

Effect of Family-Centered Care on Maternal Coping and Participation in the Care of their Children with Traumatic Brain Injury

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Abstract

Background: Children with traumatic brain injuries need specialized care, so their mothers must be provided with adequate information required to give this care. Using family-centered care in practice supports families, particularly mothers and involves them in the care of their children. **The present study aimed:** To evaluate the effect of family centered care intervention on coping patterns of mothers and participation in caring for their children with traumatic brain injury. **Subject & Methods:** A quasi- experimental study was conducted on 50 mothers whose children had traumatic brain injury at Accidental Hospital's Neuro-Surgical Department in Zagazig University Hospitals. **Tools:** Five tools were used as follows: Mothers and children socio-demographic data, Family-Centered Care Scale, Index of Parent Participation, Mothers' Reported Practice Checklist and Coping Orientation to Problems Experienced Inventory Scale. **Results:** Nearly three-quarters of the studied mothers provided moderate participation in activities of care for their children before the intervention that improved to a maximum participation among all of them post the intervention. More than half of mothers demonstrated low coping patterns pre-test, compared to the majority of them showed a higher coping post-test. Furthermore, there were highly statistically significant differences between the total studied mothers' coping patterns & their participation mean scores pre/ post-test ($P \leq 0.001$). **Conclusions:** The family-centered care intervention had a significant effect on enhancing mothers' coping patterns and participation in the care of their children with traumatic brain injury. **Recommendations:** Designing and implementing educational programs for pediatric nurses to promote family centered care in clinical practice.

Keywords: Care participation, Children, Family centered care, Maternal coping & Traumatic brain injury.

Introduction

Traumatic brain injury (TBI) is the leading cause of death and impairment among children aged 1 to 18 years. The condition is caused by a mechanical blow to the head which interferes with normal brain function. It is usually categorized as mild, moderate and severe according to the Glasgow Coma Scale and can have fatal consequences (Haydel et al., 2024).

According to the Global Burden of Disease, there were 27 million new cases of TBI globally in 2016 with associated permanent cognitive, physical, and behavioral disabilities (Al-Hajj et al., 2023). In the United States, pediatric TBI leads to over 500 thousand visits emergency hospitals and approximately 60 thousand hospital admissions annually (Haydel et al., 2024). While in Egypt El-Farouny, (2021) reported that during one year, from January to December, 2019, 423 cases of traumatic head injuries were seen in the emergency room of Menoufia University Hospital.

Children's brain trauma is responsible for a significant number of emergency rooms and hospitalizations yearly and continues to be a leading cause of pediatric mortality and disability due to the consequent physical and intellectual troubles

(Chevignard et al., 2020). Diagnosis of traumatic brain injury may throw the family into disarray because of its associated problems, like the unknown of medical results, losing parental function, physical appearance alterations, altering the daily routines, financial hardships, and fear of unknown and social stigma (Fabricius et al., 2020). Unfortunately, survivors of severe TBI in childhood are typically experience behavioral, cognitive, emotional and physical impairments. So, early detection and appropriate care of the injured children significantly influence the outcomes (Boos et al., 2022).

Mothers of children with TBI typically suffer from a lot of stressors throughout their child's therapy and typically look for more additional information as they are more likely to take an active role in their children's care and spend more time at their bedside (Whiffin et al., 2021). Additionally, mothers cope in different ways based on personal and family related factors including the degree of child's severity, the timing of the diagnosis, the manifestations, prior traumatic experiences, and the family's reactions (Lalonde et al., 2020).

Traumatic brain injury and emergency hospitalization bring up a number of changes, difficulties, and

roadblocks for families. It is advised to use the FCC model to reduce the undesirable effects of this experience on children and family life and to provide better results over the short, medium, and long terms (Rasmussen et al., 2021).

Family centered care (FCC) respects and responds to each family's unique needs and values. The main concepts of the FCC include dignity and respect, involvement, information exchange, and cooperation, which depend on a partnership relationship between the healthcare team and families (Johnson, 2023; and Seniwati et al., 2023). Implementation of FCC interventions leads to multiple beneficial effects, such as reducing of parental stress, enhancing parent competency in child care, lower hospitalization rates, as well as decreasing readmission rates following discharge, minimizing long-term morbidity, and better family satisfaction (Abukari & Schmollgruber, 2023).

Family-centered care is an essential approach for engaging, teaching, and supporting family members (Hill et al., 2019). One of the key ideas of FCC is family presence with the child at the bedside during their hospital stay that leads to good communication, higher patient satisfaction, and better results (Sanyod et al., 2021).

Children's traumatic brain injuries need specialized care since they have complicated and urgent treatments. Parents must be provided with adequate information required to give this kind of care. Using FCC in practice enhances the well-being of children and families, lessens stress & anxiety, and strengthens the bond between parents and children (Milford, 2016; Agrawal et al., 2024).

Nursing care of traumatic brain injury involves monitoring the child's level of consciousness, doing a thorough, repeated neurologic examination at regular intervals, and recognizing the manifestation of elevated intracranial pressure (ICP). The child's head should also be slightly raised. Furthermore, implementing safety protocols and seizure avoidance techniques, together with giving the prescribed anticonvulsant, as well the nurse should minimize the suffering and anxiety for both the child and the family (Abd El-Azim et al., 2019).

Significance of the study

Trauma in Egypt is a serious health issue which requires priority attention as mothers face challenges and stress when caring for their children. So, medical care professionals should assess families & their adapting mechanisms, help them to apply FCC, and encourage them to engage in the everyday routines required to care for their children (Hussein et al., 2022). Therefore, the aim of this study was to highlight the value of helping families particularly,

mothers to cope with TBI and participate more actively in the care.

