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CHANGES IN PARENTING SENSE OF COMPETENCE DURING STRUCTURED FAMILY-CENTRED CARE FOR PRETERM INFANTS IN VIETNAM

Nguyen Minh Thanh Giang*[1], Pham Le My Hanh[1], Nguyen Thi Anh Thu[1], Cam Ngoc Phuong[1]

[1]Tam Anh Ho Chi Minh City Hospital, Ho Chi Minh City, Vietnam.

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***Corresponding Author: Nguyen Minh Thanh Giang**
Tam Anh Ho Chi Minh City Hospital, Ho Chi Minh City, Vietnam.

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ABSTRACT

Objectives: To describe changes in parenting sense of competence among parents of preterm infants during implementation of a structured family-centred care (FCC) programme in a Vietnamese neonatal intensive care unit (NICU).

Methods: This prospective, single-centre, one-group before-and-after study was conducted from March 2025 to March 2026. Parents of infants born at <37 weeks of gestation received parental education, supervised caregiving, breastfeeding and skin-to-skin support, and discharge preparation. The Parenting Sense of Competence–Revised (PSOC-R) was administered at NICU admission, transfer to rooming-in care, and before discharge. Scores were compared using repeated-measures analysis of variance with Bonferroni-adjusted pairwise comparisons.

Results: Of 116 enrolled families, 110 parents completed all assessments, including 101 mothers and nine fathers, representing 113 infants. Mean total PSOC-R scores were 58.40 ± 6.21 at admission, 71.57 ± 4.11 at rooming-in, and 83.47 ± 5.17 before discharge ($P < 0.001$). The reported admission-to-discharge increase was 25.07 points (95% confidence interval, 24.68–25.47).

Conclusion: Parenting sense of competence increased during hospitalisation while the FCC programme was being implemented. Without a concurrent control group, these changes cannot be attributed causally to FCC. Controlled studies, validation of the Vietnamese PSOC-R, and follow-up after discharge are needed.

KEYWORDS: Family-centred care; neonatal intensive care unit; parenting sense of

competence; preterm infant; parental participation.

INTRODUCTION

Hospitalisation in a neonatal intensive care unit (NICU) may disrupt early parent–infant interaction and limit opportunities for parents to participate in their infant's care. Parent–infant separation during neonatal hospitalisation may also delay bonding [1]. Family-centred care (FCC) seeks to involve parents as partners in care and decision-making rather than limiting their role to visiting [2].

FCC programmes may combine skin-to-skin contact, breastfeeding support, parental education, participation in routine infant care, and shared decision-making. Reviews describe potential benefits for parental experiences and infant and family outcomes, but substantial variation in programme components and outcome measures limits direct comparisons between interventions [2,3]. Parenting sense of competence, which comprises perceived efficacy and satisfaction in the parenting role, is one relevant parent-reported outcome [4].

At the study hospital, a structured FCC programme was introduced in March 2025 to support progressive parental involvement in the care of preterm infants. Prospective assessment at successive stages of hospitalisation may help describe how parents' perceived competence changes as they move from NICU admission to rooming-in and discharge.

The primary objective was to describe changes in total Parenting Sense of Competence–Revised (PSOC-R) scores across these three stages. The secondary objective was to examine changes in the Satisfaction and Efficacy domains. The study evaluated changes during programme implementation rather than establishing a causal intervention effect.

MATERIALS AND METHODS

Study design and setting

We conducted a prospective, single-centre, one-group quasi-experimental before-and-after study in the NICU of Tam Anh General Hospital, Ho Chi Minh City, Vietnam, from 1 March 2025 to 31 March 2026. PSOC-R was assessed at NICU admission, transfer to rooming-in care, and before hospital discharge.

Participants

Participants were parents who were directly involved in caring for a preterm infant born at <37 weeks of gestation and admitted to the NICU for at least 5 days which assessed prospectively at enrolment.

Parents were excluded if they were aged <18 years, if the infant had been transferred from another healthcare facility, had a major congenital anomaly, or had a high likelihood of death (based on the treating neonatologist's clinical assessment at enrolment), or if the family declined participation.

Participants were recruited by convenience sampling. One primary caregiver per family contributed to the parent-level analysis; three participating families had twins.

