Effect of Implementing Continuous Care Model on Psychological Outcomes in Children undergoing Abdominal Surgery and Mother's Anxiety Level

[1]Amal Gharib Sabaq, [2]Basma Rabie Abdelsadik, [3]Madiha Hassan Bayoumi

Assistant professors of pediatric nursing, Faculty of nursing, Benha University

Abstract: Surgical operation can lead to emotional distress for both children and their families that persists for a long time after discharge. This distress is commonly reflected as anxiety and fear. Through continuous care model, children's anxiety and fear can be decreased. Aim of the study was to evaluate the effect of implementing continuous care model on psychological outcomes in children undergoing abdominal surgery and mother's anxiety level. Setting: This study was conducted at the surgical pediatric unit at Benha Specialized Pediatric Hospital affiliated to the Ministry of Health. Design: A quasi experimental design was utilized for conducting the current study. Subjects: 100 children accompanying their mothers were selected purposively and divided equally into study and control groups. Tools of data collection: Four tools were used: Personal and medical assessment sheet, children's fear scale, visual facial anxiety scale and Spielberger state anxiety inventory. Results: The results of this study showed that 56% and 68% of children in the study group had significantly mild fear after 1 week, and 1 month of implementation of the care model compared to 26% and 22% in the control ones (P< 0.000). Meanwhile, about more than half (52%) and more than two thirds (70%) of children in the study group experienced mild level of anxiety after 1 week and 1 month of implementation of the care model compared to less than one quarter (16% and 12% respectively) of the control ones. Besides, majority of mothers in the study group reported significantly mild anxiety level after one week and one month of implementation of the care model compared to the control ones (p<0.000).Conclusion: The current study concluded that the continuous care model was efficient in decreasing the level of anxiety and fear among children undergoing abdominal surgery as well as mother's anxiety level. Recommendation: Implement continuous care model in surgical pediatric units which will help children along with their mothers feel empowered and this will alleviate the risk of anxiety and fear. Future research is suggested to compare the differences between continuous care model and other intervention.

Keywords: Abdominal surgery, anxiety level, continuous care model, children, psychological outcomes and mothers.

1. INTRODUCTION

Surgery and hospitalization tend to induce negative behaviors and feelings in children [1]. Due to their developmental level and limited cognitive development, children use behavior rather than words to express the implied emotions. Common behavioral manifestations of fear, anxiety, and helplessness incorporate hostility, withdrawal, lack of cooperation and regression[2]. It is estimated that approximately 40% –60% of children undergoing surgery suffer from severe fear and anxiety which are associated with maladaptive behavior continuing for many weeks after surgery[3].

Anxiety is an emotion described by an uncomfortable sentiment of fear over anticipated events and may be related with body's reaction in the form of sympathetic, parasympathetic and endocrine stimulation[4]. Factors contributing to anxiety in

children involve separation from parents and home, loss of control, unfamiliar routines, surgical instruments and hospital procedures[5] . In addition, Parental anxiety may remain owing to the inadequate knowledge and information about the child's care during hospitalization and after discharge[6,7] .

Abdominal surgery is a broad classification of surgical procedures performed in the abdominal region to diagnose or treat a medical condition. It includes various techniques relying upon which abdominal organ is concerned. Most of these procedures traditionally require opening the abdomen with a large incision and are alluded to as open abdomen surgeries or laparotomies, which are considered as major operations that are followed by prolonged recovery. Laparoscopic surgeries just require smaller incisions that leave less scarring and cause less post-operative pain[8].

Continuous care model is a progressing procedure to accomplish efficient, interactive communication between the child as the subject of care and nurse as health-care services provider. The model is conducted to identify the needs and problems of the children as well as to stimulate them for applying the continuous health behaviors to help in improving and promoting their health[9]. The main objective of this model is to develop a program that prompts increases acceptance, attitude and proper performance for care, therefore disease and its possible complications able to be controlled[10].

Pediatric nurse plays a significant role in reinforcing, educating the mothers to deal with their children's disease, preparing them for proper cares pre, post operation and also help in mitigating their anxiety. Mothers are not prepared adequately for such care which leads to anxiety and long term behavioral disorders; hence, the nurses should intervene in the continuous mother's preparation especially at the discharge process[11]. Training is essential in preparing the children and their mothers, but it is not sufficient, children follow-up is needed[12]. Mother's contact with health care centers and applying telecommunication techniques are conventional follow-up methods[13].

Significance of the problem:

Abdominal surgery represents a wide range of pediatric surgery and involves correction of numerous types of anomalies[14]. Child's illness and hospitalization is a source of anxiety and stress for both the child and the parents[15]. Cope with anxiety in children is a crucial challenge in pediatric nursing practice.

According to the statistics department at Benha Specialized Pediatric Hospital (2018), the total annual admission to the pediatric surgical unit is 1850 children. The number of children who underwent abdominal surgeries was 750, and 300 of them were of school age (40%).