Aim of the study

The present study aimed to evaluate the effect of FCC intervention on coping patterns of mothers and participation in the care of their children with TBI.

Hypothesis

- H1:** Studied mothers are expected to have good knowledge about core concepts of FCC after the intervention.
- H2:** The mothers' participation in caring of their affected children is expected to be higher following the intervention.
- H3:** The mothers' coping pattern is expected to be greater compared to before the intervention.
- H4:** Family-centered care intervention is expected to improve mothers' coping patterns and involvement in providing TBI care for their children.

Subject and Methods

Research design:

For this research, a quasi-experimental design (one group Pretest Posttest design) was employed.

Setting:

The present study was carried out at Neuro-Surgical Department at the Accidental Hospital which is affiliated to Zagazig University Hospitals. It is situated on the fourth floor and composed of five rooms designed for injured adults, each with 25 beds, and two rooms of these dedicated for children with 13 beds.

Subjects:

The study included 50 mothers and their children with TBI aged 5 to 15 years of both sexes and accepted to participate in the study.

Sample size:

Sample size calculation was estimated using the Power analysis program of Statistics Kingdom., based on Rasmussen et al., (2021) to detect a medium effect size (0.5), α error rate of 0.05, a 95% confidence interval, and 90% power. Therefore, a sample size of 50 children and their accompanying mothers was estimated after accounting for a 15% dropout rate (T-test sample size calculator and Z-test sample size calculator, 2022).

Tools for data collection:

Five tools were used by the researchers to collect the necessary data.

Tool (I): Mothers and Children Socio-demographic Data

It consists of the following two parts:

Part A: Characteristics and medical history of the studied children including their age, sex, educational grade, injury severity, TBI causes, type of problem post injury and length of hospital stay.

Part B: Characteristics of the studied mothers such as age, educational level, occupation, residence and number of family member and family type.

Tool (II): Family-Centered Care Scale (FCCS)

Family-Centered Care Scale (FCCS) is a new evaluation tool designed for parents to evaluate nursing care provided during the hospitalization period (pre/post), it included 21 items and adopted from (Arslan et al., 2019). The items were formatted using a five-point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). The scale was composed of three sub-dimensions as support (10 items), collaboration (8 items), and respect (3 items). The average response time of the scale was 15 min. Total score can range from 0-105 that classified as

- **Poor score <60%.**
- **Good score ≥60%.**

Tool (III): The Index of Parent Participation (IPP)

It was adopted from Abdelkader et al., (2016) that is used to evaluate how much parental involvement particularly mothers occurs throughout hospital stays (pre- and post). The IPP consisted of 26 items and gauged parents' true involvement in child care. This tool's 26 elements are divided into four categories: Activities related to daily living ADL (1-6 items), providing comfort includes (7-13), advocating for their child (14-22) and technical task (23-26). A two-point rating system was used to assess the mother's involvement in their children's care while they were in the hospital (zero for no participation, and one score for yes participation). The overall score varied from 0 to 26 (100%), with greater mean scores denoting greater involvement from mothers. It was classified as follows:

- Mothers' **minimum** participation score varied from 0 to 9.
- **Moderate** participation level in caring activities of their affected children was 10 to 18.
- The **maximum** score for participation (mothers who participated in the program gave their children the best possible care) was between 19 and 26.

Tool IV: Mothers' Reported Practice Checklists

The researchers created it as guided by [Kyle & Carman, (2013); Perry et al., (2014); Glasper et al., (2016); Hockenberry et al., 2017; Abd El-Azim et al., (2019); & Shaikh et al (2024)] to assess mothers reported practice (pre/post) as regards pain relief (6 steps), nutrition (10), reduce stimuli (7), protect the child from injury (4), swelling care (2), head position (2) and temperature control (8), seizure prophylaxis (3), wound care (5), maintain adequate cerebral tissue perfusion (7), When should I call the doctor (12). Mothers' practices were graded using a scoring method where one point was awarded for each step done and zero for not done. As a result, the

mothers' overall practices were divided into two categories:

- **Unsatisfactory <75%.**
- **Satisfactory ≥ 75%.**

Tool V: Coping Orientation to Problems Experienced Inventory Scale (COPE)

It is 60-item self-report questionnaire that adopted from (Carver et al., 1989); it is used by the caregiver to cope with their child's injury and its consequences. It assessed several facets of coping behavior and interested in how mothers dealing with the stress that child's injury has created, the instructions for the situational version of the COPE were given. Four-point Likert scales were used to format the items: 1 represented not doing this at all, 2 represented doing this somewhat, 3 represented doing this in a medium amount, and 4 represented doing this a lot. The total score ranged from 0 to 260. **Copping patterns were lower if the total score was <85% and higher ≥85%.**

Method:

Family- centered intervention program:

The researchers created it to help families-mothers in particular-to take care of their children who have TBI.

General objectives of intervention program:

The intervention program's goal was to enhance mothers' coping patterns and involvement in providing TBI care for their children.

The intervention program was developed through four phases as follows:

Assessment Phase

At this stage, each mother was interviewed individually. The researchers completed the demographic data of the participants, which took between twenty and thirty minutes to complete. The mothers were asked to evaluate their responses on the rating scales, and the researchers filled the FCC, Participation, Coping scale (tools II, III, and V). It took an average of 30 to 45 minutes to complete the scales.

