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Evaluation of the impact of family-centered care training on pediatric nurses' attitudes

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ABSTRACT

Objective: This study aimed to evaluate the impact of structured Family-Centered Care training on pediatric nurses' attitudes toward Family-Centered Care.
Methods: This quasi-experimental study utilized a pretest-posttest control group design with 140 pediatric nurses (70 intervention, 70 control). Conducted in public hospitals from March to August 2024, the intervention group received a four-week Family-Centered Care training. The Family-Centered Care Attitude Scale was used to measure attitudes, and data collection included a demographic data form administered both before the training and six weeks after its completion. Statistical analysis included *t*-tests and chi-square tests.
Results: Nurses in the intervention group showed significant improvement in their attitudes toward Family-Centered Care after training, with higher posttest scores compared to the control group ($P < 0.05$). The control group showed no significant changes between pretest and posttest scores. These findings confirmed the hypothesis that Family-Centered Care training positively influences pediatric nurses' attitudes.
Conclusions: Structured Family-Centered Care training significantly improved pediatric nurses' attitudes toward Family-Centered Care, emphasizing the importance of innovative educational methods in promoting Family-Centered Care adoption in pediatric nursing.
Implications for practice: Incorporating regular Family-Centered Care training into pediatric nursing practices can foster more Family-Centered Care approaches, improve patient and family satisfaction, and promote nurses' professional growth, ultimately enhancing the overall quality of care in pediatric settings.

Introduction

Family-Centered Care (FCC) is an approach in which the care provided to children is planned, implemented, and evaluated collaboratively by the healthcare team and the family. FCC is a comprehensive model with significant impacts on the child's health, family well-being, health policies, healthcare professionals' workload, and care standards (Al-Motlaq et al., 2024; Neal et al., 2007; Öztürk & Ayar, 2014). This model, which emerged approximately 50 years ago to provide the highest level of care for children, is effective in promoting collaboration between the healthcare team and families (Al-Motlaq et al., 2024). FCC is widely accepted and applied globally, from the West to the East (Al-Motlaq et al., 2019; Al-Motlaq et al., 2024). One of the most distinguishing features of FCC is its ability to facilitate harmony among children, families, and healthcare teams, strengthen communication, and enhance patient and family satisfaction. Furthermore, FCC has multifaceted benefits, including reducing anxiety, fostering a sense of security in children, shortening recovery time, managing pain, and supporting growth and development (Al-Motlaq et al., 2024; Neal et al., 2007; Öztürk & Ayar, 2014). For healthcare professionals, FCC increases job satisfaction, reduces burnout, and positively contributes to clinical decision-making processes (Al-Motlaq et al., 2024). A study conducted in Turkey showed that FCC practices reduce anxiety levels in children and families during painful and stressful procedures (Çağlar, 2019). Despite its recognized benefits, studies have shown that both healthcare personnel and pediatric nurses lack sufficient knowledge and appropriate attitudes toward FCC (Al-Motlaq et al., 2024; Aykanat & Gözen, 2014; Boztepe & Çavuşoğlu, 2009; Neal et al., 2007; Tosun & Tüfekci, 2015). For the effective implementation of FCC, it is emphasized that nurses' knowledge levels need to be improved, and structured educational programs are critical in this regard. These programs are

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essential in enhancing nurses' theoretical knowledge and practical skills related to FCC, ultimately playing a key role in improving patient and family satisfaction (Al-Motlaq et al., 2019; Kara & Tufekci, 2024). The COVID-19 pandemic caused restrictions on FCC practices in many clinics, negatively affecting children and their families (Al-Motlaq et al., 2021). Studies have shown that the lack of FCC during the pandemic resulted in increased stress, anxiety, and dissatisfaction among children and families (Acar & Ünal, 2022; Ceylan, 2024; Hart et al., 2020). During this period, it was emphasized that FCC helped families support their children and contributed to faster recovery by making children feel more secure (Mirlashari et al., 2020).