In the light of the clinical experience in the pediatric surgical unit for many years, it is noticed that many of the children who are scheduled for abdominal surgeries are exposed to various levels of anxiety, fear before and after surgery. Many strategies have been attempted to help children adapt with the upcoming surgery and despite these strategies, nothing much is done to lessen the children's fears and anxiety[16]. There is a dire need to develop continuous follow-up care. Although the importance of follow-up care on children's health, the effect of continuous follow-up care on psychological outcomes for children undergoing abdominal surgery has not been evaluated yet. So, the researchers implement a continuous care model for these children aspiring that the results from this study will emphasize the significance of incorporating continuous care model to provide holistic and quality care for easing the psychological burden of hospitalized children and this in turn would reduce mother's anxiety level.

Aim of the study:

The aim of this study was to evaluate the effect of implementing continuous care model on psychological outcomes in children undergoing abdominal surgery and mother's anxiety level through the following objectives:

-Assessing children's fear and anxiety before implementation of continuous care model.

-Assessing mother's anxiety level before implementation of continuous care model.

-Designing and implementing continuous care model based on their actual needs.

-Evaluating the effect of implementing continuous care model on children's fear, anxiety and mother's anxiety level.

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Research hypotheses:

H_1 - Children who received the education based on continuous care model will exhibit lower fear scores than those in the control groups.

H_2 - Children who received the education based on continuous care model will experience less anxiety level scores than those in the control groups.

H_3 - Mothers of children who exposed to the education based on continuous care model will report less anxiety level scores than those in the control groups.

H_4 - There was a significant positive correlation between children's anxiety level and mother's anxiety level.

2. SUBJECT AND METHODS

Research design:

A quasi-experimental research design was utilized to fulfill the aim of this study.

Settings:

The current study was carried out at the pediatric surgical unit at Benha Specialized Pediatric Hospital affiliated to Ministry of Health. It received children from all over Qaluobia governorate. The unit involved two rooms and each room contained 8 beds. The unit also involved an intermediate surgical care unit composed of five beds.

Subjects:

Sample size:

According to the total number of children (n=300) who were admitted to the previous mentioned setting (Benha Specialized Pediatric Hospital, statistical report, 2018), considering level of significance of 5%, and power of study of 80%, the sample size can be estimated using the following formula: n = [(Zα/2 + Zβ)^2 × {2(SD)^2}]/ (mean difference between the two groups)^2.

Where:

SD = standard deviation (2.68).

Zα/2: This depends on level of significance, for 5% this is 1.96.

Zβ: This depends on power, for 80% this is 0.84.

n = [(1.96 + 0.84)^2 × {2(2.68)^2}]/ (1.5)^2 =50.0.

Thus, based on the above statistical formula, the sample size required per each group is 50.

Sample type: Non probability purposive sample of 100 children accompanying their mothers were selected and divided equally after fulfilling the following criteria:

The inclusion criteria:

 -Children age ranged from 8-12years

-Children who undergone abdominal surgery for the first time

-Children hospitalized at least 2 days before surgery

- Children and Mothers willing to participate in the study

- Need to stay in the hospital for more than 3 days

Exclusion criteria:

- Children have other neurological problems such as epilepsy or mental problems

- Children who use any anxiolytic drugs at preoperative period.

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Technique: Children were divided equally into two groups. Group I (study group) consisted of 50 children who received education based on continuous care model and routine care and Group II (control group) included the other 50 children who received the routine care according to surgery unit policy.

Tools of data collection:

Four tools were used for data collection.

Tool (I): Personal and medical assessment sheet:

It was designed by the researchers after reviewing the recent and relevant literature. It was divided into three main parts: **The first part** is related to the personal data of children which include the age, the gender, the educational level, the residence and attend any previous intervention for relieving anxiety before surgery. **The second part** is related to the personal data of mothers such as the age, the level of education, the occupation. **The third part** covers the medical data such as, the previous hospitalization, and the surgery type.

Tool (II): Children's Fear Scale (CFS): It was adapted from faces anxiety scale developed by **McKinley etal., (2003)[17]** to measure fear in children undergoing abdominal surgery. The fear scale consists of line drawings of five young sex-neutral faces ranging from no fear or not scared at all (neutral face) on the far left to a face showing (extreme fear or scared) on the far right. The child is asked to look at these faces and point out which of the five faces matches his or her level of fear.

Scoring system for the CFS is as follows: Scores were converted to numerical scores and the total scores were ranged from 0 to 4 where, 0 (no fear), 1(a little bit more scared or mild fear), 2, (a bit more scared or moderate fear), 3 (more scared or moderate high fear) and 4 (extreme fear).

Tool III: Visual Facial Anxiety Scale (VFAS): The VFAS was developed by adapting the Wong-Baker Faces Pain Scale of **Garra etal., (2010)[18]** to assess the anxiety level for children undergoing abdominal surgery. It comprised of 11 similarly styled stick-figure reflecting different types of facial expressions. The children were asked to rank the 11 faces from 0–10 and then to match one of the 11 facial expression with a numeric verbal rating scale varying from 0 = no anxiety and 10 = highest level of anxiety). Accordingly, the total levels of anxiety were categorized to no anxiety (0), mild (2), mild-moderate (4), moderate (6), moderate-high (8) or highest anxiety (10).