Planning Phase

After doing a thorough assessment of the participants and reviewing the relevant studies on how mothers cope with TBI and take care of their children, the researchers developed the FCC intervention. The researchers created Arabic booklet to act as a referral manual for mothers who are looking for their TBI children and to teach them the coping mechanisms for handling the stress associated with their children's injury. The educational classroom and children's rooms at the neurosurgical department were the places of learning. Role-playing, lectures, and modified small-group discussions were among the teaching methods used. A range of suitable resources were employed, such as instructional CD, films, a laptop, a power presentation, and a brochure.

Implementation Phase

The family centered care intervention was carried out in small groups of mothers; each group consisted of three to five mothers. There were four sessions in all that covered the practical and theoretical contents, with an average duration of thirty minutes per session. During sessions, the researchers answered all mothers' queries, resolved any complaints during hospitalization, and identified the origins of their tension and worry, provided all mothers an opportunity to speak and share their experiences.

First session: The researchers discussed the goal of the intervention, the number of sessions, the time of the meeting, the rules of the program, the expected results, and the advantages of participating in the program.

Second session: The researchers gave a brief overview about the core concepts of FCC and various coping mechanisms.

Third session: It included information about traumatic brain injury as definition, types, causes, treatment.

Fourth session: The researchers discussed the overall care provided such as pain relief, reducing stimuli, preventing the child injury, maintaining adequate cerebral tissue perfusion, seizure prophylaxis, wound care, head position, and when to call the doctor.

Evaluation Phase

- Using the same study tools, the researchers evaluated the FCC intervention's effect. During the child's hospital stay, the researchers followed up the studied mothers.
- Counseling and guidance were given by the researchers, affirming mothers' abilities, along with a reminder of the significance of FCC intervention.

Operational design

Pilot study

In order to assess the tools' clarity and applicability and to determine how long it would take to fill out the data, a pilot study with five mothers and their children (10%) was conducted. Based on the results of this study, the necessary modifications in reported practice checklists were performed. The research did not include the mothers who took part in the pilot trial.

Validity and reliability

After a careful analysis of the pertinent literature, socio-demographic data and checklists were created and approved by five professors: two pediatric nursing professors, two neuro-surgery professors, and one pediatrician professor. Every professor (100%) concurred that the validity of the study's tools was relevant to its goal. The reliability of tools was tested by using of Cronbach's alpha test. Reliability coefficient for Family-Centered Care Scale (FCCS) was **0.846**, for The Index of Parent Participation (IPP)

was **0.837**, for Mothers' Reported Practice Checklists was **0.784** and for Coping Orientation to Problems Experienced Inventory Scale was **0.90**.

Ethical Consideration

The ethical approval from the ethical committee of Faculty of Nursing, Zagazig University gave its approval to conduct the study with a code number 134 and a date of 9/7/2023, as well as an official permission of the health professionals of the above reported setting. All participants were informed of the study's goals and the data would only be used for scientific purposes in accordance with ethical rules. Furthermore, confidentiality regarding the identity of the participants and all supplied data will be secured. They were also informed they could leave the study at any time.

Field work

Following the identification of the participants who met the study's requirements, the researchers gave a brief explanation of the study's purpose and methodology and got each mother's signed consent. The meeting location and schedule were also decided upon by the researchers. The researchers greeted them at both the morning and afternoon shifts. Three days a week, on Sunday, Tuesday, and Wednesday, the researchers were accessible for data collection and implementation (post-test), which took place 48 hours after implementation of the intervention. Through the processes of assessment, planning, execution, and evaluation, the researcher began to gather data. This study was implemented from September 2023 to February 2024.

Administrative Design

The directors of the previously mentioned setting formally granted permission for the study to be conducted in the settings that were chosen.

Statistical Analysis

The collected data were analyzed by the Statistical Package of Social Sciences (SPSS) version 24. After complete entry, data were explored to detect any error, then, it was analyzed by the same program for presenting frequency tables with percentages. Qualitative data were presented as number and percent. Besides, Quantitative data were described as mean \pm SD as appropriate. The study data were tested for normality by the Kolmogorov-Smirnov test. For normally distributed variables, a paired sample t-test was used to indicate an actual difference between the research variables. Pearson correlation (r) was performed to measure the strength of a linear relationship between total main research targeted variables. The Chi-Square and McNemar Chi-Square tests were used to check whether the frequencies changed from pre to post tests or not. All tests were performed at a level of significance (P-value) ≤ 0.05 was considered to be statistically significant.

Results

Table (1): Socio-demographic characteristics of the studied children (n=50)

Children's socio-demographic Characteristics		No=50	
		No.	%
Age	5-<10	14	28
	10-<15	22	44
	15	14	28
	Mean ± SD	12.00 ± 3.0	
Sex	Boys	36	72
	Girls	14	28
Educational grade	Primary	21	42
	Preparatory	15	30
	Secondary	14	28
Injury severity	Mild	14	28
	Moderate	23	46
	Severe	13	26
Causes of TBI	Falls	28	56
	Road traffic injuries	15	30
	Violence	7	14
Type of problems post injury*	Problems with mobility	29	58
	Problems with self-care	29	58
	Problems with activity	50	100
	Anxiety & depression	35	70
	Pain	36	72
Length of hospital stays (days)	7 -< 15	29	58
	15-<30	14	28
	30-<45	7	14
	Mean ± SD	16.02 ± 8.7	

*More than one answer

Table (2): Socio-demographic characteristics of the studied mothers (n=50)