Research conducted with neonatal intensive care and pediatric nurses has shown that nurses' knowledge and attitudes toward FCC are not at the desired level (Al-Motlaq et al., 2019). The literature frequently emphasizes the need to improve nurses' knowledge and attitudes toward FCC (Aykanat & Gözen, 2014; Boztepe & Çavuşoğlu, 2009; Kara & Tufekci, 2024; Öztürk & Ayar, 2014; Tabakçıoğlu, 2019; Tosun & Tüfekci, 2015). Studies with parents have indicated that they expect more effective communication with the healthcare team in neonatal and pediatric units, as well as enhanced safety, comfort, and minimized trauma and pain for their children (Ayvaz & Açıkgöz, 2019; Çağlar, 2019; Ceylan, 2024; Yıldız & Akbayrak, 2014). FCC is a care model well-suited to meet these expectations. However, studies indicate that FCC practices remain inadequately implemented in pediatric units (Arslan & Turgut, 2013; Aykanat & Gözen, 2014; Boztepe & Çavuşoğlu, 2009; Çağlar, 2019; Öztürk & Ayar, 2014; Tosun & Tüfekci, 2015). FCC is suitable for addressing these expectations; however, existing studies predominantly focus on the outcomes of FCC rather than the processes required for its effective implementation, including structured education and targeted interventions to improve nurses' attitudes. This study addresses this gap by developing a structured, theory-based FCC training program tailored for pediatric nurses in Turkey. The program incorporates innovative educational techniques built upon Hovland's Message-Learning Theory (Yale Approach), interactive learning methods, and technology-supported tools. It aims to systematically evaluate and enhance nurses' attitudes toward FCC while providing evidence-based recommendations for integrating FCC into pediatric care practices and exploring the applicability of similar training programs across diverse healthcare settings. In this context, the research focuses on assessing pediatric nurses' attitudes toward FCC and aims to determine the impact of this structured training program on their attitudes.

Materials and methods

Study design

This study was conducted using a quasi-experimental pretest-posttest control group design to evaluate the impact of FCC training on pediatric nurses' attitudes toward FCC. This quasi-experimental design was chosen due to the inability to randomly assign participants to intervention and control groups, a common scenario in clinical and educational research settings. In this design, naturally existing groups (such as nurses working in different pediatric wards) were utilized to measure the impact of the intervention. While randomization was not feasible, steps were taken to minimize biases, such as using different data collection time points for each group and ensuring minimal interaction between participants in the two groups. This design allowed for a controlled comparison of the pre- and post-intervention attitudes, providing robust evidence of the training's impact on pediatric nurses' attitudes toward FCC. The research was carried out in public hospitals in Gaziantep, Turkey between March and August 2024, with two groups: an intervention group and a control group. The intervention group received a four-week training program supported by technological tools, while the control group received no training. Pretests and posttests were administered to both groups before and after the intervention. To minimize interaction between the groups, data collection was conducted at different time points.

Inclusion and exclusion criteria

Inclusion criteria

The study included pediatric nurses working in pediatric wards at public hospitals in Gaziantep who voluntarily agreed to participate in the research. All participants committed to fully participating in the four-week FCC training program.

Exclusion criteria

Nurses were excluded from the study if they had previously received formal training on FCC or if they did not attend any of the scheduled training sessions during the study period.

Study population and sample size

The study population consisted of pediatric nurses working in pediatric wards at public hospitals in Gaziantep. The sample size was determined using G*Power 3.1 statistical analysis software. The calculation was based on a two-tailed independent samples *t*-test, which was selected to compare the mean attitude scores between the intervention and control groups. Parameters included a Type I error rate of 5 % ($\alpha = 0.05$), statistical power of 80 % (1-$\beta = 0.80$), and an effect size of 0.5, which represents a medium effect size as per Cohen's guidelines (Cohen, 1988). This effect size was chosen based on prior studies evaluating the impact of similar training interventions on nurses' attitudes. The minimum sample size required for each group was calculated as 64 participants. To account for potential dropouts and ensure robust statistical analysis, 70 participants were recruited for each group, resulting in a total of 140 participants.

Data collection instruments

In this study, data were collected using a Sociodemographic Data Form and the Family-Centered Care Attitude Scale.

Sociodemographic data form

The Sociodemographic Data Form consisted of 13 questions that captured participants' sociodemographic characteristics, including age, gender, years of professional experience, educational background, and duration of work in pediatric wards.

Family-centered care attitude scale

The Family-Centered Care Attitude Scale was developed by Kara and Tufekci (2024) to assess the attitudes of nurses working in pediatric wards toward FCC. The scale consists of 58 Likert-type items with no reverse-coded items. The items, developed in Turkish language, are scored on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The scale is composed of two factors: Contribution of FCC (items 1–28) and Involvement of Family and Child in Care (items 29–58). It provides three scores: two subscale scores and one overall attitude score. The scores are calculated by summing the items and dividing by the number of items. Scores range from 1 to 5, with higher scores indicating more positive attitudes toward FCC. The 4-point range is divided into five equal categories ($4 / 5 = 0.8$): very low (1.00–1.79), low (1.80–2.59), moderate (2.60–3.39), high (3.40–4.19), and very high (4.20–5.00). The overall reliability of the scale is excellent, with a Cronbach's alpha of 0.978. The Contribution of FCC subscale has a Cronbach's alpha of 0.966, and the Involvement of Family and Child in Care subscale has a Cronbach's alpha of 0.972 (Kara & Tufekci, 2024).