Tool IV: Spielberger State Anxiety Inventory (SSAI): This tool was adopted from **Spielberger etal., (1983)[19]** to assess the severity of mothers' anxiety level. Using items that measure subjective feelings of tension, apprehension, nervousness, worry. It consists of 20 statements, divided into two balance statements, 10 statements correct direct and the rest of statements correct adversely. The number of statements correct direct were 3, 4, 6, 7, 9, 12, 13, 14, 17, 18, the responses were rated from not at all, scored (one), somewhat, scored (two), moderately so, scored (three) and very much so, scored (four). The adverse statements number were 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, the responses for this statement were rated from not at all, scored (four), somewhat, scored (three), moderately so, scored (two), and very much so, scored (one).

Scoring system

The total scores were ranged from 20 – 80, the higher score indicates severe anxiety, average score indicates moderate anxiety and low score indicates mild anxiety. In this respect, the severity of total anxiety level was categorized into three levels, mild anxiety (1<28) moderate anxiety (28<55), and severe anxiety (55≤ 80).

Tools validity:

Tools of data collection were translated into Arabic and reviewed for their content validity by five experts (two in pediatric and three in psychiatric nursing field from the Faculty of Nursing Benha University) who selected to test the content validity of the instruments and to Judge its clarity, comprehensiveness, relevance, simplicity, and accuracy. All of their comments were taken into consideration; some items were re-phrased to reach the final version of the tools. The tools were considered valid from the experts' perspective.

Reliability assessment:

Internal consistency reliability of all items of the validated tools were assessed using Cronbach's alpha coefficient. It was (r=0.87) for children's Fear Scale by **McKinley etal., (2003)**, 0.77 for visual facial anxiety scale by **Garra etal., (2010)** and 0.93 for Spielberger state-trait anxiety inventory by **(Spielberger etal., 1983)**.

Administrative and Ethical consideration:

All the relevant principles of ethics in the research were followed. Before starting the practical work, an official letter explaining the purpose of the study was obtained from the faculty dean of nursing to the hospital director to carry out the study and collect the necessary data. A written informed consent was obtained from the mothers of children after informing them about their rights to participate, refuse, or withdraw at any time without giving any reason and without any effect on the care of their children. Confidentiality was assured to each child and their mothers.

Pilot Study:

A pilot study was carried out on 10% (10) of the total study sample to test the applicability, clarity, relevance, feasibility of study tool, sequence of questions to maintain consistency, and time needed. Subjects under pilot study were excluded from the present study to avoid sample bias and contamination.

Field work:

Data collection was conducted over a 4-month period extending from the beginning of August 2019 till the end of November 2019. The intervention was conducted based on continuous care model (CCM) and includes four stages of familiarization, sensitization, follow up, and evaluation.
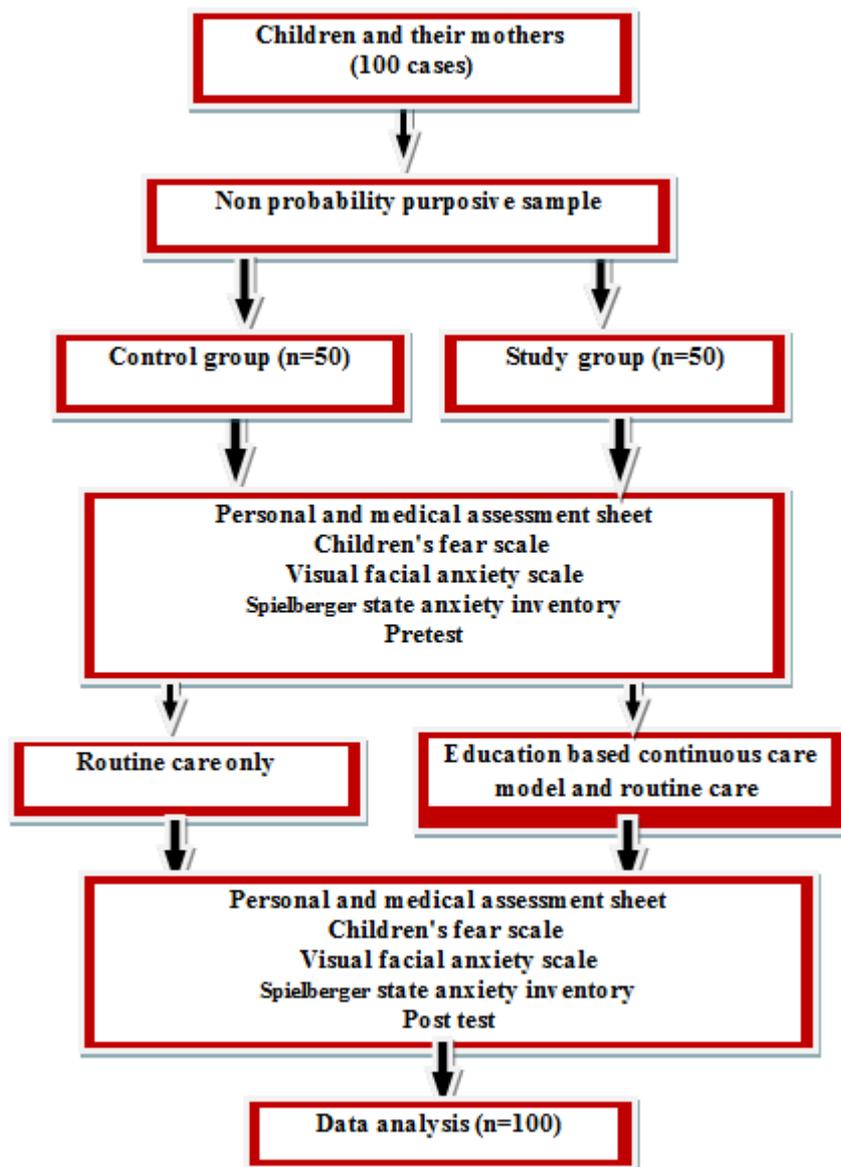
Familiarization stage: This stage is to establish the necessary sensitivities regarding disease, accurate recognition of the problem, creating motivation and a feeling of the need for follow-up process. First, the researchers were available at the previously mentioned setting four day/week to classify children who fit the inclusion criteria equally into study and control groups. Average of 4-5 children and their mothers were interviewed per/day. Second, a fifteen-minute meeting was conducted, between the researchers, children and their mothers in the study group for oriented them about CCM and the purposes of the research. Each child's mother signed a written consent. Then, the first pre-test tools were distributed to collect baseline data (tools I, II, III & IV) before implementation the model. The control group was recruited first to avoid sample bias/contamination. The time required for complete the study tools ranged between 15-30 minutes. Additionally, the subjects in the study group and the researchers expressed their expectations and requests as well as clarifying how the participants keep contact with the researchers for the next follow up after discharge.

