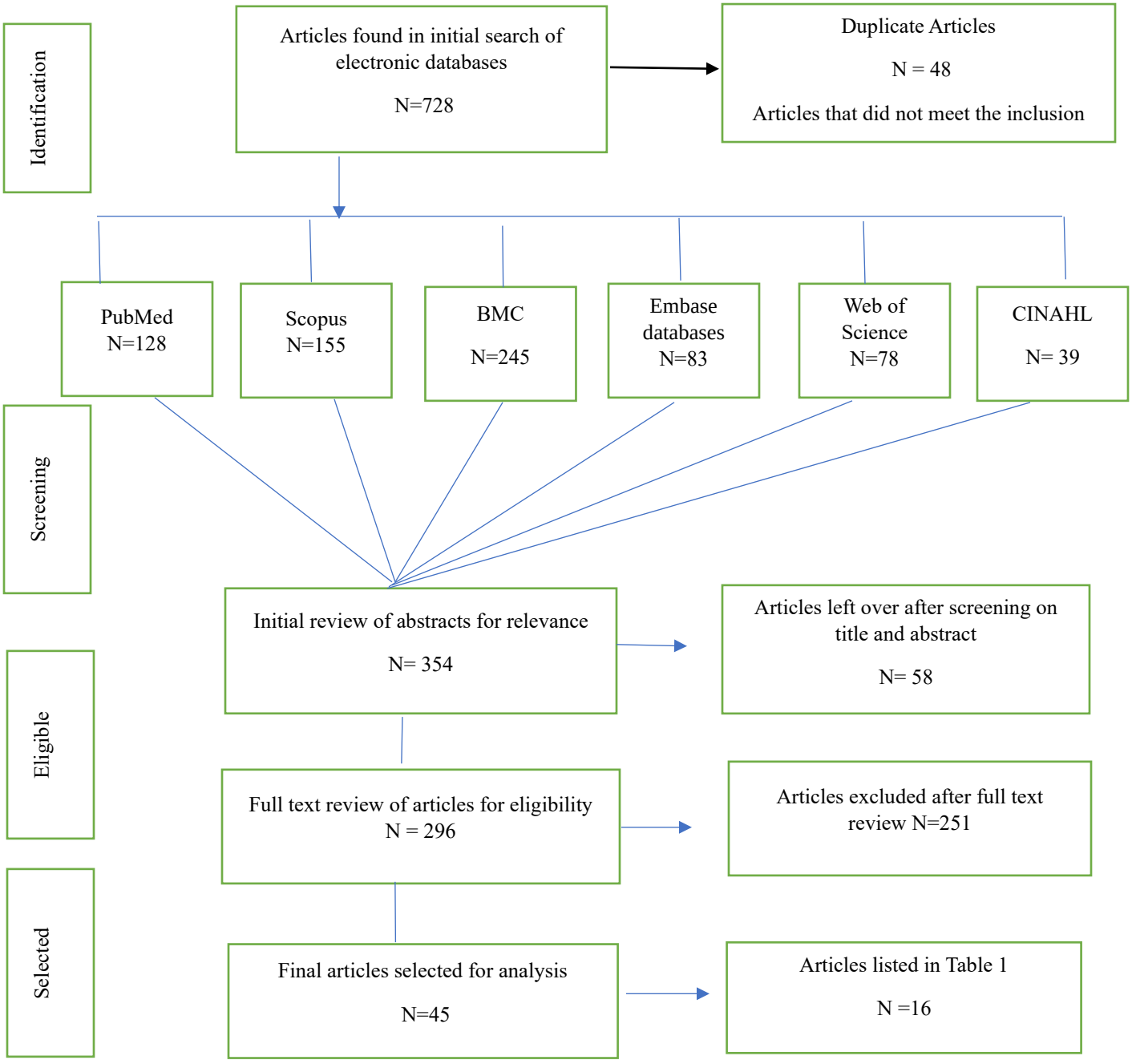
In the initial phase of the search, which was carried out in accordance with the strategy described in the methodology section using the PubMed, Scopus, Web of Science, CINAHL, BMC, and Embase databases, a total of 728 potentially relevant articles were identified. After removing duplicates and reviewing titles and abstracts, 296 articles were deemed eligible for screening. At this stage, studies that did not meet the exclusion criteria—such as lacking a focus on FCC in NICUs, being conducted in developed countries, or lacking full-text availability—were eliminated. Ultimately, 38 articles were deemed suitable for inclusion in this systematic review. In order to ensure a comprehensive search, the reference lists of these articles were also manually reviewed, resulting in the identification of 7 additional articles. Consequently, a total of 45 articles were included in the final analysis. Among these, 16 articles were selected and listed in Table 1. These articles describe the challenges and solutions related to providing FCC (Flow chart1).