Ethical considerations

The study was approved by the Ethics Committee of Hasan Kalyoncu University (Date: April 4, 2024; No: 2024/54). Additionally, official permissions were obtained from the hospitals where the study was conducted, and written informed consent forms were collected from nurses who agreed to participate in the study. The consent forms were signed during individual meetings with the nurses, and it was clearly explained to the participants that they could withdraw from the study at any time and that the confidentiality of their data would be protected.

Research process

This study was conducted to evaluate the impact of FCC training on pediatric nurses' attitudes by establishing intervention and control groups. Before the main study was conducted, a pilot implementation of the FCC training was carried out with 10 pediatric nurses who were not included in the main study sample. To prevent ethical issues arising from group interactions, the nurses in the intervention group and the control group were selected from different wards within the same hospitals and from different hospitals. The intervention group, consisting of 70 pediatric nurses, received FCC training, while the control group of 70 nurses did not receive any training.

Development of the training program

The FCC training program was systematically developed using evidence-based practices and theoretical frameworks to address pediatric nurses' specific needs. Initially, a comprehensive review of the literature was conducted to identify common challenges and gaps in FCC practices. Feedback from pediatric nursing experts further informed the program design to ensure relevance and applicability in clinical settings. The training was built upon Hovland's Message-Learning Approach (Yale Approach), emphasizing the role of attention-grabbing, memorable, and understandable messages in fostering attitude changes. These principles were integrated into both the content and delivery methods to maximize engagement and effectiveness.

The program was piloted with 10 pediatric nurses to identify potential improvements. Feedback from this phase was incorporated to refine the session content, enhance interactive elements, and optimize the training schedule to better accommodate participants' needs.

Implementation of the training program

The entire training program (both theoretical and practical) was conducted by a single pediatric nurse (the first author), who is also trained in educational technologies. This nurse ensured that the training was tailored to the specific learning needs of pediatric nurses and designed the sessions to enhance the practical applicability of FCC principles in clinical settings. The training was structured based on Hovland's Message-Learning Approach (Yale Approach), which is rooted in the theory that attitudes can be changed through learning processes and was designed to strengthen the nurses' attitudes toward FCC (Lau, 2020). The FCC training aimed to enhance the nurses' positive attitudes toward FCC through innovative educational methods combining theoretical knowledge and practical applications.

The training spanned four weeks, with sessions held twice a week, each lasting approximately 30 min. The sessions were conducted in conference rooms of public hospitals in Gaziantep. To accommodate the participants' schedules, each session was offered at two different times—morning and afternoon. Alternative sessions were provided for nurses unable to attend specific sessions to maintain the integrity of the training. The training program covered both theoretical and practical aspects.

- In the first week, the definition, purpose, key concepts, and historical development of FCC were discussed.
- The second week focused on FCC principles and its impact on children, families, and healthcare teams.
- During the third week, challenges in FCC implementation and comparisons with traditional care models were highlighted.
- The final week concentrated on nurses' roles in FCC.

The sessions incorporated rich multimedia content, including animations, videos, and graphics, to engage participants and enhance the learning process through interactive PowerPoint presentations. Each session concluded with interactive Q&A periods, and the learning process was reinforced using the Quizizz platform. The detailed structure and content of the training program are outlined in Table 1.

Table 1
Educational Framework for FCC Training.

Week	Topics Covered	Educational Methods and Tools	Duration
Week 1	- Definition and Purpose of FCC - Key Concepts and Historical Development - Clinical Importance of FCC	- Interactive Presentations (Animations, videos, graphics) - Group Discussions - Workbooks - Interactive Q&A Sessions - Reinforcement using the Quizizz Platform	30 min × 2 sessions
Week 2	- Principles of FCC - Impact of FCC on Children, Families, and Healthcare Teams - Patient and Family Satisfaction	- Case Studies - Interactive Presentations - Role-Playing Activities - Group Discussions - Interactive Q&A Sessions - Reinforcement using the Quizizz Platform	30 min × 2 sessions
Week 3	- Challenges in FCC Implementation - Comparison with Traditional Care Models - Integration Strategies	- Problem-Solving Workshops - Simulations - Interactive Presentations - Group Discussions - Interactive Q&A Sessions - Reinforcement using the Quizizz Platform	30 min × 2 sessions
Week 4	- Roles of Nurses in FCC - Application of FCC in Clinical Practice - Integrating FCC into Nursing Practice	- Hands-on Training - Action Plan Development - Interactive Presentations - Group Projects - Interactive Q&A Sessions - Reinforcement using the Quizizz Platform	30 min × 2 sessions

Training materials were made accessible via e-learning platforms, allowing nurses to access them at their convenience, creating a flexible learning environment tailored to various learning styles. Additionally, group discussions and workbooks were used to foster interaction among participants and to bridge theoretical knowledge with practical applications. Following the completion of the training in the intervention group, the collected data were analyzed and discussed in light of existing literature.