Sensitization stage: It was implemented in a separate inpatient room through 6 sessions within 2 days before discharge. Children and their mothers were divided into 10 groups, 5 children and their mothers in each group. The duration of time in each session was about 30-45 minutes started based on the children and their mother's readiness. In this stage, the researcher discussed simply with the children and their mothers the following; the nature of the child's illness together with the problems encountered after the surgery and ways of controlling these problems, activity allowed, pain alleviation, wound care, medication administration, the importance of doctor's next visit and the importance of follow-up care. The sessions were repeated for different groups and the basic content was the same for all groups. Two group were taken/ week. So, this stage took (5) weeks. Methods of teaching were group discussion, questions and answers, demonstration and re-demonstration in addition to proper visual aids such as pictures and real objects.

Control or follow stage: This stage was to evaluate new problems and to keep interactive communication as well as decision-making and problem solving. It was conducted through four prearranged follow-up telephone calls starting from one week after the discharge for one month. Issues such as child's situation after the surgery, pain alleviation, changing the dressing, bathing, activity, diet and any arising problems were the subject of telephone calls.

For the control group: children and their mothers were instructed about routine care at the discharge from surgeon.

Evaluation stage: Posttest after one week and one month for children's fear, anxiety and mother's anxiety level were done for both groups using the same pretest assessment tools. Comparison between both groups to evaluate the effect of implemented continuous care model and to measure the extend of change.

Flow chart Diagram 1: stages of study.

Statistical analysis: All the statistical analysis was performed using the SPSS version 19. Numerical Data were expressed as mean and standard deviation as appropriate. Qualitative data were expressed as frequency and percentage. The comparison was done using Chi-square test. The observed differences and associations were considered as follows: Non-significant at $P > 0.05$, significant at $P < 0.05$ and highly significant at $P < 0.001$.

3. RESULTS

Table (1): Distribution of studied children regarding their personal Data (n=100).

Personal data	Study group (n=50)		Control group (n=50)	
	No	%	No	%
Age				
8 < 10	23	46.0	24	48.0
10 -12	27	54.0	26	52.0
Mean ±SD	9.86±1.24		9.99±0.90	
Gender				
Male	34	68.0	26	52.0
Female	16	32.0	24	48.0

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Education level				
Not enrolled in the school	5	10.0	7	14.0
Third grade	10	20.0	9	18.0
Fourth grade	8	16.0	8	16.0
Fifth grade	12	24.0	12	24.0
Sixth grade	15	30.0	14	28.0
Residence				
Urban	18	36.0	23	46.0
Rural	32	64.0	27	54.0