Since this research is a review article of previously published studies and does not involve direct interaction with human participants, obtaining a formal ethics approval from a biomedical research ethics

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committee was not required. Nevertheless, throughout all stages, principles of scientific integrity and respect for the rights of original authors were upheld.



Flowchart 1. Searching strategy

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Table 1. Summary of the studies

	Author(s) and Year of Publication/ Country	Type of Study	Challenges	Solutions
1	Ladak et al., 2013/ Pakistan[14]	Non-Randomized Pretest-Posttest Study	-Hesitancy to embrace cultural and structural changes. -Scarcity of human and financial resources. -Absence of specialized training for nursing personnel. -Issues related to cultural and linguistic diversity. -Suboptimal physical layout of the care unit.	-Conducting capacity-building programs. -Developing communication skills. -Revising hospital policies. -Providing appropriate infrastructure.
2	Yu YT et al., 2017/ Taiwan [5]	A randomized controlled trial	-Maternal absence following childbirth (due to the customary). -Difficulties maintaining parental involvement after discharge. -The need for cultural alignment.	- Setting age-specific goals, - recording and evaluating progress, - actively involving fathers in care, -leveraging insurance and healthcare support -adapting care programs to cultural contexts and providing ongoing family education.
3	Maree et al., 2017/ South Africa [15]	Quality Improvement Study (Mixed Methods)	-Limited time and human resources. -Cultural barriers. -The need for organizational culture change.	- Capacity-building and nurse training programs. - Development of communication skills. - Revision of hospital policies. - Provision of appropriate infrastructure, and ongoing support for nurses and families.
4	Verma et al., 2017/ India [16]	Randomized Controlled Trial	- Cultural context and diversity - Study limitations - Resource constraints - Staff attitudes and training	- Training and capacity building of parent attendants. - Adapting and translating FCC principles. - Peer support programs. - Empowering mothers/parent-attendants. - Implementing multidisciplinary support structures. - Enhancing communication and information Sharing.

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5	O'Brien et al., 2018/ International (various countries)[1]	A multicenter, multinational, cluster-randomized controlled trial	- The need for cultural change in NICUs, -Comprehensive staff education and training, -Linguistic and cultural support for parents, -Limited availability of data providing.	-Comprehensive training programs, - Multifaceted support for both parents and staff, - Conducting ongoing evaluations of the program -Expanding research in diverse settings.
6	Phiri et al., 2020/ In developing countries [11]	Integrative Review	-Lack of infrastructure and appropriate medical equipment, -Insufficient time and human resources for nurse training, -Cultural barriers, -Inadequate hospital policies.	- Implementation of capacity-building and nurse training programs, -Development of communication skills, - Revision of hospital policies -Provision of adequate infrastructure, -Ongoing support for nurses and families.
7	Oude Maatman et al., 2020/ International (various countries)[17]	Integrative Review	- Shifting Staff Perspective -Effective Communication -Alignment of Support -Participation in Medical Rounds -Ward Design and Facilities	- Specialized Training and Support -Advanced Communication Skills -Foster Empathy and Reflection -Parental Choice in Participation -Optimized Ward Environment
8	Waddington et al., 2021/ International (various countries)[18]	Descriptive study	-Limited time and human resources, -Cultural and organizational barriers, -The need for specialized training for nurses.	- Conduct capacity-building - Training programs that enhance nurses' knowledge and skills -Developing effective communication skills among nurses, - Revising hospital policies to support family-centered practices, -Ongoing support for both nurses and families -Supporting parents as primary caregivers.