Pre-test/post-test comparisons

At the beginning of the study, the Family-Centered Care Attitude Scale was administered to both the intervention and control groups. The post-test was conducted six weeks after the completion of the training. Comparisons between the pre-test and post-test scores were made for both groups to evaluate the changes in attitudes.

Data analysis

The data were analyzed using SPSS 20.0, with continuous variables summarized as means and standard deviations, and categorical variables as frequencies and percentages. The Student's t-test was used for continuous variables, and the Chi-Square test for categorical variables. Following data collection, a post-hoc power analysis was conducted using G*Power software to verify the adequacy of the sample size and the strength of the observed effect. Based on the mean and standard deviations of the independent groups, Cohen's d effect size was calculated as 0.84, indicating a large effect size according to established guidelines (Cohen, 1988). The power of the study was determined to be 96 %, which exceeds the commonly accepted threshold of 80 %, further confirming the reliability and robustness of the study's findings.

Results

Characteristics of group participants

In terms of gender distribution, 74.2 % of the nurses in the intervention group and 78.5 % in the control group were female, with no statistically significant difference observed between the groups ($X^2 = 0.059$, $p = 0.808$). Regarding marital status, 67.1 % of the nurses in the intervention group and 68.5 % in the control group were single, again showing no significant difference between the groups ($X^2 = 0.618$, $p = 0.432$). The majority of participants in both groups lived in a nuclear family structure, with 87.1 % in the intervention group and 84.2 % in the control group, and no statistically significant difference was identified between the groups in terms of family type ($X^2 = 8.038$, $p = 0.09$). Educational background showed that 75.7 % of nurses in the intervention group and 95.2 % in the control group held a bachelor's degree, with no significant difference observed between the groups ($X^2 = 5.636$, $p = 0.776$). Similarly, income levels were comparable, as 55.7 % of the nurses in the intervention group and 51.4 % in the control group stated that their income was equal to their expenses, with no statistically significant difference found ($X^2 = 4.195$, $p = 0.650$). In terms of work hours, 45.7 % of nurses in the intervention group and 47.1 % in the control group reported working between 41 and 50 h per week, and no significant difference was observed between the groups ($X^2 = 8.944$, $p = 0.177$). Satisfaction with the profession was also similar, with 55.7 % of nurses in the intervention group and 62.9 % in the control group reporting positive job satisfaction, with no statistically significant difference ($X^2 = 0.066$, $p = 0.798$). In terms of knowledge of FCC, 65.7 % of nurses in the intervention group and 58.6 % in the control group reported being knowledgeable, with no significant difference observed ($X^2 = 0.232$, $p = 0.630$). Additionally, 88.5 % of the nurses in the intervention group and 82.9 % in the control group had not received prior FCC-related training, and no significant difference was found between the groups ($x^2 = 4.918$, $p = 0.860$). The average number of children for nurses in the intervention group was 0.814 ± 1.06, while it was 0.642 ± 0.96 for the control group. In terms of years of service, the average length of professional experience was 6.09 ± 5.07 years for the intervention group and 4.47 ± 4.58 years for the control group. Nurses' perceptions of the importance of FCC were similar, with the intervention group rating it 7.02 ± 2.55 out of 10, and the control group rating it 7.11 ± 2.36.

Overall, no statistically significant differences were found between the intervention and control groups in terms of socio-demographic characteristics, professional experience, job satisfaction, or prior knowledge and training related to FCC ($P > 0.05$). This confirms that both groups were comparable, ensuring the validity of the study's outcomes.

Training effect

As shown in Table 2 there is no statistically significant difference between the Family-Centered Care Attitude Scale scores and the total scores of the nurses in the control and intervention groups based on the pre-test results ($P > 0.05$). However, the post-test results reveal that the nurses in the intervention group scored significantly higher both in the subscale scores and the total score compared to the control group ($P < 0.05$).

As presented in Table 3 there was no statistically significant difference between the pre-test and post-test scores of the nurses in the control group across the subscales and the total score of the Family-Centered Care Attitude Scale ($P > 0.05$). In contrast, the post-test scores of the nurses in the intervention group were significantly higher than their pre-test scores in both the subscales and the total score, and this difference was determined to be statistically significant ($P < 0.05$).