Mothers' socio-demographic characteristics		No=50	
		No.	%
Mothers' age	30-<40	15	30
	40-<50	28	56
	≥50	7	14
	Mean ±SD	41.64 ±4.5	
Mothers' education	Read and write	7	14
	Secondary	29	58
	Collage and postgraduate	14	28
Mothers' occupation	Housewife	22	44
	Working	28	56
Number of family members	3-5	38	76
	6-10	12	24
	Mean ± SD	4.24 ± 0.4	
Family type	Nuclear	43	86
	Extended	7	14
Residence	Rural	21	42
	Urban	29	58

Table (3): Knowledge of studied mothers about the core concepts of family centered care before and after FCC intervention (n=50)

Items	Pre-Test N=50		Post-test N=50		Significance tests
	No.	%	No.	%	
Support score = (50)					
Poor	28	56	4	8	$\chi^2=26.47,$ * $p \leq 0.001$
Good	22	44	46	92	
Mean \pmSD	31.62 \pm5.1		39.40 \pm5.4		t=14.03, * $p \leq 0.001$
Collaboration score=(40)					
Poor	28	56	2	4	$\chi^2=32.19,$ * $p \leq 0.001$
Good	22	44	48	96	
Mean \pmSD	23.28 \pm4.7		33.80 \pm 5.4		t=24.81, * $p \leq 0.001$
Respect score=(15)					
Poor	30	60	9	18	$\chi^2=18.53,$ * $p \leq 0.001$
Good	20	40	41	82	
Mean \pmSD	6.26 \pm 1.4		8.02 \pm 1.5		t=14.70, * $p \leq 0.001$

χ^2 : McNemar Chi square test,

t: Paired t-test,

* $P < 0.05$ significant

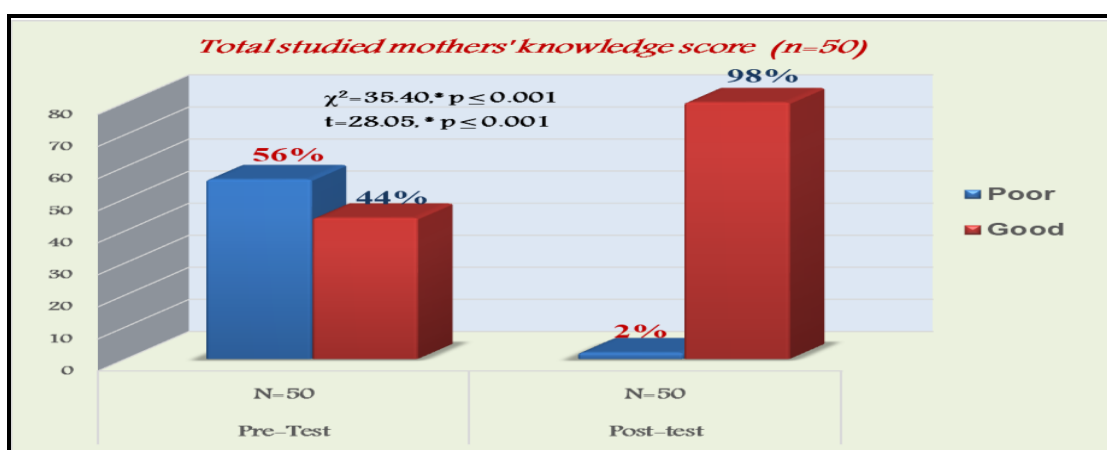


Figure (1): Total studied mothers' knowledge scores regarding the core concepts of FCC before and after the intervention

Table (4): Participation of studied mothers scores in their children' care during hospitalization before and after FCC intervention (n=50)

Items	Pre-Test N=50		Post-test N=50		Significance tests
	No.	%	No.	%	
Activities of Daily Living (ADL) score= (6)					
Minimum	00	00	00	00	$\chi^2=17.64,$ * $p \leq 0.001$
Moderate	15	30	00	00	
Maximum	35	70	50	100	
Mean \pm SD	4.12 \pm 1.0		5.48 \pm 0.7		t=8.44, * $p \leq 0.001$
Providing Comfort score= (7)					
Minimum	1	2	00	00	$\chi^2=52.55,$ * $p \leq 0.001$
Moderate	35	70	1	2	
Maximum	14	28	49	98	
Mean \pm SD	3.96 \pm 1.1		5.68 \pm 0.8		t=15.52, * $p \leq 0.001$
Advocating for their child score= (9)					
Moderate	36	72	3	6	$\chi^2=45.77,$ * $p \leq 0.001$
Maximum	14	28	47	94	
Mean \pm SD	6.12 \pm 1.0		7.78 \pm 0.9		t=13.84, * $p \leq 0.001$
Providing Technical Care score= (4)					
Minimum	15	30	00	00	$\chi^2=42.75,$ * $p \leq 0.001$
Moderate	28	56	12	24	
Maximum	7	14	38	76	
Mean \pm SD	1.84 \pm 0.7		2.84 \pm 0.5		t=13.22, * $p \leq 0.001$

χ^2 : Chi square test,

t: Paired t-test,

* $P < 0.05$ significant.