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9	Sivanandan et al., 2021/ India [19]	Non-Randomized Pretest-Posttest Study	- Resistance to adopting cultural and organizational changes. -lack of human and financial resources. -Need for specialized training for nurses. -Cultural and language differences. -Inadequate physical design of the unit.	-Conduct specialized training courses for nurses. -Develop supportive organizational policies. -Improve the unit's physical infrastructure. -Utilize cultural interpreters. -Establish multicultural working groups.
10	Maria et al., 2021/ India [20]	Feasibility and Acceptability Assessment (Mixed Method)	-Forced separation of newborns from parents. -Traditional mindset of healthcare providers. -Issues with adhering to FCC activities. -Fatigue of parent-attendants and providers. -Limited human and financial resources. -Inadequate physical design of the NICUs.	-Training parent-attendants in newborn care. -Sensitization and training of healthcare providers. -Peer support programs for Parents. -Continuous education and empowerment of staff. -Maintaining trained nurses through ongoing sessions. -Adapting FCC principles to cultural contexts. -Implementing infection prevention training within FCC. -Scaling FCC models across various locations. -Implementing COVID-19 transmission prevention measures in FCC.
11	Lee، 2023/ International (various countries) [8]	Review article	-The cultural practice of separating the infant from the mother -Limiting parents to passive visitors. Transitioning from traditional caregiving to a family-centered approach can be difficult.	-To create an environment that enables parents to take an active role in their infant's care, - Provide suitable facilities (such as private rooms in the hospital), -Establish hospital policies grounded in a family-friendly framework - Empower healthcare staff
12	Siva et al., 2023/ India [9]	Quasi-experimental study	-Limited time, -Organizational constraints, -Inadequate training, -Ethical and legal considerations.	-Capacity-building initiatives - Training in communication skills, -Reform of hospital policies, -Ongoing support for both nurses and families

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13	Guarda-Rodrigues et al., 2024/ International (such as Nigerian, Iranian, Ugandan)[21]	Scoping Review	-Cultural barriers, -Lack of specialized training for nurses, -Limitations in financial and human resources.	- Conduct capacity-building and training programs for nurses, - Develop communication skills, - Revise hospital policies, - Provide appropriate infrastructure, - Ensure ongoing support for nurses and families.
14	Kenner and Boykova , 2024/ International (various countries)[22]	Literature Review	-Cultural differences. -Limitations in financial and human resources across different countries. -The lack of specialized training for nurses.	-Establish global standards to improve the quality of neonatal nursing care. -Conducting international training programs. - Facilitating the exchange of knowledge and experiences between nurses and global healthcare centers. - Increasing financial and human resources in NICUs of developing countries.
15	Alqarawi and Alhalal 2024/ International (various countries)[23]	Systematic Review	-Cultural barriers. -Lack of time and human resources. -Financial constraints. -Lack of development of communication skills.	-To conduct capacity-building and nurse training programs. - Revise hospital policies. - Provide appropriate infrastructure, and ensure ongoing support for nurses and families.
16	Bellizzi et al., 2024/ In developing countries [24]	Literature Review	-Cultural differences, limitations in financial and human resources. -The need for global standards. -Lack of specialized training for nurses.	- Conduct international training programs. - Increase financial and human resources in NICU - Facilitate the exchange of knowledge and experiences between nurses and various healthcare centers.

Based on these findings, the following points are presented:

Definition of Family-Centered Care and Its Importance in NICUs

Family-centered care is an approach that advocates for the active participation of family in clinical decision-making and care processes, recognizing family members as equal partners in the care experience [7]. In this perspective, empathy and respect for the family's values, beliefs, and needs form the foundation of optimal care provision. In NICUs—where preterm infants or those with serious medical conditions receive treatment—family presence can play a significant role in reducing infant's stress and improving his/her physical, psychological, and social development [14]. Evidence indicates that successful implementation of

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family-centered approach in NICUs can lead to improved outcomes such as increased infant weight gain, reduced psychological complications among parents, and greater satisfaction with healthcare services [25]. In contrast, in the absence of this approach, parents may experience feelings of powerlessness, emotional isolation, and even prolonged anxiety and depression—factors that indirectly affect the infant's health as well [16].

Structural Barriers in Developing Countries

Developing countries generally refer to nations that, compared to developed countries, rank lower on economic, social, and human development indicators and have not yet fully undergone the processes of industrialization and institutionalization of sustainable socioeconomic growth. Such countries are often characterized by lower per capita Gross Domestic Product (GDP), weaker industrial infrastructure, higher dependence on agriculture, elevated rates of poverty and illiteracy, and limited access to high-quality healthcare and education [17].

According to the World Health Organization (WHO), millions of infants are born each year in developing countries, and a significant portion of them require special care immediately after birth [26]. However, hospital capacity and specialized units in these countries are limited, especially in rural and peri-urban areas where access to specialized services is scarce, and also shortages in financial resources, human capital, and medical equipment place an additional strain on healthcare systems [27]. Under such conditions, when a family-centered care approach is introduced, it becomes essential to provide an appropriate physical environment for parents' presence in the NICU, develop clear guidelines for their admission and participation, and, most importantly, ensure that there are sufficient trained staff to guide this process [7, 19]. Yet in many developing countries, these prerequisites either do not exist at all or are severely restricted.