In the study, a post-hoc power analysis was conducted using the G*Power program, based on the mean and standard deviations of the independent groups. As a result of this analysis, Cohen's d effect size was calculated at 84 %, and the study's power was determined to be 96 %.

Upon examining Table 4, it was observed that in the analysis of the total score variable, the pre-test mean scores of the experimental group were 1.709 ± 0.46, and the post-test mean scores were 2.130 ± 0.51. A statistically significant difference was found between these mean scores ($t = 7.106$, $p = 0.001$). In contrast, the pre-test mean scores of the control group were 1.729 ± 0.43, and the post-test

Table 2
Comparison of Pre-test and Post-test Scores of Nurses in the Intervention and Control Groups on the Family-Centered Care Attitude Scale Subdimensions and Total Scores ($N = 140$).

Pre-test	Control Group	Intervention Group	*P*-value
	Mean ± SD	Mean ± SD	
Contribution of Family-Centered Care Subscale	1.771 ± 0.44	1.740 ± 0.35	0.416
Participation of Family and Child in Care Subscale	1.689 ± 0.44	1.628 ± 0.38	0.476
Total Scale Score	1.729 ± 0.43	1.709 ± 0.46	0.919
Post-test			
Contribution of Family-Centered Care Subscale	1.742 ± 0.47	2.107 ± 0.49	**0.001**
Participation of Family and Child in Care Subscale	1.693 ± 0.42	2.153 ± 0.59	**0.001**
Total Scale Score	1.738 ± 0.41	2.130 ± 0.51	**0.001**

Significant at $P < 0.05$. Student's t-test.
SD, standard deviation.

Table 3
Within-Group Comparison of Pre-Test and Post-Test Scores of Nurses in the Control and Intervention Groups on the Family-Centered Care Attitude Scale (N = 140).

	Pre-Test	Post-Test	p-value
	Mean ± SD	Mean ± SD	
Control Group			
Contribution of Family-Centered Care Subscale	1.771 ± 0.44	1.742 ± 0.47	0.462
Participation of Family and Child in Care Subscale	1.689 ± 0.44	1.693 ± 0.42	0.088
Total Scale Score	1.729 ± 0.43	1.738 ± 0.41	0.108
Intervention Group			
Contribution of Family-Centered Care Subscale	1.740 ± 0.35	2.107 ± 0.49	**0.001**
Participation of Family and Child in Care Subscale	1.628 ± 0.38	2.153 ± 0.59	**0.001**
Total Scale Score	1.709 ± 0.46	2.130 ± 0.51	**0.001**

Significant at P < 0.05.Paired t-test.

mean scores were 1.738 ± 0.41, with no statistically significant difference observed between these scores ($t = 1.163$, $p = 0.108$). The effect of time on the total score variable was found to be statistically significant (F = 52.236, $p = 0.001$). Additionally, the group * time interaction was determined to have a moderate effect size ($\eta p^2 = 0.258$) and high test power (power = 0.99) (F = 47.902, $p = 0.001$). Furthermore, the group effect demonstrated a statistically significant difference (F = 8.565, $p = 0.004$). The post-test mean scores of the experimental group were found to be significantly higher than those of the control group (p = 0.001). In the analysis of the Contribution Subscale, the pre-test mean scores of the experimental group were 1.740 ± 0.35, and the post-test mean scores were 2.107 ± 0.49. A statistically significant difference was found between these scores ($t = 3.339$, $p = 0.001$). In the control group, the pre-test mean scores were 1.771 ± 0.44, and the post-test mean scores were 1.742 ± 0.47, with no statistically significant difference observed between these scores ($t = 0.827$, $p = 0.462$). The time factor was found to have a significant effect on the Contribution Subscale (F = 8.629, $p = 0.004$). The group * time interaction was statistically significant, with a small effect size ($\eta p^2 = 0.081$) and high test power (power = 0.99) (F = 12.120, $p = 0.001$). Additionally, the group effect was also found to be significant for the Contribution Subscale (F = 7.710, $p = 0.006$). In the analysis of the Participation Subscale, the pre-test mean scores of the experimental group were 1.628 ± 0.38, and the post-test mean scores were 2.153 ± 0.59. A statistically significant difference was found between these scores ($t = 7.021$, $p = 0.001$). For the control group, the pre-test mean scores were 1.689 ± 0.44, and the post-test mean scores were 1.693 ± 0.42, with no statistically significant difference observed between these scores ($t = 1.730$, $p = 0.088$). The effect of time on the Participation Subscale was found to be statistically significant (F = 49.794, p = 0.001), and the group * time interaction also demonstrated a statistically significant difference (F = 48.540, p = 0.001). Furthermore, the group effect was determined to show a statistically significant difference (F = 8.707, $p = 0.004$).

