

The moderating effects of nurses' background characteristics on the relationship between family-centred care perception and practice for hospitalized children and their families in Malawi

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ARTICLE INFO

Keywords:

FCC perception
FCC practice
Hospitalized children
Moderation
Moderation effects

ABSTRACT

Purpose: Globally, limited information is available on the relationship between the perception and practice of family-centered care (FCC), and the moderating effects of nurses' background characteristics on this relationship. This study investigated the relationship between FCC perception and FCC practice and the moderating effects of the nurses' background characteristics on this relationship.

Design and methods: A cross-sectional study was conducted using a two-stage stratified sampling method. Data were collected from 444 nurses using the Family Centered Care Questionnaire-Revised and analyzed using IBM SPSS Version 25. The Hayes PROCESS macro model, version 3, was integrated into SPSS to examine the moderating effects at a significance level of 0.05.

Results: The response rate was 98%, and a statistically significant positive association was found between FCC perception and FCC practice ($r = 0.353, p < .001$). Gender of a nurse ($\Delta R^2 = 0.0206, p < .002$), having children ($\Delta R^2 = 0.0231, p < .001$), experience ($\Delta R^2 = 0.0107, p = .028$), and working in a medical-surgical ward ($\Delta R^2 = 0.0208, p = .008$) had a statistically significant moderating effect on the relationship between FCC perception and FCC practice.

Conclusion: These findings provide minimal evidence of the existence of non-modifiable moderators of FCC. Future studies with modifiable moderators are therefore needed. **Practice implications:** Understanding the moderating effects of nurses' background characteristics on the relationship between FCC perception and FCC practice may facilitate the development of FCC interventions that favor these background characteristics and facilitate the integration of FCC into routine policies and practices.

Introduction

Family-centered care (FCC) is a model of caring for children and their families within healthcare services; it ensures that care is planned around the whole family, not just the individual child or person (Al-Motlaq & Shields, 2017). In FCC, all family members are recognized as both primary care providers and care recipients (Coyne et al., 2013). In implementing FCC as a partnership approach to healthcare and decision making shared by family members and healthcare providers, healthcare professionals such as nurses assume leadership and coordination roles, whereas families are consumers or recipients of care. Studies have

concluded that FCC has many benefits. For instance, FCC has been shown to improve pediatric care outcomes and family members' satisfaction with care, while reducing the cost of care for organizations (American Academy of Pediatrics Committee on Hospital Care, 2012). Furthermore, FCC helps families by increasing the competencies of family members through their participation in the delivery of care (Coyne et al., 2013). Although families do not implement or practice FCC, they support nurses in performing some FCC activities, including monitoring the child's condition at the bedside; participating in simple nursing activities such as nasogastric feeding, wound dressing, bathing, or taking temperatures; and undertaking complicated forms of nursing

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<https://doi.org/10.1016/j.pedn.2023.09.004>

Received 20 March 2023; Received in revised form 21 August 2023; Accepted 4 September 2023

Available online 12 September 2023

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care such as monitoring children who have undergone cardiac surgery or kidney transplantation (Hill et al., 2018).

Some conceptual frameworks have been developed to support FCC and to guide its implementation. Through its understanding of the relationships between care and the family, the Institute for Patient and Family-Centered Care (IPFCC), formerly the Institute for Family-Centered Care, identified nine elements (Table 1) and four core concepts to guide FCC implementation as a model of care. The four core concepts are respect and dignity, information sharing, family participation in care, and collaboration (American Academy of Pediatrics Committee on Hospital Care, 2012; Hill et al., 2018). *Respect and dignity* pertain to how healthcare providers treat family members and respect their choices to meet the family's healthcare needs. *Information sharing* encompasses how health professionals communicate with family members and make information available to them and their children while in hospital (Hill et al., 2018; Ladak et al., 2013). *Family participation* allows family members to participate in decision making and provide care to their sick child at a level chosen by the family, and *collaboration* refers to the mutual partnerships between health professionals and families and the support provided by these professionals to families in ways that improve care (Hill et al., 2018).

Many FCC studies involving nurses have found that the FCC practice scores are lower than the FCC perception scores (Alabdulaziz et al., 2017; Dall'Oglio et al., 2018; Matziou et al., 2018; Phiri et al., 2020). Diverse research findings also support the notion that nurses' socio-demographic factors are significantly associated with both the practice and perception of FCC (Alabdulaziz et al., 2017; Coyne et al., 2013; Dall'Oglio et al., 2018; Ladak et al., 2013; Matziou et al., 2018; Phiri et al., 2020; Prasopkittikun et al., 2020). However, to date, research on the moderating effects of nurses' socio-demographic factors on the relationship between FCC perception and FCC practice has not yet been documented.