Table (1) reveals that, more than half (54% & 52% respectively) of the children's age in both study and control groups were ranged from 10 to 12 years and the mean age of them were (9.86±1.24 & 9.99±0.90) years respectively. Regarding children's gender, more than two third (68%) of children in the study group was males compared to 52% of the controls. The same table indicates that, the highest percentage (30%) of children in the study group was in the sixth grade primary education compared to 28% of the controls. As for residence, it is found that more than half (64%) were from rural areas compared to 54% of the controls.
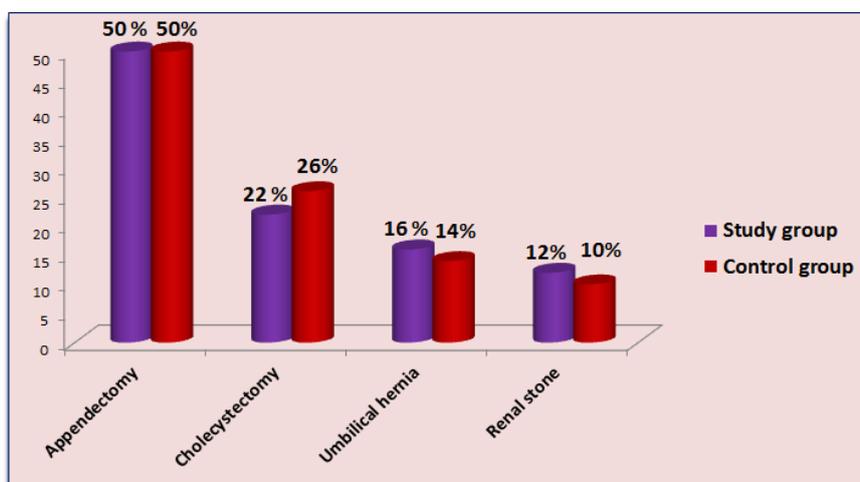

Figure 1: Distribution of children in both study and control groups according to their diagnosis (n=100).

Figure (1) illustrates that, half (50% & 50% respectively) of children in both study and control groups had appendectomy followed by those had cholecystectomy and umbilical hernia (22%, 26% & 16%, 14% respectively). On the contrary, a minority (12% & 10% respectively) of the children in both study and control groups had renal stone operation.
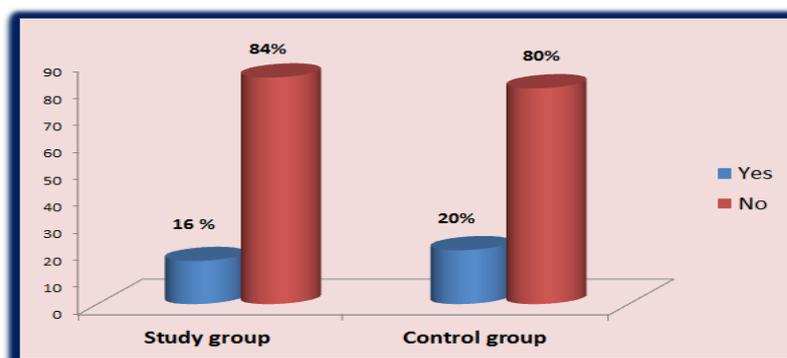

Figure 2: Distribution of children in both study and control groups according to their previous hospitalization (n=100).

Figure (2) clarifies that the majority (84% & 80% respectively) of children in both study and control groups had no history of previous hospitalization.

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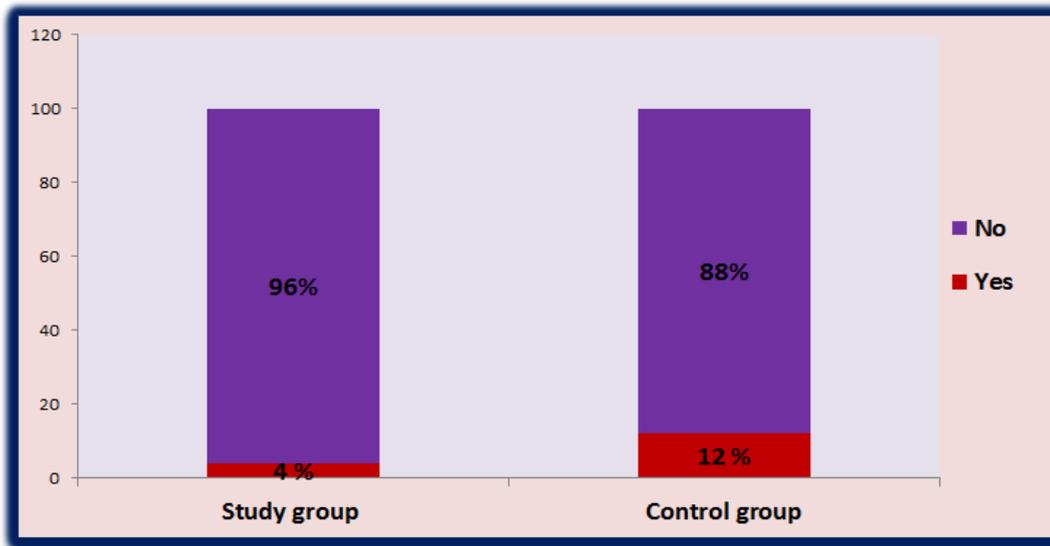Vol. 7, Issue 1, pp: (235-249), Month: January - April 2020, Available at: **www.noveltyjournals.com**

Figure 3: Distribution of children in both study and control groups according to their previous intervention for relieving anxiety before surgery (n=100).

It is clear from **figure (3)** that most (96%) of children in the study group and majority (88%) of them in the control group had no previous intervention for relieving anxiety before surgery.