Discussion

Family participation has emerged as a key factor in improving pediatric healthcare outcomes (Al-Motlaq et al., 2024). Our study demonstrated that structured FCC training significantly improved pediatric nurses' attitudes toward FCC. It is evident that pediatric nurses play a key role in raising awareness and driving change in the development of FCC practices. In this context, pediatric nurses' attitudes toward FCC emerge as an important concept. In an international study by Feeg et al. (2016) comparing healthcare professionals' FCC attitudes across different countries, healthcare professionals in Turkey were found to have significantly lower scores compared to those in the U.S. and Australia (Feeg et al., 2016). Studies by Tabakçıoğlu (2019) and Aydın Kartal et al. (2023) emphasized that pediatric nurses in Turkey

Table 4
Pre-test and Post-test Analysis Results of the Total and Subscale Scores of the Family-Centered Care Attitude Scale for Experimental and Control Groups Based on Time, Group, and Group*Time Interactions (N = 140).

Groups	Pre-test M ± SD	Post-test M ± SD		F/t²	p	ηp^2	Power
Overall Score							
Experimental group ($n = 70$)	1.709 ± 0.46	2.130 ± 0.51		7.106	**0.001**	–	–
Control group (n = 70)	1.729 ± 0.43	1.738 ± 0.41		1.163	0.108	0.258	0.99
P[3]	0.802	**0.001**		–	–	–	–
			Time	52.236	**0.001**		
			Group*Time[1]	47.902	**0.001**		
			Group	8.565	**0.004**		
Contribution of Family-Centered Care Subscale							
Experimental group (n = 70)	1.740 ± 0.35	2.107 ± 0.49		3.339	**0,001**	–	–
Control group (n = 70)	1.771 ± 0.44	1.742 ± 0.47		0.827	0.462	0.081	0.99
P[3]	0.711	**0.001**		–	–	–	–
			Time	8.629	**0.004**		
			Group*Time[1]	12.12	**0.001**		
			Group	7.71	**0.006**		
Participation of Family and Child in Care Subscale							
Experimental group (n = 70)	1.628 ± 0.38	2.153 ± 0.59		7.021	**0,001**	–	–
Control group (n = 70)	1.689 ± 0.44	1693 ± 0,42		1.730	0.088	0.260	0.99
P[3]	0.507	**0.001**		–	–	–	–
			Time	49.794	**0.001**		
			Group*Time[1]	48.54	**0.001**		
			Group	8.707	**0.004**		

a = Variance analysis, p = Level of significance, [1]Analysis of variance in repeated measurements, [2]paired t-test, [3]t test with Bonferroni correction.

displayed ambivalent attitudes toward FCC, and in-service training was shown to improve these attitudes. These findings indicate the need for more educational interventions to enhance nurses' FCC attitudes (Aydın Kartal et al., 2023; Tabakçıoğlu, 2019). These results suggest that the attitudes of pediatric nurses in Turkey toward FCC have not yet reached the desired level. Providing FCC training to pediatric nurses is crucial for fostering more positive attitudes toward FCC, which is essential for ensuring a higher quality of care experience for children and their families.

In this study, the sample, consisting of pediatric nurses, was divided into two main groups: an intervention group and a control group. A total of 140 pediatric nurses participated in the study, with 70 nurses in each group. When comparing the nurses in the intervention and control groups in terms of sociodemographic and professional characteristics, no statistically significant differences were found. This indicates that the two groups in the study were homogeneous, thereby ensuring the validity of between-group comparisons and allows for a reliable and objective measurement of the isolated impact of the educational intervention. Similar studies have shown that such parity facilitates a more accurate testing of educational interventions (Johnson & May, 2015). Recent studies have shown that educational interventions targeting nurses positively influenced their individual attitudes and behaviors (Abolfotouh et al., 2017; Baran et al., 2020; Erdoğan & Kanan, 2024; Kara & Tufekci, 2024; Kavak et al., 2019; Yuan, 2024). In this study, FCC training for pediatric nurses was provided through interactive educational tools, including PowerPoint presentations and platforms like Quizizz, which were observed to reinforce the nurses' learning processes. These interactive technologies made the nurses' acquisition of knowledge and the application of what they learned more effective. A review of the literature shows that such trainings contribute to the practices of healthcare professionals. Studies have shown that FCC training positively influenced the attitudes and practices of both physicians and nurses toward FCC in pediatric clinics (Çetintaş et al., 2023; Günay & Polat, 2017). The findings of the current study align with the existing literature wherepositive effects of FCC training on pediatric nurses' attitudes have been recorded. Increasing nurses' awareness through education can enhance the effective implementation of FCC, which, in turn, can improve both patient and family satisfaction (Kutahyalioglu et al., 2022).