The same designated parent completed all three assessments. The first assessment was conducted before training, the second after completion of sessions 1–5, and the third after completion of all seven sessions and before hospital discharge.

Sample size

The sample size was estimated using G*Power version 3.1.9.7 for a repeated-measures analysis of variance (ANOVA) with a within-subject factor. The assumptions were a two-sided significance level of 0.05, 90% statistical power, an effect size of Cohen's f = 0.15, one study group, three repeated measurements, a correlation of 0.50 between repeated measurements, and a non-sphericity correction of $\varepsilon = 1$. Under these assumptions, the required sample size was 92 participants. To allow for potential loss to follow-up and incomplete assessments, the recruitment target was set at 110 participants.

The calculated minimum sample size was 92, with a recruitment target of 110 to allow for attrition. Of 116 families enrolled, 110 completed all three assessments and were included in the analysis. An effect size of Cohen's f = 0.15 was selected based on findings from previous studies assessing parenting competence.

Measures and data collection

A structured data collection form was used to record selected demographic characteristics of the participating parent and clinical characteristics of the preterm infant.

Parenting sense of competence was assessed using the Parenting Sense of Competence–Revised (PSOC-R), developed by Gilmore and Cuskelly (2024) [4]. The PSOC-R comprises 16 items rated on a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree), with higher scores indicating greater perceived parenting competence. The scale

comprises two domains: Efficacy (10 items; possible score 10–60) and Satisfaction (6 items; possible score 6–36), with a total possible score of 16–96.

The Vietnamese PSOC-R was translated by the research team, reviewed by local experts, and pilot-tested in 25 parents of preterm infants to assess comprehensibility and feasibility. Pilot participants were excluded from the final sample of 110 parents. Internal consistency was not assessed in this study and did not establish full psychometric validity of the Vietnamese version. Higher scores were interpreted as greater perceived parenting competence.

The same designated parent completed three dated PSOC-R assessments: at admission before training (T1), after completion of sessions 1–5 (T2), and after completion of all seven sessions before discharge (T3). Nurses distributed and collected the self-completed questionnaires and were available for clarification. Parents were given privacy and assured that their responses would not affect their infant's care.

Structured family-centred care programme

The programme was delivered by physicians and nurses from NICU admission until discharge. It comprised eight local care standards covering parental presence, psychological support, parental holding during painful procedures, the NICU sensory environment, skin-to-skin contact, breastfeeding support, parent education and assessment, and discharge transition (Table 1). Seven training sessions combined education, supervised skills practice and feedback (Table 2).

The programme comprised seven training sessions delivered across three stages of NICU hospitalisation. PSOC-R was assessed before training at admission (T1), after completion of sessions 1–5 (T2), and after completion of all seven sessions before discharge (T3). The programme was implemented as part of routine clinical care, with progressive parental participation in infant care throughout NICU hospitalisation.

The original implementation algorithm is provided in Figure 1. The seven training sessions were delivered across three care stages rather than on seven consecutive days. PSOC-R assessments occurred before training, after sessions 1–5, and after all seven sessions before discharge. Parental access was extended. The score threshold of 75 was informed by a previous cohort and used as an operational threshold for additional support, rather than a validated PSOC-R cut-off.

Statistical analysis

Data was managed and analyzed using IBM SPSS Statistics version 22.0. Continuous variables

are presented as means and standard deviations (SDs), and categorical variables as counts and percentages. Repeated-measures analysis of variance (ANOVA) was used to compare PSOC-R total and domain scores across the three assessment points. Pairwise comparisons were performed with Bonferroni adjustment when the overall time effect was statistically significant. The assumption of sphericity was assessed using Mauchly's test. When the assumption of sphericity was violated, the Greenhouse–Geisser correction was applied. Statistical significance was defined as a two-sided P value <0.05. Effect sizes and 95% confidence intervals were reported where applicable.

A complete case analysis included 110 parents who completed all three assessments. Six enrolled families did not complete follow-up because of transfer at family request (n = 4) or infant death (n = 2) and were excluded from the repeated-measures analysis. No missing-data imputation was performed.