Understanding the moderating effects of nurses' background characteristics on the relationship between FCC practice and FCC perception can lead to the development of FCC interventions and an understanding of their effectiveness based on a particular nurses' background characteristics. This is because the purpose of studying moderators is to understand how or how much categorical or quantitative variables change the strength or direction of the relationship between independent and dependent variables (Gómez, Schallock, & Verdugo, 2020). For example, using gender, future researchers may develop interventions to study how much change can be gained in FCC practice and perception when male or female nurses are used to implement an FCC intervention. This understanding could lead to development of more studies to understand more complex correlational or causal relationships in future FCC interventions (Gómez, Schallock, & Verdugo, 2020). Another important

aspect of studying moderating effects in the context of FCC is that moderating effects or outputs may act as the basis for further testing of FCC theory (Gómez, Schallock, & Verdugo, 2020). Moderation analysis might lead to the improved measurement of FCC outcomes and further understanding of the causal relationships in this context in future studies (Fraser & Galinsky, 2010). Considering the local context in Malawi, the uniqueness of this study is that previous studies have already demonstrated that FCC in Malawian settings is highly implemented and greatly valued by nurses despite chronic shortages of material and financial resources. Thus, studies on moderating effects of nurses' background characteristics may include measuring FCC interventions involving nurses and help to understand the causal relationships and the changes that moderators in the selected interventions in FCC affect.

Whereas in future research on FCC, moderators would also help researchers judge the external validity of their studies of FCC by identifying statistical limitations when a relationship between variables is established (Fraser & Galinsky, 2010). This judgment will be possible because moderation in FCC can be considered as the extent to which the relationship between FCC perception (independent variable) and FCC practice (dependent variable) changes as a function of a third variable, or moderator (MacKinnon, 2011), namely the background characteristics of nurses in this study.

Yet, to date, the lack of moderation studies on FCC means that this relationship and the associated effects of nurses' background characteristics are not yet quantifiable. In simple terms, moderation studies that can assist FCC researchers to contextualize the degree of moderating effect of an interacting variable on the relationship between FCC perception and FCC practice are needed. It is anticipated that findings from this study may inform the future development of effective approaches using FCC as the model of care in improving pediatric patient outcomes. In the current study, we investigated the relationship between FCC perception and FCC practice among nurses in Malawi, and the moderating effects of these nurses' background characteristics on this relationship.

Methods

Study design and settings

This hospital-based cross-sectional study was conducted in four national referral hospitals, 17 district hospitals, and eight faith-based/community hospitals distributed across the three regions of Malawi between August and October 2020. In Malawi, *national hospitals* are large regional or national referral hospitals, while *district hospitals* are smaller but comprehensive care facilities that provide primary- and secondary-level care in their district catchment areas. *Mission hospitals*

Table 1
FCC measurement, subscales, and items on FCC practice and FCC perception on FCCQ-R.

#	Original Element of Family Centred Care (Johnson et al., 1992)	Subscale on FCCQ_R (Bruce & Ritchie, 1997)	Items on FCCQ_R Questionnaire (Bruce & Ritchie, 1997)
1	Recognizing that the family is constant in child's life	Family is constant	1–3
2	Facilitating parent and professional collaboration at all levels	Parent and professional collaboration	4–9
3	Recognizing family strengths and individuality and respecting different methods of family coping	Recognizing family individuality	10–14
4	Sharing information that is complete and unbiased with parents about their children's care on ongoing basis and supportive manner	Sharing information	15–19
5	Encouraging and facilitating parent to parent support	Parent to parent support	20–23
6	Incorporating the developmental needs of infants, children and adolescents and their families into healthcare systems	Developmental needs of children and families	24–28
7	Implementing appropriate policies and programmes that provide emotional and financial support to meet needs of families	Emotional support for families	29–32
8	Assuring that the design of health care systems is flexible. Accessible and responsive to family needs	Design of health care that is flexible	33–39
9	Putting in place continuing education programmes that provide opportunities and support for staff to learn to deal with families effectively	Emotional support for staff	40–45

FCCQR = Family Centred Care Questionnaire _Revised.

are like government district hospitals but are owned by various Christian organizations. Mission hospitals provide at least 40% of all healthcare services to the population of Malawi (Phiri et al., 2022). All of the participating hospitals are general hospitals with fully functioning pediatric departments.

Participants

This study targeted only nurses who were working in pediatric wards and fulfilled the eligibility criteria. Full-time nurses aged 21–60 years who worked in pediatric wards, had at least 1 year of pediatric nursing experience, and consented to participate voluntarily in the study were eligible for inclusion whereas participants without these characteristics were excluded. Ethical approval for the study was granted by the National Health Sciences Research Committee (19/06/2353) of Malawi and the Survey and Behavioural Research Committee of the Chinese University of Hong Kong (SBRE 19–1806). All of the participants were given adequate information about the nature of the study, areas of inquiry, and the nature of voluntary participation in a study information letter, and those who agreed to participate signed a written consent form.

Sample size

A stratified two-stage sampling method was used to recruit a nationwide sample of nurses working in pediatric inpatient settings. At the time of data collection, Malawi had five administrative health zones and 113 central, mission, and district hospitals classified according to their level of service (Ministry of Health, 2017a, 2017b). In the first stage of sampling, one central, three district, and one mission hospital were selected in each of the five zones, except the Central East district, which has no central hospital. In this zone, 20 nurses from two mission and five district hospitals were recruited. In the second stage of sampling, a nurses working in pediatric wards were recruited randomly from each hospital that was selected in stage one. The sample size was determined as described below to give this study adequate precision to estimate the nurses' current and necessary practices on FCC.