Table (2): Distribution of studied mothers according to their personal data (n=100).

Personal data	Study group (n=50)		Control group (n=50)	
	No	%	No	%
Age				
<25	23	46.0	21	42.0
25-	8	16.0	19	38.0
30+	19	38.0	10	20.0
Mean ±SD	27.46±6.01		26.14±4.45	
Mothers Education				
Illiterate	3	6.0	4	8.0
read & write	5	10.0	6	12.0
basic education	7	14.0	5	10.0
secondary education	8	16.0	7	14.0
technical education	20	40.0	22	44.0
university education	7	14.0	6	12.0
Occupation				
Housewife	37	74.0	35	70.0
Working	13	26.0	15	30.0

Table (2) shows the personal data of the studied mothers; it is observed that the mean age of both study and control groups were 27.46±6.01 and 26.14±4.45 years respectively. In relation to mother's' education, more than two fifth (40% & 44.0% respectively) in both study and control groups were technical education. Additionally, nearly three quarters (74%) of mothers in the study group were housewife compared to more than two thirds (70%) in the controls.

Table (3): Comparison between the studied children in both study and control groups regarding their fear scores through the assessment periods of study (n=100).

Children's fear level	Pre				After 1week				After 1 months			
	Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)	
	No	%	No	%	No	%	No	%	No	%	No	%
No fear	2	4.0	2	4.0	22	44.0	0	0.0	16	32.0	0	0.0
Mild fear	3	6.0	5	10.0	28	56.0	13	26.0	34	68.0	11	22.0
Moderate fear	20	40.0	14	28.0	0	0.0	26	52.0	0	0.0	23	46.0
Extreme fear	25	50.0	29	58.0	0	0.0	11	22.0	0	0.0	16	32.0
X^2	4.41				66.2				53.5			
p-value	0.22				0.000**				0.000**			

**Highly statistical significant differences P-value <0.001

 Not Significant (NS) P>0.05

Table (3) indicates that half and more than half (50% &58% respectively) of children in both study and control groups experienced extreme fear before the implementation of continuous care model. After the implementation, it was found that 56% and 68% of children in the study group had mild fear after one week and one month compared to 26% and 22% of the controls. Additionally, there was a statistical significant differences (p<0.000).

Table (4): Comparison between the studied children in both study and control groups regarding their total anxiety level through the assessment periods of study (n=100).

Children's anxiety level	Pre				After 1week				After 1 months			
	Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)	
	No	%	No	%	No	%	No	%	No	%	No	%
No	0	0.0	0	0.0	22	44.0	0	0.0	11	22.0	0	0.0
Mild	3	6.0	7	14.0	26	52.0	8	16.0	35	70.0	6	12.0
Mild –moderate	2	4.0	4	8.0	2	4.0	10	20.0	4	8.0	10	20.0
Moderate	6	12.0	9	18.0	0	0.0	10	20.0	0	0.0	10	20.0
Moderate –high	9	18.0	10	20.0	0	0.0	0	0.0	0	0.0	0	0.0
Highest anxiety	30	60.0	20	40.0	0	0.0	22	44.0	0	0.0	24	48.0
X^2	5.57				69.8				73.04			
p-value	0.23				0.000**				0.000**			

**Highly statistical significant differences P-value <0.001

 Not Significant (NS) P>0.05

Table (4) shows that 60% and 40% of the studied children in both study and control groups have highest anxiety level before the implementation of continuous care model with no significant differences. In contrast, after the implementation of continuous care models, there was a highly statistical significant difference between study and control groups regarding total level of children's anxiety after one week and one month, where more than half (52%) and more than two thirds (70%) of them in the study group experienced mild level of anxiety compared to 16% and 12% of the controls (p<0.000).

Table (5): Comparison between the studied mothers in both study and control groups regarding their anxiety level through the assessment periods of study (n=100).

Mother's anxiety level	Pre				After 1week				After 1 months			
	Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)		Study group (n=50)		Control group (n=50)	
	No	%	No	%	No	%	No	%	No	%	No	%
Mild	9	18.0	11	22.0	43	86.0	17	34.0	41	82.0	16	32.0
Moderate	8	16.0	9	18.0	4	8.0	11	22.0	5	10.0	7	14.0
Severe	33	66.0	30	60.0	3	6.0	22	44.0	4	8.0	27	54.0
X^2	0.40				28.9				10.4			
p-value	0.81				0.000**				0.005*			

**Highly statistical significant differences P-value <0.001

Not Significant (NS) P>0.05

It is evident from **table (5)** that nearly two thirds (66%) of mothers in the study group and more than half (60%) of them in the control groups have severe anxiety level before the implementation of continuous care model with no statistical significant differences. In contrast, after the implementation of continuous care models, there was a highly statistical significant difference between study and control groups regarding total level of mother's anxiety after one week and one month, where majority (86% &82%) of them in the study group experienced mild level of anxiety compared to 34% and 32% of the controls (p<0.000).

Table (6): Correlation between total mother's anxiety level and children's anxiety among study group through the assessment periods of study (n=50).