Ethical considerations

The FCC programme was reviewed and approved as a hospital quality-improvement project by the Quality Improvement Project Review Council of Tam Anh General Hospital, Ho Chi Minh City in February 2025. The review included a research ethics review. All participating parents provided written informed consent. Participation was voluntary, and parents were informed of the study procedures and their right to decline participation.

RESULTS AND DISCUSSION

Results

As shown in Figure 2, 128 families were screened, 11 were excluded because of congenital anomalies (n = 5) or transfer from another NICU (n = 6), and 117 met the inclusion criteria. One family declined participation, leaving 116 enrolled families. Six families did not complete follow-up because of transfer at family request (n = 4) or infant death (n = 2). The complete-case analysis included 110 parents, representing 94.8% of enrolled families (110/116) and 85.9% of screened families (110/128). The final sample comprised 101 mothers (91.8%) and nine fathers (8.2%), caring for 113 infants, including three sets of twins.

Participant and infant characteristics are presented in Table 3. The mean gestational age at birth was 31.5 ± 3.01 weeks. Non-invasive respiratory support was the most common initial mode of respiratory support (98/113, 86.7%). Mean caregiver age was 28.0 ± 3.6 years. High school, college or university education was reported for 90 parents (81.8%), postgraduate education for 19 (17.3%), and primary or secondary school education for one (0.9%). Forty parents

(36.4%) had received previous prematurity education.

Mean total PSOC-R scores increased from 58.40 ± 6.21 at T1 to 71.57 ± 4.11 at T2 and 83.47 ± 5.17 at T3. Satisfaction scores were 22.33 ± 3.61, 27.15 ± 2.81, and 31.45 ± 2.83, respectively; Efficacy scores were 36.07 ± 4.88, 44.42 ± 3.96, and 52.03 ± 3.97. Repeated-measures ANOVA with Greenhouse–Geisser correction showed significant overall time effects for all three outcomes (all $P < 0.001$), with partial eta-squared values of 0.988 for total PSOC-R, 0.753 for Satisfaction, and 0.902 for Efficacy (Table 4).

Pairwise comparisons showed increases in total PSOC-R scores of 13.17 points from T1 to T2 (95% CI, 12.63–13.72), 11.90 points from T2 to T3 (95% CI, 11.49–12.31), and 25.07 points from T1 to T3 (95% CI, 24.68–25.47). Corresponding increases in Satisfaction were 4.83 (95% CI, 3.90–5.75), 4.29 (95% CI, 3.48–5.10), and 9.12 points (95% CI, 8.28–9.96). Increases in Efficacy were 8.35 (95% CI, 7.41–9.28), 7.61 (95% CI, 6.79–8.43), and 15.95 points (95% CI, 15.11–16.80), respectively. All pairwise comparisons were statistically significant after Bonferroni adjustment for three comparisons within each outcome (all adjusted $P < 0.001$); confidence intervals were adjusted using the same method (Table 5).

DISCUSSION

In this prospective study, parents' reported sense of competence increased across three stages of neonatal hospitalisation during implementation of a structured FCC programme. Repeated assessment describes the trajectory of parental perceptions as families moved from admission to rooming-in and preparation for discharge. The findings do not establish which programme components contributed to the observed change.

Several explanations may account for this pattern. Parents may gradually become more familiar with the NICU environment and the specific needs of a preterm infant; repeated education and supervised practice may provide opportunities to acquire and rehearse caregiving skills; and feedback from nurses and physicians may reinforce confidence. Rooming-in may also provide a more direct opportunity to assume day-to-day caregiving responsibilities before discharge. These explanations are plausible in the context of the programme, but the study did not measure exposure to individual FCC components, programme fidelity, or the contribution of each component. The observed changes therefore cannot establish which elements, if any, were responsible for the increase.

Khodabandeh Shahraki et al. evaluated FCC and parenting competence in a quasi-experimental study of parents of preterm neonates [5]. Its comparison-group design provides a stronger basis for assessing intervention-related differences than the uncontrolled design used here.

Differences in setting, intervention content and outcome measurement also limit comparisons of effect magnitude.

Recent reviews describe heterogeneous FCC interventions and parent- and infant-related outcomes [2,3]. Their findings support evaluating clearly specified programmes with consistent outcome measurement. The present study contributes a description of programme implementation and repeated parent-reported outcomes at one Vietnamese NICU; it does not identify a universally effective FCC package.