Using the power analysis software PASS 14.0 (NCSS, Kaysville, USA), we estimated that a minimum sample of 387 nurses would give the study 80% statistical power to detect a change at a 5% level of significance, with an effect size as small as $R^2 = 0.02$. In other words, if a socio-demographic factor explained at least 2% of the variability in the FCC practice and FCC perception scores, a minimum change in R^2 (ΔR^2) of 2% would be detectable with 80% power at a 5% level of significance (Rosner, 2011; Setia, 2016). For this study, 453 nurses were targeted for recruitment, assuming a 20% non-completion rate. Finally, a sample of 444 full-time nurses participated in the study.

Measures and outcomes

Over the last three decades, FCC has been measured from the perspectives of practice and perception (Dall'Oglio et al., 2018). In this study, consistent with guiding elements of FCC (Table 1) the Family-Centered Care Questionnaire-Revised (FCCQ-R) was used to assess how nurses practiced and perceived FCC activities (Bruce & Ritchie, 1997). First, the FCCQ-R asks health professionals to indicate the extent to which each FCC item is included in their everyday work (i.e., the current practice of FCC); this is otherwise referred to as FCC practice. Second, the FCCQ-R asks the extent to which the same FCC item is considered a necessary practice for providing FCC; this is otherwise referred to as FCC perception (Matziou et al., 2018). The FCCQ-R was developed in line with the nine key elements of FCC and contains 45 items that describe the activities of FCC. These activities are divided into nine subscales of FCC and categorized as current and necessary practice domains in the FCCQ-R. Items on the FCCQ-R relating to both current and necessary practices of FCC are scored using a 5-point Likert scale

from 1 (*strongly disagree*) to 5 (*strongly agree*); the questionnaire was validated by the original authors (Bruce & Ritchie, 1997), and internal consistency coefficients of 0.5–0.9 were reported among nurses (Alabdulaziz et al., 2017). The mean score for each subscale ranges from 1 to 5; although the numbers of activities differ between subscales, a mean score above 3 on each subscale indicates a good current and necessary practice of FCC. A higher score indicates a wider implementation of the subscale in terms of practice and a higher perception of FCC (Phiri et al., 2020). The total practice and perception domain mean scores each range from 9 to 45. An average score above 27 for each domain indicates considerable current and necessary practice of FCC (Matziou et al., 2018). In this paper, current FCC practices are referred to as *FCC practices*, while necessary practices are referred to as *FCC perceptions* (Alabdulaziz et al., 2017; Matziou et al., 2018).

Data collection schedules were set in agreement with the selected hospitals so that administrative arrangements could be made. Background characteristics of the nurses such as age, gender, marital status, and education, as stipulated in Table 2, were added. Data were collected via self-administered questionnaires distributed by the researcher and three research assistants. The research assistants helped to collect questionnaires from the study participants and checked that all study parameters were complete before sending the completed questionnaires to the researcher. The research assistants were highly qualified pediatric nurses who had a master's degree in child health nursing and over 5 years of working experience and were oriented in the use of this tool. The data collection sessions took 45–60 min as the data collection tool was slightly longer.

Table 2
Background characteristics of the participants (N = 444).

Characteristics	Subgroup	n (%)
Age (years)	21–30	236 (53.1)
	31–40	172 (38.6)
	>40	36 (8.3)
Gender	Male	149 (33)
	Female	295 (66.4)
Marital status	Single	149 (33.6)
	Married	244 (55.0)
	Sep/Widow	51 (11.4)
Number of Children	Nil	175 (39.4)
	Have children	269 (62.6)
Education level	≤Dip NMT	267 (60.1)
	Diploma (RN)	61 (13.7)
	≥Bachelors' degree	116 (26.2)
Religious denomination	Catholic	82 (18.5)
	CCAP	111 (25.0)
	SDA	97 (21.9)
	Pentecostals	119 (26.9)
	Moslem/Buddha/Hindu	35 (7.9)
Cultural group	Chewa	84 (19.9)
	Tumbuka	161 (38.2)
	Yawo	102 (23.0)
	Lhomwe	93 (20.9)
Professional level	NMT	260 (58.6)
	RN	184 (41.4)
Specialisation	No	387 (87.2)
	Yes	57 (12.8)
Ward type	Nursery	65 (14.6)
	Medical/Surgical	151 (34.0)
	NRU/Orthopaedic/Oncology	37 (8.3)
	General Ward	191 (43.0)
Work experience (years)	1–10	357 (80.4)
	> 10	86 (19.6)
Hospital type	District	142 (32.0)
	Mission	124 (27.9)
	Central	178 (40.1)

Data are presented as frequency (percentage). CCAP = Church of Central Africa Presbyterian; Diploma NM-T = Diploma in Nursing and Midwifery-Technician; Diploma RN=Diploma Registered Nurse = NMT = Nurse Midwife Technician (Staff nurse); NRU = Nutrition Rehabilitation Unit; RN = Registered Nurse; SDA = Seventh Day Adventist.