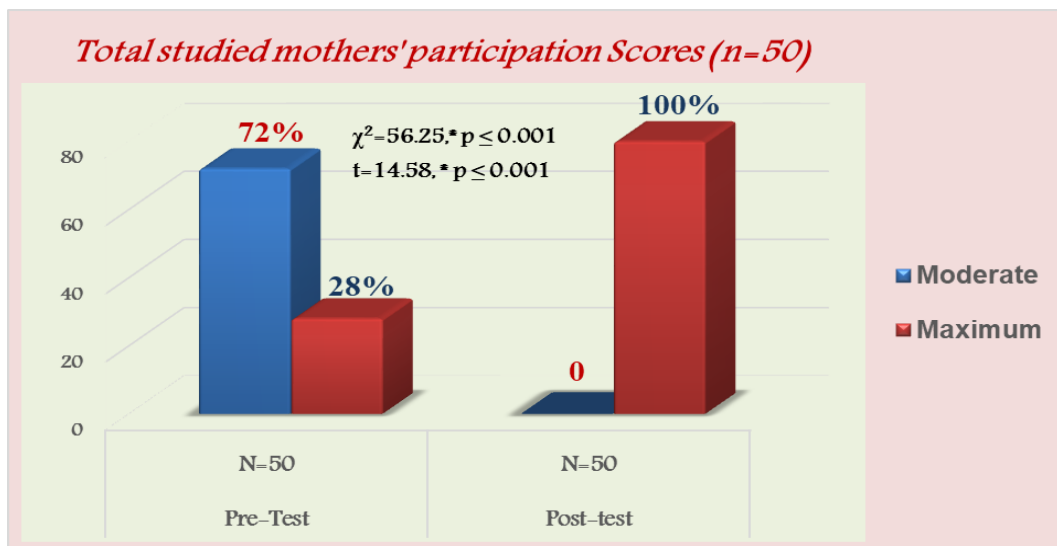


Figure (2): Total studied mothers' participation scores in child care during hospitalization before, and after FCC intervention (n=50)

Table (5): Mothers' reported practice regarding child's care before, and after FCC intervention (n=50)

Items	Pre-Test N=50		Post-test N=50		Significance tests
	No.	%	No.	%	
Pain relief score = (6)					
Unsatisfactory	43	86	5	10	$\chi^2=57.85,$ * $p \leq 0.001$
Satisfactory	7	14	45	90	
Mean ± SD	3.70 ± 0.7		5.12 ± 0.6		t=16.48, * $p \leq 0.001$
Nutrition score = (10)					
Unsatisfactory	50	100	6	12	$\chi^2=78.57,$ * $p \leq 0.001$
Satisfactory	00	00	44	88	
Mean ± SD	6.28 ± 0.7		8.30 ± 0.8		t=24.26, * $p \leq 0.001$
Reduce stimuli score = (7)					
Unsatisfactory	44	88	5	10	$\chi^2=60.86,$ * $p \leq 0.001$
Satisfactory	6	12	45	90	
Mean ± SD	4.56 ± 0.9		6.34 ± 0.7		t=23.07, * $p \leq 0.001$
Protect child from injury score = (4)					
Unsatisfactory	43	86	3	6	$\chi^2=64.41,$ * $p \leq 0.001$
Satisfactory	7	14	47	94	
Mean ± SD	1.82 ± 0.6		3.14 ± 0.5		t=19.80, * $p \leq 0.001$
Swelling care score = (2)					
Unsatisfactory	43	86	5	10	$\chi^2=57.85,$ * $p \leq 0.001$
Satisfactory	7	14	45	90	
Mean ± SD	0.68 ± 0.7		1.90 ± 0.3		t=12.70, * $p \leq 0.001$
Head position score = (2)					
Unsatisfactory	50	100	6	12	$\chi^2=78.57,$ * $p \leq 0.001$
Satisfactory	00	00	44	88	
Mean ± SD	0.56 ± 0.5		1.88 ± 0.3		t=19.80, * $p \leq 0.001$

χ^2 : McNemar Chi square,

t: Paired t-test,

* $P < 0.05$ significant.

Table (6): Mothers' reported practice regarding child's care before, and after FCC intervention (n=50)

Items	Pre-Test N=50		Post-test N=50		Significance tests
	No.	%	No.	%	
Temperature control score = (8)					
Unsatisfactory	9	18	00	00	$\chi^2=9.89,$ * p=0.002
Satisfactory	41	82	50	100	
Mean ±SD	6.36 ± 0.8		7.40 ± 0.7		t=18.29, * p ≤ 0.001
Seizure prophylaxis score = (3)					
Unsatisfactory	43	86	8	16	$\chi^2=49.02,$ * p ≤ 0.001
Satisfactory	7	14	42	84	
Mean ± SD	1.70 ± 0.7		2.84 ± 0.4		t=12.61, * p ≤ 0.001
Wound care score = (5)					
Unsatisfactory	36	72	6	12	$\chi^2=36.94,$ * p ≤ 0.001
Satisfactory	14	28	44	88	
Mean ± SD	2.98 ± 0.8		4.16 ± 0.6		t=21.50, * p ≤ 0.001
Maintain adequate cerebral tissue perfusion score = (7)					
Unsatisfactory	27	54	6	12	$\chi^2=19.94,$ * p ≤ 0.001
Satisfactory	23	46	44	88	
Mean ± SD	5.30 ± 1.1		5.74 ± 0.8		t=2.49, * p =0.016
Reporting doctor score = (12)					
Unsatisfactory	7	14	1	2	$\chi^2=4.89,$ * p =0.027
Satisfactory	43	86	49	98	
Mean ± SD	10.12 ± 1.2		11.00 ± 1.1		t=12.96, * p ≤ 0.001

χ^2 : McNemar Chi square,

t: Paired t-test,

*P<0.05 significant.