The timing of measurement is important when interpreting the observed trajectory. At admission, caregivers may have had limited experience with the infant's clinical needs and may have been coping with uncertainty associated with preterm birth and NICU admission. Later measurements were obtained after further contact with the infant and additional opportunities for education and caregiving. Consequently, increasing scores may reflect several overlapping processes: adaptation to the hospital environment, growing familiarity with the infant, changes in the infant's clinical stability, participation in the FCC programme, and the natural progression toward discharge. Because these influences were not separated analytically, the relative contribution of FCC cannot be determined.

Evidence from other support approaches also warrants careful interpretation. Nieves et al. reported lower parental stress with a parent-empowerment programme, while satisfaction was high in both study groups [6]. Garfield et al. evaluated a smartphone intervention using a pilot randomised design [7]. Such interventions differ in delivery, timing and outcomes and should not be treated as equivalent to the FCC programme described here.

From a clinical and service perspective, the findings support the usefulness of assessing parental sense of competence at more than one point during NICU care. Repeated assessment may help teams identify when caregivers report lower confidence and structure education, supervised practice, and discharge preparation around the progression of care. The programme described here combines education with opportunities for direct participation and ongoing professional support; this integrated approach is relevant to NICUs seeking to formalise parent involvement. Nevertheless, this study did not evaluate implementation fidelity, staff workload, resource requirements, cost, or infant outcomes. It therefore does not establish the programme's cost-effectiveness or demonstrate that increasing PSOC-R scores leads to better post-discharge outcomes.

Strengths and limitations

This study has several limitations. First, the one-group before-and-after design did not include

a concurrent control group. Changes in PSOC-R scores may reflect the FCC programme, but they may also be explained by parental adaptation, accumulated caregiving experience, changes in infant condition, or other time-dependent factors. Statistical significance across repeated measurements does not resolve this limitation and should not be interpreted as proof of causation.

Second, the study was conducted at one hospital and used convenience sampling. The findings may not be generalisable to NICUs with different admission profiles, staffing models, visiting policies, family resources, or approaches to parental participation. The sample also included relatively few fathers; consequently, the results primarily represent mothers' experiences and may not capture the needs or trajectories of fathers and other caregivers.

Third, the study was not designed to compare trajectories across clinical or demographic subgroups. The data therefore do not support conclusions about whether changes differ by gestational age, parity, previous antenatal education, or other caregiver and infant characteristics. Such analyses would require a prespecified approach and adequate sample sizes within relevant subgroups.

Fourth, PSOC-R is a self-reported measure and may be influenced by social-desirability or response-shift effects, particularly when the same caregivers complete the questionnaire during a programme in which staff actively encourage parental participation. The Vietnamese questionnaire was translated, reviewed by local experts, and pilot-tested for comprehensibility and feasibility; however, these steps do not constitute full psychometric validation. Measurement equivalence, reliability, and construct validity in Vietnamese parents of preterm infants remain to be established. In addition, without an established minimally important change for this population and language version, the clinical significance of the numerical increase cannot be determined from statistical significance alone.

Finally, assessments ended before discharge. The study cannot determine whether perceived competence remained higher after families returned home or whether changes were associated with sustained caregiving confidence, parental mental health, healthcare use, or infant outcomes. These questions are important because transition from the NICU to home introduces new responsibilities and challenges that are not captured by a discharge assessment.

In addition, the analysis was limited to programme completers; exclusion of families whose infants died or were transferred may introduce attrition bias. Assessment points were linked to care transitions rather than fixed elapsed times, and the time spent in each stage was not reported.

Future research should address these limitations through controlled, preferably multicentre

studies with clearly specified intervention components and a concurrent comparator. Studies should prespecify the primary outcome and analysis plan, report effect estimates with confidence intervals, and evaluate programme fidelity, parental exposure, and implementation requirements. Multicentre recruitment would improve the assessment of generalisability across Vietnamese NICUs. Further work should also validate the Vietnamese PSOC-R, include fathers and other caregivers, and follow families after discharge to assess the persistence and practical relevance of changes in perceived competence. Where feasible, implementation and economic outcomes should be measured alongside parent-reported outcomes.