		Total mother's anxiety level					
		Pre		After one week		After one month	
		Study group (n=50)	Control group (n=50)	Study group (n=50)	Control group (n=50)	Study group (n=50)	Control group (n=50)
Total children's anxiety level	r	.750	.720	.742	.697	.888	.834
	p-value	.000	.000	.000*	.000	.000*	.000

** Significant at the 0.01 level (-tailed).

Table (6) demonstrates that there was a significant positive correlation between total mother's anxiety level and total children's anxiety level among study and control groups through the assessment periods of study (p<0.000).

4. DISCUSSION

Surgical operation can lead to emotional distress for both children and their families that persists for a long time after discharge. This distress is commonly reflected as anxiety and fear[20]. Current strategies for decreasing anxiety and stress in children incorporate distraction, creating an inviting physical environment, traditional or web based informational and orientation programs as well as child and parental preparation[21,22]. Despite these aspects of pediatric patient care are important, all are limited in scope to satisfy the emotional needs of stressed children[23]. Prepare children for surgery requires other intervention customized to the emotional needs of children. Continuous care is a nursing model designed to specify children's needs and problems. Hence, the researchers conducted this study to evaluate the effect of implementing continuous care model on psychological outcomes in children undergoing abdominal surgery and mother's anxiety level.

The result of the current study revealed that more than half of the children's age in both study and control groups were ranged from ten to twelve years and more than two thirds of them were males. From the researcher's point of view, this age group was chosen since any intervention in the form of continuous care model is most effective in the concrete

operational stage of development according to Piaget's theory because children can think more concrete and learn effective strategies for coping with surgery. These results are in accordance with **Aranha *et al*. (2017)[4]** who evaluated the effectiveness of multimodal preoperative preparation program on fear and anxiety of children undergoing surgery and indicated that majority (83.3%) of children in the experimental group and two thirds (66.7%) in the control group were in the age group of 10–12 years. Additionally, majority (83.3%) of them were boys.

In relation to child's level of education, the current study finding demonstrated that the highest percentage of children in both study and control groups were in the sixth grade primary education. This finding is paralleled to an Egyptian study conducted by **El-Moazen etal., (2018)[24]** to evaluate the effect of selected play activities on preoperative anxiety level and fear among children undergoing abdominal surgeries and found that the highest percentage of children was in the sixth grade primary education.

Concerning residency, the current finding stated that more than half of children in both study and control groups from rural area. This finding may be interpreted as unavailability of hospitals for performing abdominal surgeries in rural area. This finding is in compatible with **Nisha and Umarani, (2013)[25]** who studied the effect of play intervention in the reduction of anxiety among preoperative children and found that 53.3% of the children in experimental group were from rural area and 50% of them in the control group were from both rural and urban area.

As for child's type of surgery, the results of the current study showed that half of children in both study and control groups had appendectomy followed by cholecystectomy. This result is corresponded with **Hosseinpour and Ahmadi (2016)[26]** who conducted a study about emergency abdominal surgery in infants and children in Iran, and reported that the differential diagnosis of surgical acute abdomen were appendicitis, cholecystectomy, and pancreatitis. Conversely, this result disagrees with **Abd-Elhafeez, (2011)[27]** who conducted a study to assess the effect of preoperative instruction on postoperative gastrointestinal motility among school age children undergoing abdominal surgery and found that, most of children in both study and control groups had underwent spleenectomy and renal stones.

As regards to the history of previous hospitalization for school age children, the current study findings illustrated that the majority of children in both study and control groups had no history of previous hospitalization. This finding is similar with **Potasz etal., (2013)[28]** who carried out a study to explore the effect of play activities on stress among 53 hospitalized children in Brazil and found that the highest percentage of children (64%) had no previous experience of hospitalization.

The current study finding clarified that half and more than half of children in both study and control groups experienced extreme fear before implementation of continuous care model. This might be attributed to the fear can increase when children are unprepared for what is going to happen in hospital setting and upcoming surgical procedures. This result is supported with an Egyptian study conducted by **Mohamed (2011)[29]** to evaluate the effect of selected distractors on the intensity of pain and fear among children undergoing painful procedures in the pediatric surgical ward and concluded that 52% of children in the pediatric surgical ward experienced severe fear during painful procedure in the pretest. Likewise, This finding is advocated with **El-Moazen etal., (2018)[24]** who revealed that more than two-thirds (68%) of children experienced severe fear before implementation of the play sessions.

Following the implementation the continuous care model, it was clear that more than half and more than two thirds of children in the study group had mild fear after one week and one month. This could be interpreted as the model is benefit to inform children what to expect and what is expected of them. Therefore, children feel more in control of the situation and are less fearful. This reflected that the children in the study group continued to get better throughout the follow-up period. This finding supports the proposed first hypothesis of the current study. In this regard **Lerwick, (2016)[23]** mention that making expectations clear to the patient and their families are a vital part of preventing healthcare-induced anxiety and fear.