The pre-test scores of the Family-Centered Care Attitude Scale between the control and intervention groups were not statistically significant suggesting similar initial attitudes of nurses in both groups. This analysis indicates that the educational intervention played a decisive role in any change in nurses attiudes toward FCC. The study confirmed the effectiveness of the FCC training which positively influenced the attitudes of pediatric nurses. A significant increase in their attitudes toward FCC have been recorded compared to their pre-training scores. The post-test scores were higher in both subscales and the total scale score compared to the control group. The sample size calculation and subsequent post-hoc power analysis highlight the methodological rigor of this study. With a power level of 96 % and an effect size of 0.84, the study reliably demonstrates the effectiveness of the FCC training intervention. These results align with prior research emphasizing the importance of adequate sample sizes and effect sizes in detecting significant changes in healthcare professionals' attitudes following educational interventions (Cozby & Bates, 2012; Pagano, 2009). The methodological robustness of this study enhances its contribution to the existing body of literature on FCC and supports the generalizability of its findings. Within-group comparison also showed no significant difference between the pre-test and post-test scores of the control group, whereas the post-test scores of the nurses in the intervention group significantly increased. The increase in the scores on both subscales and the total scale underscores the effectiveness of the training provided. These outcomes compares very well with previous studies recomending continuous training as an essential factor in changing attitudes of health professionals toward care (El-Ziady et al., 2017).

Statistical power ranges from 0.00 to 1.00, and as power increases, the likelihood of detecting a true effect also rises. In this study, the Cohen's d effect size approaching 1 clearly indicates the strong impact of the intervention (Cohen, 1988). While a power value of 0.80 or higher is generally considered ideal (Pagano, 2009), some sources suggest that power values ranging between 0.70 and 0.90 are also acceptable (Cozby & Bates, 2012). Büyüköztürk (2005) stated that if the power of a study falls below 0.50, the reliability of the results may be questionable. Çapık (2013) noted that studies using parametric tests generally have higher statistical power, with only 46.4 % of tests achieving a statistical power of 0.80 or above at moderate effect sizes. Based on this body of literature, the structured FCC training provided in this study has clearly demonstrated its impact on the attitudes of pediatric nurses. In the intervention group, significant increases were observed in both the Contribution and Participation Subscales, as well as in the total scale scores, while no changes were detected in the control group. The group-by-time interaction analysis showed that scores increased significantly over time, supported by a medium effect size ($\eta p^2 = 0.258$) and high statistical power (96 %) (Cohen, 1988; Pagano, 2009). In the literature, effect size is noted to represent clinical and practical significance, with f^2 values classified as small (0.02–0.15), medium (0.15–0.35), and large (≥0.35) (Schober et al., 2018). In this study, an effect size exceeding 0.80 across all variables demonstrates the strong impact of the training provided. The group-by-time interaction analysis further indicates that the effects of the training were sustained over time and contributed to increased awareness of family participation among nurses, aligning with similar findings in the literature (Al-Motlaq et al., 2024; Aydın Kartal et al., 2023). Similarly, the literature indicates that periodic training programs for nurses significantly improve their knowledge levels over time and lead to group * time interactions (Kırmızıgül et al., 2023; Saltan & Akdeniz Kudubeş, 2024). In this context, the findings of the current study highlight the value of FCC training both theoretically and practically, demonstrating the critical role of such structured programs in addressing knowledge gaps and supporting FCC among nurses. The findings of this study reveal the strong impact of the intervention on nurses' attitudes toward FCC and clearly demonstrate that FCC training is a crucial tool for improving these attitudes. A review of the literature reveals that similar findings have been reported in various studies. Ülgen and Tüfekci (2024) demonstrated that pain management training provided to pediatric nurses significantly improved their knowledge and attitudes toward pain management (Ülgen & Tüfekci, 2024). Similarly, Blatz et al. (2020) and Coşkun (2022) highlighted that training programs for neonatal and pediatric nurses positively influenced their attitudes and practices toward various aspects of patient care, including breastfeeding, skin assessment, and family participation (Blatz et al., 2020; Coşkun, 2022). Moreover, Oude Maatman et al. (2020) emphasized that education for healthcare professionals led to behavior change by encouraging family participation in care (Oude Maatman et al., 2020). Furthermore, studies by Barreto et al. (2022) and Öztürk Şahin et al. (2020) demonstrated that nurses' positive attitudes toward FCC were associated with their level of academic education, and nurses with more knowledge were more likely to adopt FCC practices (Barreto et al., 2022; Öztürk Şahin et al., 2020). Gafni-Lachter and Ben-Sasson (2022) noted that FCC training for healthcare workers improved nurses' FCC practices and their perceptions of self-efficacy. Dean et al. (2021) found that after the implementation of an Individualized Family-Centered Developmental Care Education Program, pediatric nurses significantly improved their knowledge and perceptions of this care model. Similarly, Montgomery et al. (2016) observed that training programs led to positive changes in nurses' attitudes and beliefs regarding family-centered bedside rounds. Others also reported that FCC training provided in neonatal intensive care units improved nurses' attitudes toward family participation, with significant increases in their scores following the training (Albayrak & Büyükgönenç, 2022). These studies are supportive of the results of the current study and indicate that FCC training can improve pediatric nurses' attitudes toward FCC. Enhancing