Moderation measures and hypotheses

The conceptual framework for moderation analysis was derived from Hayes' single moderation analysis model (Hayes, 2015). In this model, the dependent and independent variables and one moderator at a time are entered into the moderation analysis until all moderators have been tested (Hayes, 2015). In this study, moderation analysis was guided by a bivariate analysis, which identified a direct relationship between FCC perception and FCC practice. Furthermore, in this study it was assumed that the relationship between FCC perception and the FCC practice could be moderated by the background characteristics of the nurses (Fig. 1). Moderation analysis was performed to determine whether some of these background characteristics had a significant interaction effect on the relationship between FCC perception and FCC practice. In the moderation model, the categorical variables used in linear regression were maintained and tested to determine their specific moderating effects on the model. Only the background characteristics of nurses that exhibited a significant interaction effect in the first model analysis were included in the second model analysis to determine their R^2 and ΔR^2 and are reported in this paper (Table 4). The study addressed the following hypotheses:

Hypothesis 1. There will be a statistically significant relationship between the FCCQ_R scores for FCC perception and FCC practice.

Hypothesis 2. The relationship between FCC perception and FCC practice will be moderated by nurses' background characteristics.

Statistical analyses

The primary units of analysis for this study were the FCC practice and FCC perception domains of the FCCQ_R. For data analysis, the researcher grouped the 45 items into the nine subscales of FCC that form the practice and perception domains, as stated earlier. In the moderation analysis, FCC perception was the independent variable and FCC practice was the dependent variable; the nurses' background characteristics were potential moderators. These variables were set because to date, no variables have been used in FCC studies beyond FCC perception, FCC practice, and nurses' background characteristics. The data were analyzed using IBM SPSS, Version 25. Both bivariate and multivariate analyses were performed. Hayes' (2015) PROCESS macro model, version 3 was integrated into SPSS to examine the moderating effects of nurses' background characteristics on the relationship between FCC perception and FCC practice. The results of the moderation analysis formed the basis of the hypothesized model (Hayes, 2015). All statistical analyses were two-sided, and the level of significance was set at $p = .05$.

Results

Background characteristics of nurses

The study response rate was 98%. As presented in Table 2, the mean age of the participants was 31.4 years ($SD = 6.1$). Approximately 66.4% of the participants were female, and 55.0% were married. Approximately 62.6% of the nurses had children, and approximately one third (38.2%) were of Tumbuka ethnicity. Slightly more than half (60.1%) of the nurses were educated up to the diploma level and (58.6%) were nurse-midwife technicians (NMTs), 43.2% were working in general wards, and 80.4% had <10 years of work experience.

Relationship between FCC perception and FCC practice cores on the FCCQ_R

A bivariate analysis was performed to explore the relationship between the FCC practice and FCC perception scores on the FCCQ_R. The results showed a statistically significant positive relationship between the FCC practice and FCC perception scores ($r = 0.353$, $p < .001$). Furthermore, variations were identified in the relationship between the FCC perception and FCC practice subscale scores, i.e., some had positive relationships, and some had negative relationships. However, the strength of the relationship between the FCC perception and FCC practice scores was below medium based on its correlation coefficient (Table 3).

Moderating effects of nurses' background characteristics on the relationship between FCC perception and FCC practice

Thirty-three categorical variables (Table 2) were entered into the moderation analysis model. Only significant results from the moderation analysis are presented in this section (Table 4) while the non-significant results are presented in Table 5. Conditional visualizations are presented as graphs in Supplementary Material 1 (Figs. 2–6). In summary, the moderation analysis showed that gender (being male or female), having children, experience, and working in a medical-surgical ward were significant moderators of the relationship between FCC perception and FCC practice.

Furthermore, in an exploratory moderation analysis, eight parameters are presented: models 1 and 2, the direct effect of the independent variable on the dependent variable, the value of the constant in the model, the interaction effect, the slope or intersection, the R^2 value, and the ΔR^2 value (including its p value) (Andersson, Cuervo-Cazurra, & Nielsen, 2014). However, the two models can be presented but it is not

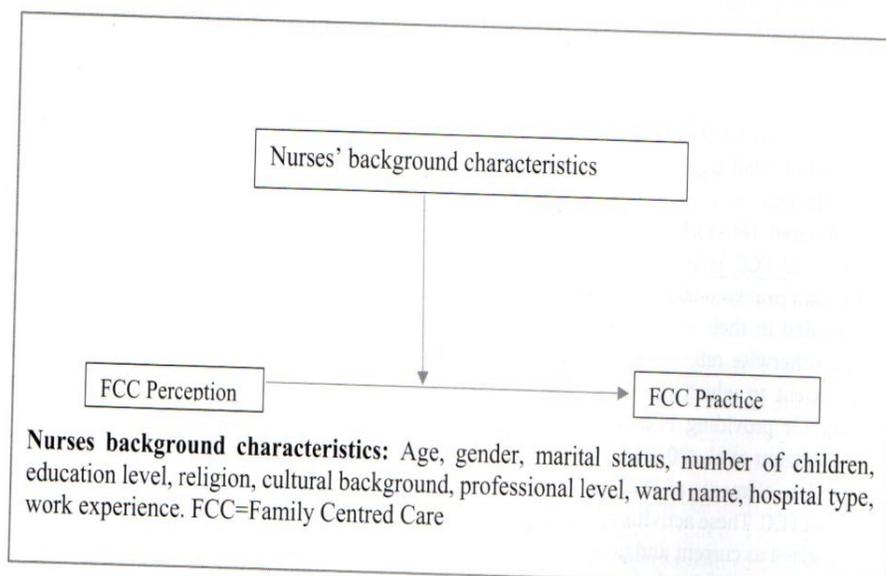


Fig. 1. A conceptual framework for moderation analysis.