Table 1. Family-centred care standards implemented in the study.

No.	Standard	Implementation
1	Parental presence	Visiting hours were extended and parents were encouraged to spend more time with their infants, with a target of at least 4–5 hours per day.
2	Psychological support	Parents were regularly updated on changes in their infant's clinical condition and encouraged to participate in treatment-related decision-making. Mothers were encouraged to communicate regularly with the attending physician and the Director of the Neonatal Centre regarding their infant's health status and to receive psychological counselling when necessary.
3	Manage neonatal pain through parental holding	Mothers were encouraged to hold their infants during blood samplings whenever clinically appropriate, allowing parental contact to be maintained during potentially painful procedures.
4	Control the NICU environment (light and noise)	Staff members were regularly reminded to reduce noise levels and maintain an appropriate sensory environment within the NICU.
5	Early and continuous skin-to-skin contact	Skin-to-skin contact was initiated as early as possible and maintained continuously when clinically feasible. A private, adequately equipped family room was provided to facilitate continuous skin-to-skin contact after the infant was transferred to rooming-in with the parents.
6	Support breastfeeding and maternal milk expression	The importance of breast milk was emphasised to mothers. Mothers were encouraged to express breast milk at the infant's bedside, with breastfeeding and milk-expression support available 24 hours a day.
7	Provide parental training and assess PSOC	Parents received training in infant-care skills according to predefined sessions, with PSOC assessed at each designated stage of the programme.
8	Ensure a smooth transition from NICU to home	A discharge plan was developed, including familiarisation with the home-care environment before discharge, completion of follow-up arrangements, and provision of information on post-discharge care and follow-up contacts.

Table 2. Parental training sessions.

Session	Content	Duration and implementation
1	Basic knowledge of preterm infant care: • Discussion of the specific characteristics of preterm infants. • Differences in physical characteristics between term and preterm infants. • Explanation of why the infant is preterm and the gestational age at birth.	45 minutes • Theoretical instruction combined with group discussion
2	Basic infant-care skills: • Techniques for bathing and caring for preterm infants. • Techniques for changing diapers and positioning the infant according to medical instructions. • Procedures and methods for expressing breast milk and bottle-feeding. • Provision of knowledge about safe sleeping positions for infants.	45 minutes–1 hour • Practical skills training at the bedside
3	Kangaroo Mother Care (KMC): • In-depth training in the techniques, benefits, and procedures for implementing skin-to-skin contact according to the KMC protocol.	45 minutes–1 hour • Theoretical instruction combined with practical demonstration
4	Preparation for transition from hospital to home: • Discussion of the mother's role and responsibilities after discharge. • Guidance on caring for the infant and recognising abnormal signs. • Counselling on the importance of neonatal screening tests, vaccination schedules, and safe medication use. • Provision of information on neonatal care services in the community for emergency situations.	45 minutes–1 hour • Counselling, group discussion, and distribution of instructional materials on infant care
5	Evaluation of training outcomes and problem-solving: • Conduct of a survey and collection of feedback from parents regarding the training process. • Answering questions and clarifying issues that remain unclear.	45 minutes–1 hour • Knowledge assessment and question-and-answer session (Q&A)
6	Familiarisation and adaptation to the care environment: • Introduce parents to the NICU environment, equipment, and safety regulations. • Provide guidance and practice on basic mandatory hand-hygiene procedures to ensure infection prevention and control before contact with the infant. • Provide additional explanations as needed to strengthen parents' caregiving skills.	45 minutes–1 hour • On-site guidance and instruction • Infection prevention and control practice

Session	Content	Duration and implementation
7	Direct bedside clinical caregiving practice: • Invite parents into the neonatal unit to actively participate in caring for their own infant. • Under the direct supervision and guidance of nurses, parents perform simple caregiving activities, including feeding, breastfeeding, bathing, maintaining body temperature, changing diapers, and cleaning the infant's personal items.	45 minutes–1 hour • Direct clinical practice under nursing supervision

Table 3. Characteristics of infants and participating parents.