pediatric nurses' knowledge, skills, and positive attitudes toward FCC is expected to positively contribute to improving the quality of care for children and families, thereby increasing satisfaction with pediatric health services.

Limitations

This study is limited to pediatric nurses from a specific region, which restricts the generalizability of the findings to other populations and settings. Although the sample size was statistically adequate and demonstrated high power, its geographic specificity may limit the broader applicability of the results. While the six-week follow-up period was sufficient to evaluate short-term attitudinal changes resulting from the FCC training, it was not adequate to assess long-term behavioral transformations, which typically require extended intervals—such as three months for attitudinal stabilization and six months for behavioral shifts—and systemic organizational adjustments to support sustained implementation. Additionally, the cross-sectional nature of the study limits its ability to provide longitudinal insights into the enduring effects of FCC training. Despite these challenges, the study successfully maintained participant engagement and adherence to the training schedule, ensuring the reliability of the findings. Future research with larger, more diverse samples, extended follow-up periods, and multifaceted interventions is recommended to validate these results and comprehensively evaluate the sustainability and practical integration of FCC principles into clinical practice.

Implications for practice

The FCC training provided in this study may promote active family involvement in pediatric care, thereby contributing to the enhancement of patient- and family-centered approaches. In this regard, the implementation of regular and comprehensive FCC training programs for pediatric nurses will enable them to internalize this approach and more effectively integrate it into their clinical practices. Expanding such training programs across pediatric wards will help nurses maintain up-to-date knowledge and skills, reinforcing their positive attitudes toward FCC. Additionally, periodic training sessions supported by technological tools can enhance the learning processes of nurses and strengthen their commitment to this approach. The long-term application of FCC training will allow for the development of strategies aimed at improving the quality of pediatric care and increasing patient and family satisfaction. Integrating FCC into the professional development of nurses will promote the adoption of innovative approaches in pediatric care, which can improve nurses' job satisfaction and lead to better care outcomes.

Conclusions

This study demonstrated that FCC training can significantly improve pediatric nurses' attitudes toward FCC. The intervention, designed using innovative and interactive educational approaches grounded in Hovland's Message-Learning Approach (Yale Approach), reinforced the importance of FCC principles and effectively transformed participants' perceptions and attitudes. The successful integration of theoretical knowledge with practical applications within the training program resulted in measurable positive changes in nurses' attitudes, further strengthening the rigor and impact of the study. One of the study's strongest aspects is its systematic and structured evaluation of short-term attitude changes, measured with a validated scale. The homogeneity between the intervention and control groups strengthened the attribution of findings to FCC training, enhancing the study's internal validity. Despite its limitations, this research highlights the critical role that structured, theory-based educational programs can play in fostering positive attitudinal shifts. It also suggests that incorporating FCC training into the routine professional development of pediatric nurses has the potential to enhance both patient and family experiences, thus reinforcing the value of such training in clinical practice.

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CRediT authorship contribution statement

Adnan Batuhan Coşkun: Writing – review & editing, Writing – original draft, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Mohammad Al-Motlaq:** Writing – review & editing, Project administration, Methodology, Investigation, Conceptualization. **Merve Pişkin:** Data curation. **Erhan Elmaoğlu:** Validation, Resources, Formal analysis. **Ayda Çelebioğlu:** Project administration, Conceptualization.

Declaration of competing interest

The authors declare no conflict of interest. However, Associate Professor Mohammad Al-Motlaq is an Associate Editor for the Journal of Pediatric Nursing.

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