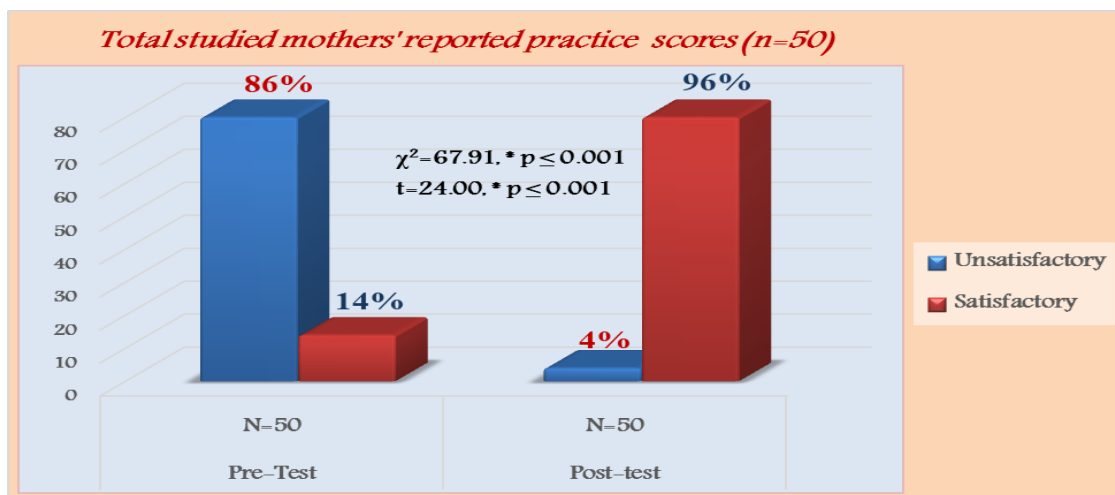


Figure (3): Total reported practice scores among studied mothers regarding child care before and after FCC intervention.

Table (7): Coping patterns of studied mothers before, and after FCC intervention (n=50)

Items	Pre-Test N=50		Post-test N=50		Significance tests
	No.	%	No.	%	
Total mother coping pattern score=(240)					
Lower coping pattern	27	54	7	14	$\chi^2=17.82,$ * p ≤ 0.001
Higher coping pattern	23	46	43	86	
Mean ± SD	209.76 ± 12.4		224.36 ± 10.9		t=17.83, * p ≤ 0.001

χ^2 : McNemar Chi square test,

t: Paired t-test,

*P<0.05 significant.

Table (8): Correlation matrix between the total studied mothers’ knowledge, participation, coping pattern and reported practice scores regarding the child’s care pre/post-test (n=50)

Items		Total FCCS	Total participation index	Total reported practice	Total COPE Inventory		
Pre-test	Total FCCS	r	1	.373**	-.027-	.457**	
		p	---	.008	.850	.001	
	Total participation index	r	.373**	1	.856**	.593**	
		p	.008	----	.000	.000	
	Total reported practice	r	-.027-	.856**	1	.341*	
		p	.850	.000	----	.015	
	Total COPE Inventory	r	.457**	.593**	.341*	1	
		p	.001	.000	.015	----	
	Post-test	Total FCCS	r	1	.059	-.012-	.377**
			p	----	.683	.936	.007
Total participation index		r	.059	1	.490**	.183	
		p	.683	----	.000	.204	
Total reported practice		r	-.012-	.490**	1	.404**	
		p	.936	.000	----	.004	
COPE Inventory		r	.377**	.183	.404**	1	
		p	.007	.204	.004	----	

*Correlation is significant at the 0.05 level.

**Correlation is significant at the 0.01 level

Table (1): Shows that, 44%, 42%, and 46% of the studied children aged 10 to less than 15 years old, were in primary school and suffered from moderate brain injuries respectively. It was found that 72% of the studied affected children were boys. Regarding causes, 56% of the brain injuries were caused by falls, followed by road traffic injuries (30%). The most common problems caused by brain injuries were problems with activity (100%), followed by anxiety and depression (70%). Also the same table portrays that 58% of studied children stayed in the hospital for 7 to less than 15 days.

Characteristics of studied mothers were clarified in **Table (2):** It was found that 56% and 58% of the studied mothers were aged 40 to less than 50 years with a mean age of 41.64 ± 4.5 and 58% had secondary education. Regarding occupation, 56% of participants were working. In addition, 76% of mothers had 3 to 5 siblings; 86% belonged to nuclear families and 58% lived in urban areas.

Table (3): Demonstrates that 56% of mothers reported a “poor” level of knowledge in support domain before the FCC intervention, compared to 92% of them had a “good” score after the intervention. In the collaboration and respect domains before the FCC intervention, a “poor” level was indicated by 56% and 60% of the studied mothers, respectively. In comparison with post-test results, the level of mothers’ knowledge improved to a “good” level among 96% and 82% of mothers, correspondingly. Also, there were highly statistically significant differences between the studied mothers’ knowledge mean scores (P<0.001).

As observed from **Figure (1):** It was found that 56% of the studied mothers reported a poor total knowledge score about the core concept of FCC, which improved to 98% of them had a good score after the FCC intervention with a highly statistically significant difference (t= 28.08, P<0.001).

Table (4): Declares the total level of mothers’ participation. It was found that 72% of mothers had a moderate participation score pre-test, while all of them had a maximum level of participation post-test. Furthermore, there were highly statistically significant differences between the mean scores of all the studied mothers’ participation domains: activities of daily living, providing comfort, advocating for their child, and providing technical care pre/posttest (P<0.001).

The total mothers’ participation scores were indicated in **Figure (2):** It was found that 72% of the studied mothers had a moderate level of participation prior to the FCC intervention, while 100% of them had a maximum participation score following the intervention with a highly statistically significant difference (t=14.58, P<0.001).