Nurses' Challenges and Family-Centered Care

In practice, nurses face a range of difficulties that can complicate the implementation of FCC. The high workload and multiple responsibilities in the NICU reduce opportunities for thorough training and meaningful interaction with parents [21]. Moreover, in many healthcare facilities, the shortage of skilled personnel familiar with intercultural communication principles places additional pressure on nurses and can prevent them from providing appropriate support to families [11, 25]. A shortage of specialized nursing personnel is considered one of the primary barriers to implementing family-centered care in developing countries. Nurses working in NICUs require specialized training in areas such as psychology, effective communication with parents, crisis management, and cultural differences [18]. This situation further widens the gap between theory and practice, ultimately preventing healthcare systems from achieving their broader goals of improving neonatal health [17]. In some clinical settings, there are still no formal or clearly defined protocols to encourage parents' active participation in infant care; as a result, nurses must individually take the initiative, which does not always receive sufficient backing or support from management or other members of the care team [9, 14].

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Additionally, a lack of specialized training in parent–infant psychology and stress management represents another challenge for nurses. In situations where parents have negative experiences or hold negative beliefs about their role and presence in the NICU, nurses need specialized skills to change their perceptions and build their confidence [2, 28]. Such skills can only be cultivated and enhanced through ongoing training, clinical practice guidelines, and hands-on workshops—such as simulated exercises for critical communication scenarios [9, 17, 29]. However, securing financial resources and allocating sufficient time to hold such training sessions are typically not high priorities in healthcare systems, imposing an added burden on nursing staff [15, 30].

Moreover, in certain hospitals or healthcare centers, organizational culture or management policies may traditionally limit parents' presence in clinical environments. This is not in line with the fundamental principles of family-centered care, which views parents as essential partners in the care process [18, 23]. As a result, nurses often find themselves caught between a commitment to family-centered care principles and adherence to conservative institutional rules or guidelines. Without adequate authority, they must strive to foster interaction and coordination [31]. Meanwhile, in some of these countries, heavy workload, high burnout rates, and low incomes further decrease nurses' motivation to continue working in such demanding environments [27]. Overall, these challenges highlight that although nurses play a pivotal role in guiding and implementing family-centered care, their success depends on robust support from hospital administrators, health policymakers, and educational structures [18, 23].

Proposed Strategies

1. The Necessity of Training and Empowering Nurses

One of the most effective ways to bridge the gap between the current situation and the ideal state in the NICU is to invest in nurses' training and empowerment [18]. Given that nurses interact with parents more than any other professional, they are best positioned to understand family needs, concerns, and expectations, and to offer strategies that encourage active participation[9]. Training in communication skills, stress management for parents, early detection of anxiety or depression symptoms, and emotional support are all crucial factors that enhance nurses' performance in implementing FCC [17]. Furthermore, awareness of cultural differences and local values can help nurses adapt their care interventions to each family's cultural context [30]. For instance, in some countries, having the father present alongside the mother in a NICU may be considered taboo or at least less common, whereas participation from both parents is deemed essential in FCC programs. Such cultural considerations must be included in nurses' training programs. Moreover, support from hospital administrators and health policymakers in securing financial, material, and human resources for ongoing training programs is vital [23].

2. The Role of Policymakers and Hospital Administrators in Advancing Family-Centered Care

Unfortunately, in many developing countries, health policies are often focused on addressing more urgent issues, such as reducing neonatal mortality or providing minimal standards of care. As a result, FCC may not be a top priority in these countries [32, 33]. Successful implementation of FCC

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in the NICU cannot rely solely on the efforts of nurses and other healthcare team members, as it also demands firm commitment and support of hospital administrators and health policymakers. This support can manifest through the approval and enforcement of clear protocols for parental entry into the unit, the allocation of funds to improve physical infrastructure, or the development of educational and research programs [17]. Additionally, provisions such as facilitating parental access, creating suitable resting and short-term accommodation areas within the hospital, and organizing educational workshops can play a pivotal role in enhancing parents' engagement in the care process [32].