Regarding the level of anxiety among children undergoing abdominal surgery, the current study finding presented that more than half of the children were experienced highest anxiety level before implementation of continuous care model compared to the control ones. This could be due to the fact that most of children were not given any intervention for relieving anxiety before surgery, lack of explanation about the procedures and lack of self-control. This result is consistent with **Noronha and Shanthi (2015)[30]** who evaluate the effectiveness of performing preoperative preparation program on

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school-age children's anxiety and found that 80% of the children in the experimental group had severe anxiety and 60% of the control group had moderate to severe anxiety in pretest.

After implementation of continuous care model, it was evident that more than half and more than two thirds of children in the study group were experienced mild level of anxiety after one week and one month compared to the control ones. This could be ascribed to the fact that the implementation of continuous care model helped children understanding the reason of surgery in a developmentally-proper manner, rising satisfaction with hospital staff interaction, creating emotional and psychological safety and this made them feel more powerful which resulted in diminishing the anxiety level. This finding also supports the proposed second hypothesis of the current study. This finding is compatible with **Van-Starrenburg etal., (2017)**[31] who conducted a study to evaluate the effectiveness of a cognitive behavioral therapy-based indicated prevention program for children with elevated anxiety levels and showed that children's self-reported anxiety levels decreased significantly more in the experimental group compared to the control group after 2 weeks and 3 months of implementation the program and added that almost two thirds of the experimental group returned to anxiety levels that fell into the normal range while almost two thirds of the control group still reported elevated levels of anxiety (p<0.05&0.01) respectively.

Similarly, this finding is in agreement with **Cecilia etal., (2012)**[32] who examined the effectiveness of a universal school-based prevention program on reducing anxiety in children and found that children in the intervention group exhibit lower levels of anxiety compared to those in the control group at 6 and 12 months follow-up periods. Likewise, this study is accordant with **Zarea etal., (2014)**[33] who conducted a study to assess the impact of Peplau's therapeutic communication model on anxiety, depression and found that the mean anxiety level in the intervention group after two and four months was significantly decreased compared to the control group (P<0.000).

On assessing the anxiety level before implementation of continuous care model, the current result illustrated that nearly two thirds and more than half of the studied mothers in both study and control groups have severe anxiety level. This might have been related to many factors as the mother's appraisal of surgery as a stressful experience with a potential threat to their children's health, mothers are not adequately prepared and educated about their children's care and worries about postoperative complications. This result is supported with **Obeidat etal., (2018)**[34] who studied state anxiety in Jordanian parents of children undergoing same day surgery and revealed that 74% of parents experienced high levels of state anxiety before surgery. Meanwhile, this finding was corresponded with a Turkish study conducted **by Akdağ etal., (2014)**[35] about a multi-centric prospective study: Anxiety and associated factors among parents of children undergoing mild surgery in ENT and found that parents exhibited high anxiety mean scores (43.63± 9.48)before surgery.

After implementation the continuous care model, the present study finding revealed that the anxiety level scores of mothers in the study group were significantly less after 1 week and 1 month compared to the control ones. This could be attributed to the effectiveness of four follow-up telephone calls in decreasing mother's anxiety level. Thus confirming our initial hypothesis; mothers of children who exposed to education based on continuous care model will report less anxiety level scores than those in the control groups. This finding is in agreement with **Okhovat etal., (2017)**[11] who conducted a study to assess the effect of the implementation of continuous care model on mothers' anxiety after discharge of their hospitalized children and showed that the mean anxiety scores of the mothers in the experimental group were significantly less after 1 week, and 1 month of implementation the intervention compared to the control ones (36, & 31.4, versus 55.8 & 49.7, *P* < 0.001) respectively. Moreover, this finding is on the same line with **Gerçeker etal., (2016)**[36] who assessed the children's postoperative symptoms at home after surgery through nurse-led telephone counseling and its effects on parents' anxiety and found that there was a significant decrease in state-trait anxiety scores in the intervention group versus the control group, with parents in the intervention group reporting lower anxiety scores.

Our study demonstrated that there was a positive significant correlation between total mother's anxiety level and total children's anxiety level among both study and control groups through the assessment periods of the study. This result proved that mothers' anxiety level could be transmitted to the children and negatively affects them. This finding is matched with a study conducted by **Nabavi etal., (2017)**[37] to investigate the relationship between anxiety in 81 school-age children undergoing surgery and parental state-trait anxiety and found that there was a significant positive correlation between children's anxiety and mothers' state anxiety. (r=0.41, P=0.005).

5. CONCLUSION

The current study concluded that the continuous care model was effective in reducing the level of anxiety and fear among children undergoing abdominal surgery as well as mother's anxiety level. Henceforth, these results support the proposed hypotheses.

6. RECOMMENDATION

Based on the findings of the present study, the following recommendations can be proposed:

1. Implement continuous care model in surgical pediatric units which will help children along with their mothers feel empowered and this will alleviate the risk of anxiety and fear. 2. Inform nurses that continuous follow-up program is needed to support children and mothers to enhance quality of care and reduce negative behaviors after surgery.

3. Replication of this study with a larger sample size at different pediatric surgical department with longitudinal follow-up for generalized the results.

4. Future research is suggested to compare the differences between continuous care model and other intervention.

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