Table (5): Shows that 86%, 100%, 88%, 86% & 100% of the studied mothers had an unsatisfactory practice before the program regarding pain relief, child nutrition, stimuli reduction, preventing the child from injury, and head position, respectively. Compared to 90%, 88%, 90%, 94% & 88% of them had a satisfactory score after the program, respectively. Additionally, there were highly statistically significant differences between the mean

scores of all the studied mothers' reported practice after FCC intervention ($P \leq 0.001$).

Table (6): Clarifies that 86%, 72%, & 54% of the studied mothers had an unsatisfactory practice level regarding seizure prophylaxis, wound care, and maintaining adequate cerebral tissue perfusion respectively, before FCC intervention, while 84%, 88%, and 88% of them had satisfactory practice after the intervention, respectively. Furthermore, there were highly statistically significant differences between the mean scores of all the studied mothers' reported practices before and after FCC intervention ($P \leq 0.001$).

The total mothers' reported practice scores were illustrated in **Figure (3)**: It was found that 86% of the studied mothers demonstrated an unsatisfactory practice regarding the child care before the FCC intervention, while 96% of them had a satisfactory practice after the intervention with a highly statistically significant difference ($t=24.00$, $P \leq 0.001$).

Table (7): Portrays the total scores of mothers' coping patterns pre- and post- test. It was indicated that 54% of mother demonstrated lower coping patterns pre-test, while 86% of them showed a higher coping after the intervention. There was a highly statistically significant difference between the studied mothers' coping mean scores before and after the intervention ($P \leq 0.001$).

Table (8): Reveals that there were statistically significant positive correlations between the total studied mothers' coping pattern, knowledge, and reported practice scores regarding the child care in relation to post-test results ($P < 0.05$).

Discussion

Family-Centered Care is a new crucial strategy for medical providers, which acknowledges the family as an integral and active participant in a child's care and integrates their viewpoints and abilities into the medical procedures. This method recognizes that the family has a significant impact on a child's well-being and that their participation is essential for obtaining the desired results (**Johnson, 2023**).

Exchange information between the nurse and parents, as well as the nurses' facilitation of parental involvement in their children's care is essential elements of these relationships (**Sjoberg, et al., 2017**). Further knowledge about coping mechanisms is needed for mothers and how to care for their TBI children so evaluating how a FCC intervention affects mothers' ability to cope and their involvement in practice was the aim of this research.

The findings of the current study revealed that nearly half of the studied children aged 10 to less than 15 years old with a mean age 12.0 ± 3.0 and approximately three-fourths of the injured children

were boys. This may be due to the developmental nature of this age as boys are hyperactive and playing usually outside homes than girls. This goes in line with **Jones et al. (2020)**, who clarified that more than half of studied children were males and had age between 5 and 16 with a mean age 13.0 ± 3.5 .

The present study showed that more than half of the studied mothers were aged from forty to less than fifty years with a mean age 41.6 ± 4.5 and had secondary school education, as well as more than half of them resided in urban areas. Such results disagree with **Khalil & Elsayed (2022)**, who reported that two thirds of the studied mothers were between thirty to less than forty years old and more than two thirds of them had university education, as well as more than two thirds of them lived in rural areas.

Concerning the causes of TBI, it was noted that more than half of traumatic brain injuries were caused by falls, followed by road traffic injuries and violence. This may be due to these age groups are more hyperactive and may be more likely to use motor vehicles. This result is consistent with that of **Schutzman (2024)**, who found that falls, followed by car accidents and child maltreatment were the leading causes of brain injuries in children and adolescents. Also, **Reddy et al. (2017)** supported this finding that the higher percentages of injuries were due to falls, while motor vehicle accidents occurred in minor cases.

Concerning severity of TBI, the current research demonstrated that nearly half of children under the study had moderate brain injury, while only one quarter of them had severe brain injury. Such result may be related to the nature of the trauma. This finding goes in harmony with **Wade et al. (2010)**, who found that more than three quarters of participants had moderate trauma, while nearly one quarter had severe injury.

The study results revealed that all studied children had problems with activity, followed by anxiety and depression. This is due to damage to the growing brain, regardless of degree, which can alter a child's growth trajectory, impose limitations on their activities, and cause subsequent emotional upsets (**Tangarife et al., 2024**). Such finding agrees with **Mass et al. (2020)** who reported that TBI can cause behavioral and social alterations in youngsters

The present study portrayed that more than half of the studied children stayed in the hospital for 7 to less than 15 days, with a mean length of stay of 16.02 days. This finding may be attributed to the kind of the trauma, the requirements of traumatic children, and the recovery from the trauma. This is compatible with **Azhar & Aljefri (2018)**, who found that the mean duration of stay for children after an accident was

15.70 days and that over half of the children hospitalized ten days or more.

As regard mothers' knowledge about the core concept of FCC pre- and post-test. It was found that over half of participants had a poor knowledge score regarding FCC's core concept (support, collaboration, respect) before the FCC intervention. This finding goes in line with **Stuart & Melling (2014)**, who clarified that parent participants' awareness of the FCC was lower. Also, **Gill et al. (2014)** & **Hill et al. (2019)**, supported the present findings and reported parents had significantly lower scores regarding core concepts of FCC. From the researchers' opinions, mothers were hoping to participate in their children care; thus, all health professionals should respect child and their mother and provide them with knowledge, support, and clear instructions.

