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Effect of protocol of care for mothers on selected postoperative outcomes among their children undergoing abdominal surgeries

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***Abstract*---**Background: Pediatric abdominal surgery embraces many types of congenital and acquired surgical disorders. Aim: to evaluate the effect of the protocol of care for mothers on selected postoperative outcomes among their children undergoing abdominal surgeries. A quasi-experimental research design was utilized. Sample: A purposive sample of 70 mothers with children undergoing abdominal surgeries participated in the study. Setting: The study was conducted in the pediatric surgery unit and outpatient clinic at Cairo University Specialized Pediatric Hospital. Tools: Four tools were utilized, a structured interview questionnaire, mothers' knowledge and reported-practices assessment sheet, observational checklists, and postoperative outcomes recording sheet. Results: After implementation of the protocol of care, there was a significant improvement in the level of mothers' knowledge, reported-practices, and skills regarding the care of their children after abdominal surgery. Children of the mothers who received protocol of care were exposed to less early postoperative complications and had improved postoperative outcomes than those in the control group. Conclusion: The protocol of care for mothers minimizes early postoperative complications and improves postoperative outcomes among their children after abdominal surgery. Recommendations: It is essential to integrate the care protocol for mothers in the pediatric surgery ward and incorporate it into the discharge plan.

***Keywords*---**abdominal surgeries, mothers, protocol of care, postoperative outcomes, children.

Introduction

Abdominal surgeries indicate various surgical disorders in pediatrics, including correcting different types of anomalies. Abdominal surgeries involve several techniques in the abdomen that are called laparotomy. The common abdominal surgeries performed in children were appendectomy, cholecystectomy, herniorrhaphy, laparotomy, colostomy, gastrostomy, and pyloromyotomy (Sabaq, Abdelsadik & Bayoumi, 2020). A recent retrospective study was conducted by Alahmari et al. (2021) to assess the clinical presentation, postoperative complications, and outcomes of pediatric abdominal surgical emergencies in 272 children aged from 1 month up to 14 years in Saudi Arabia. The study finding concluded that 51.8 % of children had uncomplicated appendicitis, 16.5 % had perforated appendicitis, 8.5 % had obstructed inguinal hernia, 4 % of children had intussusception, and 3.3 % of children had an adhesive bowel obstruction.

Kumba, Blanc, and Treluyer (2019) studied the primary postoperative outcomes and co-morbidities among 193 children who underwent abdominal surgeries. They identified and specified these outcomes as intraoperative, postoperative complications, intestinal motility, wound condition, and length of stay in the intensive care unit and the ward. Mizrahi et al. (2019) studied the postoperative outcomes of 102 children who underwent abdominal surgery. Three outcomes were monitored in this study: length of hospital stay, superficial or deep incisional surgical site infection, and intestinal motility.

Postoperative complications in pediatric surgery are essential issues; especially after abdominal surgery, complications sometimes lead to mortality/morbidity and unfavorable postoperative outcomes even though the surgical procedures were successful (Kumba, 2021). Buchanan and Tuma (2022) added that, generally, children undergoing an abdominal surgical procedure would develop some degree of transient impairment of gastrointestinal motility. Prolonged impairment, however, can lead to several considerable impediments, including increased hospital stay, healthcare costs, poor wound healing, and child discomfort.

Family-centered care in pediatric nursing includes holistic care approaches in which the child and family are supported in physical, emotional, intellectual, social, cultural, and spiritual aspects as a whole, and the family should be involved in the care of the child. Family-centered care approach reduced the anxiety and pain levels of the children, supported the child and the parents' adaptation to the hospitalization process, and increased the family's sense of self-efficacy and care satisfaction (Brown, De Young, Kimble & Kenardy, 2018). Hockenberry, Rodgers, and Wilson (2022) stated that continuous observation, early mobilization, and managing pain are primary nursing responsibilities during the postoperative period. The involvement and presence of a parent improve and normalize the hospital environment for the child, provide support, and reduce stress for the child and family.

Significance of the study

According to the World Health Organization [WHO] (2019), every day, millions of children are operated on for various diagnostic and surgical procedures. Care of children undergoing surgeries is one area of child health that is often overlooked yet can play an essential role in preventing death and disability. In Egypt, based on the Statistics Department of Cairo University Specialized Pediatric Hospital (CUSPH), the total number of children admitted to the pediatric surgical unit in 2019 was 1244; 334 (26.8%) of them underwent abdominal surgeries. Diverting colostomy, closure of colostomy, surgical correction of intestinal obstructions, and biliary atresia were the most common causes of surgical interventions for children.

Through empirical observations, children undergoing abdominal surgeries were at high risk for complications related to insufficient care offered by the mothers of these children, especially during the postoperative period. In Egypt, scares researches were conducted to teach mothers about postoperative care of their children with gastrointestinal surgeries. Therefore, the current study aims to evaluate the effect of the protocol of care for mothers on selected postoperative outcomes among their children with abdominal surgeries. Hopefully, the results will help improve the mothers' knowledge and practices and enhance postoperative outcomes among their children. Eventually, the results of the current study will provide recommendations that should be reflected in pediatric nursing education, practice, and research.