3. Implementing Pilot Projects and Continuous Evaluation

Carrying out pilot projects in various hospitals and assessing their outcomes can help identify the most effective methods and strategies suitable for broad-scale implementation of FCC. Such evaluations may encompass improvements in infants' clinical indicators, parental satisfaction, and the reduction of nurses' workload [6]. Additionally, establishing continues monitoring and evaluation systems can help pinpoint strengths and weaknesses in executing FCC, allowing for the continuous enhancement of FCC processes. Utilizing specific performance metrics and quality standards can aid in assessing the effectiveness of proposed solutions, and enable managers and policymakers to make evidence-based decisions [17, 19]. Therefore, stronger scientific evidence about the economic and social benefits of FCC must be provided. It is also essential to demonstrate that investment in this area not only improves neonatal health outcomes, but also reduces prolonged hospitalization costs and subsequent complications [5, 16].

Discussion

FCC in NICUs has been recognized as an innovative approach for improving both clinical and psychological outcomes of infants and their parents [1-3]. By emphasizing on active family participation in care processes and clinical decision-making, this approach leads to enhanced care quality and increased parental satisfaction [4, 5]. Numerous studies have shown that successful implementation of this approach can reduce parental stress, foster stronger emotional bonds, and improve infants' clinical indicators such as weight gain and reduction of medical complications [1, 3, 5, 9].

FCC, by providing opportunities for skin-to-skin contact between parents and infants, helps to regulate infant stress and anxiety while strengthening neural pathways [3, 8]. Such contact not only aids infants' brain development, but also boosts the secretion of hormones responsible for breastfeeding and improves feeding patterns, ultimately facilitating weight gain in preterm infants [5, 9, 18]. Moreover, active participation of parents in the care process reduces psychological pressure and increases satisfaction with healthcare services [6, 8, 28]. Studies indicate that parental presence in NICUs can enhance clinical outcomes for infants and raise parents' satisfaction with healthcare services [1, 4, 9].

Despite its numerous benefits, the implementation of FCC in developing countries faces multiple challenges. Among the primary obstacles re the shortage of trained personnel and inadequate physical

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infrastructure to support parental presence in NICUs [11, 18, 32]. In addition, the lack of specialized equipment and nurses' heavy workloads limit opportunities to educate parents and promote continuous skin-to-skin contact [9, 18, 23, 30, 32, 34]. These factors hinder nurses from effectively engaging parents in the care process and fully meeting their needs. Furthermore, cultural and social factors in certain communities limit active parental involvement in the infant's care—particularly fathers—and reduce their ongoing presence in the NICU [1, 3, 32, 35]. For instance, Verma et al. (2017) in India found that cultural attitudes can discourage fathers' active participation in infant's care [16]. Similar studies in countries such as Pakistan and South Africa also underscore this challenge [24, 26]. Such circumstances heighten parents' anxiety and sense of helplessness, underscoring nurses' need for communication and intercultural skills.

Nurses serve as a crucial link between parents and the medical team [21, 34]. By educating parents in areas such as infant feeding, stress management, and emotional bonding, they can contribute significantly to the success of FCC [6, 20]. However, fulfilling this role requires proficiency in communication skills, crisis management, and an awareness of cultural differences [22, 23], highlighting the importance of ongoing, up-to-date training for nurses [36-37]. For example, successful educational programs in Canada and Australia have shown that specialized training can enhance nurses' capacity to implement family-centered care and improve infants' clinical outcomes [6, 21]. Moreover, nurses require continuous training in parent–infant psychology and parental stress management in order to effectively interact with parents who have had negative experiences or hold negative beliefs about active participation in care [21, 23]. These training programs should include hands-on teaching methods, simulation workshops for sensitive scenarios, and clinical guidelines, so nurses can apply these skills in real-life settings [36, 37].

Strong managerial support and robust policies are also key factors in the successful implementation of FCC [38, 39]. The creation of clear protocols for parents' entry into NICUs, the allocation of funds to improve physical infrastructure, and the establishment of suitable spaces for parents can all help to increase their involvement in infant's care [18, 35]. For instance, a study by Mwoma et al. (2023) showed that implementing FCC significantly lowered treatment costs and shortened hospital stays for infants in Kenya, demonstrating the economic benefits of this approach [40]. Economic data also suggest that parental participation in care not only decreases complications and shortens hospital stays, but also reduces the expenses of healthcare system. Aliganyira et al. (2014), for example, found that adopting this approach considerably reduced neonatal hospitalization costs in Uganda [33]. Likewise, Masawe (2021) reported that improved FCC led to a marked reduction in long-term complications in Tanzanian infants, thereby cutting associated costs [41]. These findings provide a solid justification for investment in this area [1, 2, 23, 42].