Characteristics	Value
Infant characteristics (n=113)	
Gestational age at birth (weeks), mean ± SD	31.5 ± 3.01
Gestational age group, n (%)	≤28 weeks: 6 (5.3) 29–32 weeks: 24 (21.2) >32 weeks: 83 (73.5)
Birth weight (g), Mean ± SD	1962.5 ± 767.1
Sex, n (%)	Male: 68 (60.2) Female: 45 (39.8)
Length of hospital stay (days), Mean ± SD	36.4 ± 4.5
Clinical characteristics	
Mode of delivery, n (%)	Vaginal delivery: 78 (69.0) Cesarean section: 35 (31.0)
Initial respiratory support, n (%)	No respiratory support: 7 (6.2) CPAP/NIV: 98 (86.7) Mechanical ventilation: 8 (7.1)
Caregiver characteristics (n=110)	
Age (years), Mean ± SD	28.0 ± 3.6
Participant, n (%)	Mother: 101 (91.8) Father: 9 (8.2)
Number of children, n (%)	One child: 56 (51.0) Two or more children: 54 (49.0)
Educational level, n (%)	Primary/secondary school: 1 (0.9) High school/college/university: 90 (81.8) Postgraduate: 19 (17.3)
Occupation, n (%)	Office worker: 58 (52.7) Healthcare worker: 24 (21.8) Self-employed/business: 28 (25.5)
Urban residence in Ho Chi Minh City, n (%)	63 (57.3)
Previous prematurity education, n (%)	40 (36.4)

Infant denominator: 113; parent denominator: 110. CPAP, continuous positive airway pressure; NIV, non-invasive ventilation.

Table 4. PSOC-R scores across three assessment points.

Outcome	Admission	Rooming-in	Before discharge	P value[1]	Partial η^2
Total PSOC-R score	58.40 ± 6.21	71.57 ± 4.11	83.47 ± 5.17	< 0.001	0.988
Satisfaction score	22.33 ± 3.61	27.15 ± 2.81	31.45 ± 2.83	< 0.001	0.753
Efficacy score	36.07 ± 4.88	44.42 ± 3.96	52.03 ± 3.97	< 0.001	0.902

Values are mean ± SD; n = 110 at each assessment. PSOC-R, Parenting Sense of Competence–Revised. [1] Overall time effect from repeated-measures ANOVA with Greenhouse–Geisser correction.

Table 5. Pairwise changes in PSOC-R scores.

Outcome	Later minus earlier assessment	Mean change	95% CI [1]	Adjusted P
Total PSOC-R score	T2 − T1	+ 13.17	12.63–13.72	< 0.001
Total PSOC-R score	T3 − T2	+ 11.90	11.49–12.31	< 0.001
Total PSOC-R score	T3 − T1	+ 25.07	24.68–25.47	< 0.001
Satisfaction score	T2 − T1	+ 4.83	3.90–5.75	< 0.001
Satisfaction score	T3 − T2	+ 4.29	3.48–5.10	< 0.001
Satisfaction score	T3 − T1	+ 9.12	8.28–9.96	< 0.001
Efficacy score	T2 − T1	+ 8.35	7.41–9.28	< 0.001
Efficacy score	T3 − T2	+ 7.61	6.79–8.43	< 0.001
Efficacy score	T3 − T1	+ 15.95	15.11–16.80	< 0.001

[1]Paired-samples t-tests with Bonferroni adjustment for three comparisons within each outcome. Confidence intervals were adjusted using the same method.

T1: before training at admission; T2: after completion of topics 1–5; T3: after completion of all seven topics before discharge.