Table 3

Bivariate analysis: Correlation between FCC perception domain, its subscales and FCC practice domain and its subscales.

	1	2	3	4	5	6	7	8	9	10
1	0.199**									
2	0.371**	-0.512**								
3	0.539**	0.455**	0.695**							
4	-0.023*	-0.137*	-0.174**	0.491**						
5	-0.166**	0.186**	0.143*	-0.219**	0.122**					
6	0.618**	-0.092*	0.112*	0.211**	0.062	0.169**				
7	-0.125*	-0.099*	-0.096*	-0.042	-0.020	-0.029	0.223**			
8	-0.519**	-0.131*	0.615**	-0.313**	-0.098*	0.382**	0.158**	0.148**		
9	-0.142**	-0.112*	-0.132**	0.001	-0.417**	-0.108*	0.132**	-0.057	-0.112*	
10	0.147**	0.117*	0.124**	0.115*	0.138*	0.114*	0.224**	0.097*	-0.096*	0.353**

N = 444; * P is significant at <0.05; **P is significant at <0.001: (2 tailed).

Horizontal variables:

1. Family is constant in child's life perception; 2. Parent-professional collaboration perception; 3. Recognizing family strengths and individuality perception; 4. Sharing information perception; 5. Developmental and psychological needs of children and families-perception; 6. Parent-to-parent support perception; 7. Emotional support for families' perception; 8. Design of the healthcare system perception; 9. Emotional support for staff perception; 10. Total FCC perception score.

Vertical variables:

1. Family is constant in child's life practice; 2. Parent-professional collaboration practice; 3. Recognizing family strengths and individuality practice; 4. Sharing information Practice; 5. Developmental and psychological needs of children and families-practice; 6. Parent-to-parent support practice; 7. Emotional support for families-practice; 8. Design of the healthcare system Practice; 9. Emotional support for staff practice; 10. Total FCC.

Table 4

The moderating effect of selected nurses' demographic characteristics on the relationship between FCC perception and FCC practice.

Model	Moderators	B	Std. Error	t	p	R ²	ΔR ² (p)
1	(Constant)	123.136	13.567	9.076	<0.001	0.0231	
	Perception	0.212	0.065	3.251	0.001		
	Gender	4.841	2.632	1.840	0.067		
2	(Constant)	103.215	15.8511	6.511	<0.001	0.0512	0.0206 (p = .002)
	Perception	0.366	0.081	4.526	<0.001		
	Male gender	0.75.511	26.119	2.891	0.004		
1	Interaction effect	-1.411	0.1331	-3.090	0.002	0.023	
	(Constant)	123.136	13.567	9.076	<0.001		
	Perception	0.212	0.065	3.251	<0.001		
2	Gender	4.841	2.632	1.840	0.067	0.0512	0.0206 (p = 002)
	(Constant)	178.726	20.759	8.609	<0.001		
	Perception	-0.044	0.105	-0.420	0.674		
1	Female gender	-75.511	26.119	-2.891	0.004	0.023	
	Interaction effect	-0.411	0.133	-3.090	0.002		
	(Constant)	135.229	13.132	10.298	<0.001		
2	Perception	0.206	0.065	3.155	0.002	0.0260	0.0231 (p < .001)
	Children	-0.732	0.686	-1.067	0.287		
	(Constant)	154.287	6.916	22.309	<0.001		
1	Perception	0.079	0.034	2.305	<0.001	0.023	
	Having Children	36.927	1.122	32.914	<0.001		
	(Constant)	133.028	12.856	10.347	<0.001		
2	Perception	0.212	0.065	3.258	<0.001	0.0352	0.0107 (p = .028)
	Experience	-0.192	0.265	-0.726	0.468		
	(Constant)	176.010	23.323	7.547	<0.001		
1	Perception	-0.007	0.119	-0.056	0.955	0.025	
	Experience	-6.401	2.829	-2.263	0.024		
	Interaction Effect	0.032	0.014	2.205	0.028		
2	(Constant)	131.854	12.747	10.344	<0.001	0.0520	0.0208 (p = .008)
	Perception	0.212	0.065	3.251	<0.001		
	Ward name	-2.254	0.565	-3.991	<0.001		
1	(Constant)	254.284	49.112	5.177	<0.001	0.0520	0.0208 (p = .008)
	Perception	-0.456	0.226	-2.021	0.044		
	Medical/Surgical w	-75.714	30.682	-2.467	0.014		
2	Interaction effect	0.412	0.133	2.667	0.008		

ΔR² = R squared change; R² = R square; Std. Error: Standard error of the regression coefficient, t = t-test score; p = p-value.

always necessary (Anderson et al., 2014; Hayes, 2015). Model 1 is used only as a reference or may be used to calculate the slope of the interaction if applicable. For example, any significant finding in model 1 suggests that there is a significant interaction that corresponds to model two (Anderson et al., 2014). In this analysis, the researchers accordingly used model 1. They also included model 1 to satisfy preceding statistical claims (Anderson et al., 2014) when focusing on model 2.