Policymakers should consider the scientific evidence and view investment in FCC as an effective strategy for improving infant health outcomes and lowering long-term healthcare costs [20, 38]. Additionally, the development of supportive policies for nurses and other healthcare personnel—such as raising salaries, alleviating workloads, and creating

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educational opportunities—can boost nurses' motivation to implement this approach [42, 43].

Cultural and social differences play a vital role in the acceptance and practice of FCC. Implementing educational programs that acknowledge cultural variations and local values can help nurses tailor care interventions to each family's cultural setting[21, 24]. Bellizzi et al (2024) observed that in communities where fathers' presence in NICUs is less common, educational programs can teach parents how to take a more active role in caring for their infants [24]. Furthermore, strengthening intercultural communication and fostering an atmosphere of mutual respect in NICUs can increase parental involvement and enhance their sense of belonging. This is particularly important in culturally diverse societies, where culturally sensitive and flexible care is required [21, 34].

To ensure successful adoption of family-centered care, there is a need for operational evaluations of the proposed strategies. Implementing pilot projects in various hospitals and assessing their outcomes can help identify the best methods and strategies suitable for broader application of FCC [21, 42, 43]. Such evaluations may include measuring improvements in infants' clinical indicators, parents' satisfaction levels, and reductions in nurses' workload [21, 35]. Additionally, establishing continuous monitoring and evaluation systems can help identify strengths and weaknesses in implementing family-centered care, enabling ongoing refinements [37]. Pineda et al. (2018) suggested that using clear performance metrics and quality standards can help assess the effectiveness of proposed solutions, allowing managers and policymakers to make evidence-based decisions [25].

Overall, the body of evidence indicates that although family-centered care in developing countries faces structural and cultural barriers, it is implementable through careful planning and managerial support. This approach can enhance infants' brain and physical development, reduce complications, and positively affect the mental health of parents[21, 24]. Investment in nurse empowerment and training, as well as improvement of hospital infrastructure, along with respect for social values and beliefs, are essential prerequisites for successful implementation of FCC in NICUs [22, 25]. Moreover, offering targeted educational programs, encouraging further research, and reinforcing intersectoral collaboration can accelerate the implementation of this model and yield even greater positive outcomes [35, 43].

This study was subject to certain limitations, including the potential for publication bias due to a preference for positive results [44], varying definitions of FCC across different studies [45], and possible search-related errors [37]. Therefore, the findings should be interpreted with caution—preferably by two researchers—and further investigations in this field are recommended.

Conclusion

This review demonstrates that the successful implementation of FCC in developing countries can lead to improved clinical outcomes for infants, higher family satisfaction, and reduced parental stress. Nevertheless, a range of challenges prevents full realization of this approach's potential. The most significant barriers include limited

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financial resources, shortages of trained personnel, inadequate healthcare infrastructure, and cultural differences. Through a comprehensive analysis of the challenges and strategies for implementing FCC in developing countries, this study provides deeper insights into existing challenges and practical solutions to overcome them. Nurses play a critical role in this regard, as a vital link between families and medical team, making their involvement essential to the success of FCC. Consequently, investing in nurses' education and empowerment—particularly in areas such as parent–infant psychology, parental stress management, and intercultural communication skills—is imperative. Such training enables nurses to better understand the needs and expectations of families and to propose effective methods that encourage active participation of parents in the care process.

Moreover, managerial support and health policy-makings by hospital administrators and policymakers are necessary for establishing appropriate infrastructure and securing the financial and human resources required. Developing and enforcing clear protocols for parental presence in NICUs, allocating funds to improve physical infrastructure and equipment, and creating suitable spaces for parents can all boost parents' participation in infant's care. To ensure successful implementation of family-centered care, operational evaluations of the proposed strategies are needed.

This study highlights the substantial benefits of FCC in improving infant health and providing support to families, demonstrating that by adopting the recommended strategies and addressing current challenges, developing countries can fully exploit the potential of this approach. Such an outcome not only enhances clinical and psychological outcomes for infants, but also can raise family satisfaction and reduce long-term healthcare costs. Therefore, investing in nurses' training, upgrading hospital infrastructure, and acknowledging cultural differences are key steps toward the successful realization of family-centered care in NICUs within developing countries. To achieve these objectives, ongoing specialized training courses for nurses should be held in areas such as parent–infant psychology, parental stress management, and intercultural communication skills. Also, hospital administrators and health policymakers should draft clear protocols for parental presence in the NICU, allocate funds to improve physical and equipment infrastructure, and provide suitable spaces for parents. It is also important to consider cultural differences.

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Conflict of Interest

The authors declare that there is no conflict of interest related to this study.

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