In comparison to the pretest, the majority of mothers in the study demonstrated a good level of knowledge about the fundamentals of FCC after the intervention. This may be due to the positive effect of the intervention. This agrees with **El-Tayar et al. (2021)**, who mentioned that after the intervention, parents' knowledge significantly improved. Also, **Abdel-Latif et al. (2015)**; **Moore et al. (2015)**; **Ismail et al. (2016)**; **Piovesana et al. (2017)**; and **Thomas et al. (2018)** reported similar results that following the implementation of the family-centered educational approach, the mean score of parents' knowledge improved significantly. This highlights the value of FCC in fostering genuine cooperation, the building of partnerships, and the exchange of information between patients, families, and healthcare team members (**Sanyod et al., 2021**).

Highly statistically significant differences were found between the mean scores of all the studied mothers' knowledge domains: support, collaboration, and respect before and after FCC intervention. This finding is in the same line with **Hussein et al. (2022)**, who illustrate highly statistically significant differences between mothers' knowledge about FCC's core concept prior and following the program.

Concerning mothers' participation, it was found that before the FCC intervention, almost three-quarters of mothers in the study participated at a moderate level; after the intervention, all of the mothers participated to the fullest extent possible. This result indicates the innate desire of all mothers to help with child care when their children are in the hospital in order to provide comfort and security for them. The same results were reported by both **Kalhor et al. (2022)**; **Jenkin et al. (2022)** & **Seniwati et al. (2023)**, they mentioned that implementing family-centered approach increases the participation and integrating a family-centered strategy into practice improve family

participation during treatment and had significant impacts on their families. On contrary, **Cox et al. (2017)**, who mentioned that FCC intervention, had no effect on family engagement. **Hussein et al. (2022)** discovered that there was a marked statistically significant improvement towards mothers' participation scores following the program compared to before. This finding goes in line with the results of this study that indicated there were highly statistically significant differences between the mean scores of all the studied mothers' participation domains: daily living activities, providing comfort, advocating for their child, and providing technical care before and after FCC intervention. This is attributed to child's physical and psychological problems related hospitalization can only be supported and managed by their mother. In addition, most parents could help administer medicine and console their agitated child throughout the frightening therapy.

Regarding mothers' reported practice, it was found that most of the mothers demonstrated unsatisfactory practices about the child care before the FCC intervention, while most of them had satisfactory practices after the intervention. This result goes in agreement with **El-Tayar et al. (2021)**, who reported that only 5% of the parents had acceptable procedures in place before implementation, although the majority had adequate overall practices for caring for their children following head trauma.

Similarly, **Abdel-Latif et al. (2015)**; **Abdelkader et al. (2016)**; & **Demianczyk et al. (2022)** found that overall parental satisfaction with understanding, communication, and cooperation in the child care rose as a result of FCC interventions. From the researchers' point of view, parents, especially mothers, were most often responsible for the child's care; therefore, mothers' need to participate in the child's care is most important to ensure that their children receive safe and effective care.

It was found that there was highly statistically significant difference between the studied mothers' reported practice mean scores before and after the FCC intervention. This matches with **El-Tayar et al. (2021)**, who found that following the session, parents' stated practices significantly improved, with a highly statistically significant difference. Moreover, **Moore et al. (2015)** and **De Bernardo et al. (2017)** mentioned that following the implementation of the family-centered educational model, there was a considerable rise in the mean score of parents' care.

As regards the studied mothers' coping patterns, the study finding showed that more than half of them had a low coping pattern before the FCC intervention, while the majority of them had a higher coping after the intervention. Such result may be

related to the importance of FCC in helping families especially mothers in adapting and coping with trauma. This goes in harmony with **Demianczyk et al. (2022)**, who clarified that nearly three quarters of studied parents showed less coping and promoted after intervention. Similarly, **Narad et al. (2017) & Hickey et al. (2018)**, discovered that FCC support families in adapting to life following pediatric brain injury and coping with trauma.

The present study revealed a marked improvement in mothers' coping patterns following FCC intervention with a statistically significant difference. Such results agree with **Wade et al. (2010)**, who noted that mothers reported higher rates of active coping post- injury with statistically significant differences. This result reflects the value of FCC intervention and the necessity of its application in clinical setting.

El-Tayar et al. (2021) found that strong positive correlations between studied parents' total knowledge and their total reported practices about the care of children after head trauma pre/post program. This finding goes in line with study results that revealed there was a statistically significant positive correlation between the studied mothers' knowledge and their reported practice. From the researchers' point of view, training mothers to provide the care for their children after the intervention is crucial for enhancing knowledge and reported practices.

Moreover, there were statistically significant positive correlations between mothers' knowledge about FCC core concept and participation in caring for their children pre/post the FCC intervention ($P < 0.05$). This may be attributed to the significant effect of FCC in helping mothers to engage in care activities. This finding matches with **Sanyod et al. (2021)**, who reported that FCC had a statistically significant positive correlation with parent participation in caring for hospitalized children.

Conclusion

It can be noticed that the family-centered care intervention had a positive effect on enhancing mothers' coping patterns and participation in the care of their children with TBI, as well as mothers' knowledge and practice significantly improved.

Recommendations

- Continuous effective intervention programs for pediatric nurses to encourage FCC implementation in clinical practice.
- Developing suitable booklets and written leaflets containing basic knowledge about TBI should be available and distributed in pediatric clinics.
- Parent coping support interventions should be included in routine care and tailored to the needs of

mothers to maximize the psychosocial results and adaptive coping for families with TBI children.

- Further research is needed to identify the obstacles or difficulties preventing FCC from being implemented in pediatric settings.

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