Male gender was examined as a moderator of the relationship between FCC perception and FCC practice. All three variables were entered

into the Hayes PROCESS macro model. The direct effect of FCC perception on FCC practice was found to be statistically significant, $b = 0.366$, $t(440) = 4.526$, $p < .001$, and the moderating effect of male gender on this relationship was also significant, $b = -0.4113$, $t(440) = -3.090$, $p = .002$. Male gender also explained a statistically significant proportion of the variance in FCC practice, $\Delta R^2 = 0.0206$, $p = .002$. Female gender was also examined as a moderator of the relationship between FCC perception and FCC practice. Here, the direct effect of FCC perception on FCC practice was not statistically significant, $b = -0.044$,

Table 5
Non-significant moderating effects of nurses' sociodemographic characteristics.

Model	Moderator variables	B	Std. Error	Beta	t	Sig
1	Perception	-0.254	0.333			
	Age	-3.043	2.055	-0.183	-0.762	0.446
1	Interaction effect1	0.015	0.010	-0.703	-1.481	0.139
	Perception	0.162	0.164	0.785	1.434	0.152
1	Marital status	-4.690	15.691	0.117	0.988	0.324
	Interaction effect 3	0.027	0.081	-0.129	-0.299	0.765
1	Perception	0.094	0.174	0.147	0.328	0.743
	Education	-14.235	11.572	0.068	0.544	0.587
1	Interaction effect5	0.047	0.060	-0.560	-1.230	0.219
	Perception	0.231	0.196	0.378	0.796	0.427
1	Cadre	-3.745	26.471	0.167	1.179	0.239
	Interaction effect 6	-0.006	0.135	-0.070	-0.141	0.888
1	Perception	-0.010	0.288	-0.025	-0.047	0.962
	Specialisation	-42.848	51.268	-0.007	-0.035	0.972
1	Interaction effect 7	0.207	0.263	-0.555	-0.836	0.404
	Perception	0.238	0.116	0.544	0.788	0.431
1	Religion	1.205	5.852	0.172	2.050	0.041
	Interaction effect 9	-0.010	0.030	0.083	0.206	0.837
1	Perception	0.144	0.111	-0.134	-0.333	0.739
	Cultural Background	-7.650	5.046	0.104	1.297	0.195
1	Interaction effect_11	0.024	0.026	-0.603	-1.516	0.130
	Perception	0.098	0.162	0.384	0.944	0.346
1	Hospital Type	-9.864	15.617	0.071	0.606	0.545
	Interaction effect 13	0.061	0.080	-0.314	-0.632	0.528
				0.387	0.761	0.447

There was lack of a statistically significant moderating effect of age, marital status, education level, specialisation, professional level, religion, cultural background, and hospital type on the relationship between perception and practice in all Models variables entered in Model 1 of Hayes Moderation Process Model.

$t(440) = -0.420, p = .674$, whereas the moderating effect of female gender on this relationship was statistically significant, $b = 0.411, t(440) = -3.090, p = .002$. Similarly, female gender also explained a significant proportion of the variance in FCC practice, $\Delta R^2 = 0.0206, p = .002$.

Next, having children was examined as a moderator of the relationship between FCC perception and FCC practice. The direct effect of FCC perception on FCC practice was found to be statistically significant, $b = 0.079, t(440) = 2.305, p = .022$, and the moderating effect of having children was also significant, $b = 0.221, t(440) = 34.065, p < .001$. Having children explained a significant proportion of the variance in FCC practice, $\Delta R^2 = 0.0231, p < .001$.

Nurses were initially categorized by work experience level as having less than and >10 years of experience, and both experience groups showed a statistically significant effect. As experience was a continuous variable, overall experience was used to avoid duplication (Hayes, 2015). The direct effect of FCC perception on FCC practice was found to be statistically non-significant, $b = -0.007, t(440) = 0.056, p = .955$, whereas the moderating effect of work experience on the relationship between FCC perception and FCC practice was statistically significant, $b = 0.032, t(440) = 2.205, p = .028$. Experience explained a statistically significant proportion of the variance in FCC practice, $\Delta R^2 = 0.0107, p = .028$.

Then, working in a medical-surgical ward was examined as a potential moderator of the relationship between FCC perception and FCC practice. The three variables were entered into the moderation model. The direct effect of FCC perception on FCC practice was found to be statistically significant, $b = -0.456, t(440) = 2.021, p = .044$, and the moderating effect of working in a medical-surgical ward on this relationship was also significant, $b = 0.412, t(440) = 2.667, p = .008$. As a moderator, working in a medical-surgical ward explained a statistically significant proportion of the variance of FCC practice, $\Delta R^2 = 0.0208, p = .008$ (Table 4).