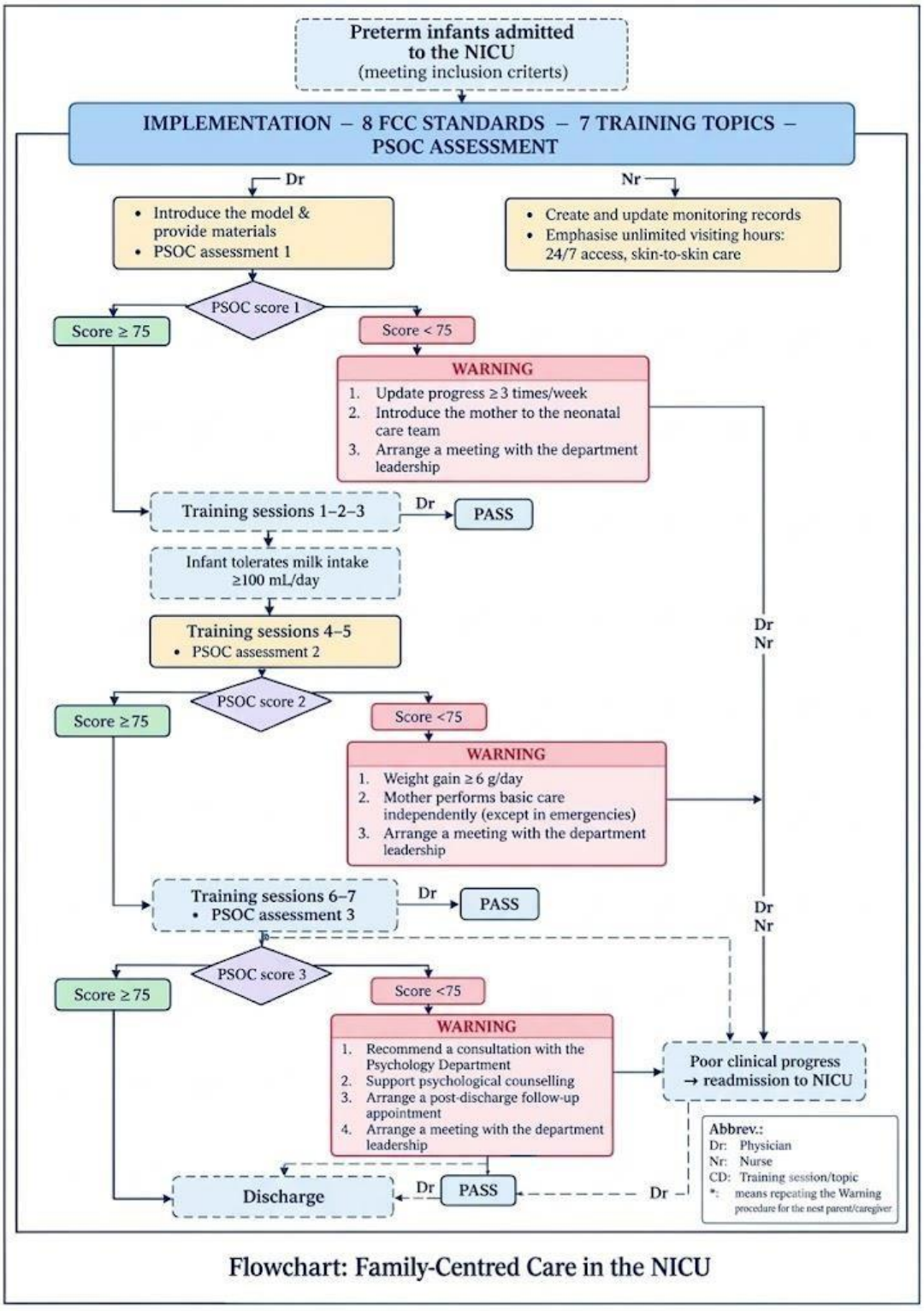


Figure 1. Original family-centred care implementation algorithm.

FCC, family-centred care; NICU, neonatal intensive care unit; PSOC, parenting sense of competence; Dr, physician; Nr, nurse.

Figure 2. Participant flow.

Stage	Families or participants
Screened	128 families
Excluded before eligibility	11 families: congenital anomalies, 5; transfer from another NICU, 6
Eligible	117 families
Declined participation	1 family
Enrolled	116 families
Did not complete follow-up	6 families: transfer at family request, 4; infant death, 2
Analysed	110 parents: 101 mothers and 9 fathers
Infants represented	113 infants; three families had twins

Completion among enrolled families: 110/116 = 94.8%; proportion analysed among screened families: 110/128 = 85.9%.

CONCLUSION

Parenting sense of competence increased from admission to discharge during implementation of a structured FCC programme in a Vietnamese NICU. The uncontrolled design prevents causal attribution to FCC, and the clinical importance and persistence of the change remain uncertain. Controlled multicentre studies with validated Vietnamese outcome measures and follow-up after discharge are warranted.

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Conflicts of interest

The authors declare no conflicts of interest.

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