Discussion

The aim of this study was to investigate the relationship between FCC perception and FCC practice and the moderating effects of nurses' background characteristics on this relationship. To the best of our

knowledge, this study is the first to explore the relationship between FCC perception and FCC practice while including the moderating effects of nurses' background characteristics. The study findings provide preliminary thought-provoking insights to inform future researchers and to support research to confirm the current findings in low-income developing and developed countries around the globe.

We demonstrated the existence of a relationship between the FCC perception and FCC practice domains, whereby FCC perception has a direct influence on FCC practice. This finding means that hypothesis 1 was supported. This relationship further suggests that further hypotheses could be generated using the elements of FCC to test and refine FCC theory in future studies. The strength of the current findings is that they suggest the existence of a cause-effect relationship in all FCC subscales, which can be further tested in future studies (Morozova et al., 2015). Studies using bivariate analysis to illuminate the relationship between FCC perception and FCC practice are not well documented to date. Thus, none has provided evidence to support the current findings. Thus, the current study contributes new evidence to the FCC literature. Given the preliminary nature of the current findings, more studies in different settings and developing countries will be needed to support this evidence.

There is evidence that some nurses' background characteristics have a significant moderating effect on the relationship between FCC perception and FCC practice. This finding further demonstrates that hypothesis 2 was partially supported. This study showed that gender can play a key role in the implementation and adoption of FCC in Malawi. First, male gender was found to have a statistically significant effect on the relationship between FCC perception and FCC practice. Although studies using moderation analysis have not been well established in FCC research, previously reported findings from regression analyses have demonstrated a relationship between male gender and FCC implementation. In their regression analysis, Dall'Oglio et al. (2018) reported that male gender was associated with a greater extent of FCC implementation than female gender in Italy. Specifically, Dall'Oglio and colleagues reported that male healthcare workers were optimistic about implementing FCC practices and believed that FCC practices were effective. This finding implies that men are confident, and this confidence can further advance FCC implementation (Dall'Oglio et al., 2018; Ladak et al., 2013). The current finding of a positive moderating effect of

male gender as a moderating nurse characteristic supports those earlier findings. A positive moderating effect indicates that a moderator increases the strength of the moderated relationship (Hayes, 2015). Given the optimism and confidence of male nurses, this finding suggests that male nurses may increase the implementation and adoption of FCC in routine practice. In developing countries like Malawi, where the proportion of male nurses is increasing and decision making is dominated by female nurses, the findings on this characteristic may suggest that deploying more male nurses to settings where FCC is most needed, such as chronic care wards would be of an added advantage.

In contrast, the moderating effect of the nurse characteristic of female gender on the relationship between FCC perception and FCC practice also has been reported but was associated with a weakening effect in the current study. This result suggests that female nurses may contribute less than male nurses to the implementation and adoption of FCC practice interventions. As found by Al-Mutair et al. (2014) using regression analysis, a lower score obtained by female nurses indicated that the female nurses were less likely than male nurses to report optimism about FCC. Consistent with this finding, Dall'Oglio et al. (2018) reported that female nurses held different attitudes toward and have lower expectations of family involvement in care than male nurses did. These earlier reports may partially explain why female nurses have a negative moderating effect on the relationship between FCC perception and FCC practice in Malawi. Given that female nurses are more prone to stress when working with families and their relatives than are male nurses (Sarafis et al., 2016), female nurses should be supported by their male counterparts when implementing FCC practice. As male nurses were found to be optimistic, nurse managers could make deliberate efforts to pair male nurses with their female counterparts to enhance support. However, the moderating effects of nurses of both gender on the relationship between FCC practice and FCC perception in Malawi could be further elucidated by a qualitative study.

The moderating effect of a nurse with children on the relationship between FCC perception and practice was found to be significant in this study. The value of this finding is that compared with nurses without children, nurses with children are associated with a stronger relationship between FCC perception and FCC practices, which may increase the adoption and implementation of FCC. This finding is also supported by linear regression analysis in the current study. The scarcity of literature on this topic means that these findings contribute limited evidence from the perspective of moderation to the FCC literature.

The current study also found through linear regression analysis that nurses with children were more likely than others to implement FCC practices. While these findings partially support our hypotheses, they do not explain why nurses with children appear to embrace FCC, let alone the observed moderation effects. There is a lack of substantive evidence to support the moderating effect of having children and its relationship with FCC. More qualitative studies are needed in this area, which thus has implications for future research.

The current study found a moderating effect of nurses' clinical experience on the relationship between FCC perception and FCC practice. Specifically, nurses' experience is likely to have a positive effect on the strength of FCC implementation. Although the effect of nurses' experience on the relationship between FCC perception and FCC practice is not well documented, the current findings support those of previous studies and strengthen the evidence. Dall'Oglio et al. (2018) concluded that nurses' work experience in hospital settings was associated with a higher perception of FCC practices. Given that FCC perception is associated with FCC practice, nurses' experience, therefore, significantly complements FCC implementation, as indicated by the current moderation analysis. Nurses who are experienced may have good working and therapeutic relationships with families. They may also have the capacity to appraise difficult FCC situations. In line with the current study findings, Bruce et al. (2002) reported that experienced nurses have the potential to break barriers and exceed families' expectations of care. Although those conclusions may support the current

findings, future researchers may use nurses' experience to support the implementation of FCC interventions. These interventions may include studying the effects of nurse-led parent–professional collaborations on certain family and child health outcomes in Malawi. The researcher may use experienced nurses to support implementation of such an intervention.

Analysis of the effect of working in a medical–surgical ward showed that this moderator is likely to weaken the relationship between FCC practice and FCC perception. Integration of the findings through linear regression and moderation analysis provided strong evidence of the role of the ward setting in modeling FCC implementation in Malawi. The moderation analysis results from the current study can be partly explained by the results of regression analysis which highlight that working in a medical–surgical ward can affect the implementation of FCC in Malawi. Although an effect of working in a medical–surgical ward and on the relationship between FCC perception and FCC practice was not previously established, reports have described the contribution of the work environment to FCC (Dall'Oglio et al., 2018; Matziou et al., 2018). Dall'Oglio et al. (2018) concluded that working in a long-term care ward affected nurses' FCC perception and FCC practice. Matziou concluded that working in an intensive care unit was likely to be associated with higher levels of FCC perception and FCC practice. These earlier studies support the notion that the working environment can weaken the relationship between FCC perception and FCC practice. However, studies are needed to explore how medical–surgical wards moderate this relationship. Like the other moderators identified in the current study, working in a medical–surgical ward may support the development of a new FCC model to explain the implementation of FCC in developing countries.

Practice implications

Understanding the moderating effects of nurses' characteristics on the relationship between FCC perception and FCC practice is of utmost importance to researchers and nursing managers and may facilitate the development of FCC interventions favorable to these potential moderators and facilitate the integration of FCC into routine policies and practices. For instance, policy makers may use nurses' vast experience as the basis for deploying them to areas where FCC practice is most needed. The identified moderators of the relationship between FCC perception and FCC practice are important and could help formulate critical questions to refine FCC theory and improve both studies of FCC and measurement of the impact of proposed FCC interventions. Furthermore, although the identified moderators are non-modifiable, they can be used to test and develop interventions and test hypotheses and FCC theory in future studies. For instance, one could hypothesize regarding whether male or female gender is associated with the effective implementation of developmental and psychological needs of children and their parents, the effects of nurse–parent collaboration, and the provision of emotional support. Although these moderators are the first to be identified in the FCC literature and are preliminary, assessment of their real impact will require further support from empirical research in the future. The current lack of substantive evidence to support the moderating effect of nurses having children on the relationship between FCC perception and FCC practice indicates the need for qualitative studies in this area.

Furthermore, to increase our understanding of the moderating effects of the identified moderators, robust randomized controlled trials of the implementation of FCC interventions are needed.

Limitations

The use of a cross-sectional study design means that no explicit conclusions about cause–effect relationships can be drawn. Moreover, although the nurses recruited in this study worked in pediatric settings in a single country, differences in the availability of resources and staffing patterns across settings may have affected the nurses'

experiences and their implementation of FCC in routine practice. Furthermore, gender differences also posed a direct effect on FCC perception on FCC practice. The workplace and other contexts under which both male and female nurses work may have played a role in the gender differences. Moreover, this is the first study to explore potential sociodemographic moderators associated with the relationship between FCC perception and FCC practice. The substantive applicability of these findings is based mainly on the choice of non-modifiable moderators, namely the nurses' background characteristics. Thus, the findings of this study need to be interpreted with caution.

Conclusion

In this study, a significant relationship between FCC perception and FCC practice was identified. As this was an exploratory moderation analysis, it was imperative to apply a simple Hayes moderation framework. Given that, on average, the moderation analysis showed ΔR^2 effect sizes of 1%–2.3%, this change is consistent within the estimated R^2 as estimated by the power analysis when the sample size was estimated. Furthermore, as no previous study had explored the effects of non-modifiable or modifiable moderators in the context of FCC, it is difficult to compare the magnitudes of the observed changes with findings from other FCC studies; however, this remains a significant finding that warrants further study. In the future, studies that include moderating variables other than FCC perception, FCC practice using nurses' background characteristics are needed.

The current findings offer several opportunities to establish relationships of FCC constructs to refine the hypothesized model, such as path analysis. Broadly, randomized controlled trials could be conducted using moderators that positively impact FCC to test FCC interventions in studies on the effectiveness of family-to-family support, the effects of parent–professional collaboration on children's and families' health outcomes, the effects of emotional support on nurses' health outcomes, and the effects of meeting developmental and psychological needs on children's clinical outcomes. However, the current study only provides evidence of the effects of some non-modifiable moderators in the context of FCC. Future studies involving modifiable moderators are therefore warranted.

Authorship credit statement

PGMC, CWC, and CLW conceived and designed the study. PGMC collected data and conducted the primary analysis. CWC, CLW, SS, AC and FD performed a critical review and analysis of the manuscript, curation of the data, and further editing and writing of the manuscript. All authors gave their final approval to publish this version of the manuscript.

Funding

The authors declare that they received no grant from any funding body or agency in the commercial, public, or not for profit sectors.

Declaration of Competing Interest

The authors have no potential conflicts of interest to declare regarding this publication.

Acknowledgment

Professional English language editing support provided by Asia Edit (asiaedit.com).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pedn.2023.09.004>.

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