Aim of the study

The aim of the current study is to evaluate the effect of protocol of care for mothers on selected postoperative outcomes among their children undergoing abdominal surgeries

Research Hypotheses

The current study results tested the following research hypotheses:

- Mothers of children who will receive the protocol of care will have higher total mean scores of knowledge, reported-practices, and skills than mothers in the control group
- Mothers who will receive the protocol of care, their children will be exposed to less early postoperative complications than children in the control group
- Mothers who will receive the protocol of care, their children will have improved postoperative outcomes than children in the control group

Methods

Research Design

A pre-posttest quasi-experimental design will be utilized to achieve the aim of the current study. Quasi-experimental research is similar to the true experimental design, except one criterion is lost (randomization)

Setting

The study was conducted in two different settings at CUSPH. The first setting was the general pediatric surgical unit; the second was the outpatient surgery clinic for follow-up.

Sample

A Purposive sample of 70 mothers having children undergoing abdominal surgeries has participated in the current study. The first 35 mothers and their children were considered a control group receiving routine care, and the second 35 mothers and their children were subjected to the protocol of care (study group).

Inclusion criteria

- Mothers who have children under twelve years and undergoing abdominal surgery for the first time and mothers need to stay in the hospital for more than 24 hours preoperatively
- Mothers who have children in the preoperative period and undergoing intraperitoneal abdominal surgery such as (diverting colostomy, closure of colostomy, appendectomy, and splenectomy)
- Children should be free from uncontrolled diabetes or any other congenital anomalies that affect the child's mobility and feeding (cleft lip and cleft palate).

Data collection tools

Tool 1: Structured Interview Questionnaire: - It was developed by the researcher; it divided into two parts:
Part I: It involved five items about personal data related to mothers, including age, level of education, occupation, number of children in the family, and place of residence.
Part II: It included ten items related to the personal data and health history of children, involving age, gender, rank within the family, diagnosis, type of surgery, and history of hospitalization.
Tool 2: Mothers' Knowledge and Reported-practices Assessment Sheet (Pre-Posttest): It was developed by the researcher to assess mothers' knowledge and reported-practices regarding the postoperative care that should be provided for their children. Assessment of mothers' knowledge involved 15 questions covering the timing of postoperative mobility, feeding, signs of pain and its alleviating factors, signs of wound infection, and postoperative warning signs. The assessment of mothers' reported-practices contained six questions and comprised the techniques of postoperative mobility, feeding, pain alleviating measures, signs of infection, warning signs, and medications. The scoring system for mothers' knowledge and reported-practices; each complete response took "2" scores; the incomplete one took "1" scores, and the wrong or unknown answer took zero. Scores less than 50% are considered unsatisfactory.

Tool 3: Observational Checklists: To evaluate the mothers' practical skills in caring for their children after abdominal surgeries. It was adapted from Bowden and Greenberg (2016) and modified and simplified by the researcher. Observational checklists encompassed: Measurement of axillary temperature wound care procedure and measurement of abdominal girth. Each performed correct step took "1" score, and the unperformed step took zero. Scores less than 60% are considered unsatisfactory

Tool 4: Postoperative Outcomes Recording Sheet: it was developed by the researcher after reviewing the related literature to measure the postoperative outcomes after abdominal surgeries. It will include the following parts:

Part 1: Monitoring of Postoperative Gastrointestinal Motility: It included the time of ambulation, time of the return of bowel sound, time of the first pass of flatus, time of the return of appetite, and time of starting oral fluids.

Part 2: Assessment of Children' Intensity of Pain: It was performed using Faces Pain Rating Scale (FPRS), developed by Wong and Baker (1983). The child was requested to choose the face that best described the intensity of the pain being experienced. Each face was rated by number to determine the pain intensity (0-10). The scores ranged from 0 (no hurt/pain) to 10 (hurts worst/worst pain). The scale had high reliability with a Cronbach's alpha coefficient of 0.70, as tested by Drendel, Kelly, and Ali (2011).

Part 3: Length of Postoperative Hospital Stay: To record the length of postoperative hospital stay (from the time of operation to discharge)

Part 4: Postoperative Wound Condition: To assess wound condition for follow-up of all children in both groups. It Includes elements such as local wound tenderness, swelling, oozing blood, redness, purulent exudates, localized pain, and signs of poor healing such as redness or warmth around the wound, pus formation, foul odor, and darkening skin.

Validity and reliability

Data collection tools were given to a group of 3 experts in pediatric surgery and pediatric surgery nursing to test the content validity. The tools were examined for content coverage, clarity, relevance, and applicability. Reliability was performed using Cronbach’s alpha, and the reliability Coefficients’ alpha between questions was 0.77.

Ethical considerations

Primary and final approvals were obtained from the research ethics committee in the Faculty of Nursing, Cairo University. The written informed consent was obtained from the mothers of children after the description of the purpose of the study. Children and their mothers were informed that participation in the study is voluntary; mothers have the right to withdraw from the study 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.

Procedure
Preparatory and assessment phase

The researcher developed data collection tools, and the protocol of care was developed and supported by illustrated Arabic booklet. Official permissions were obtained from the director of CUSPH. The researcher introduced herself to the mothers of children and explained the aim and process of the study. Written informed consent was obtained from each mother.

Data from the mothers and their children in the control group were collected first, and they received routine care. The researcher collected the personal data of the mothers and their children on an individual basis at their bedside area. As a baseline, the preoperative vital signs were measured for children in both groups during the day before surgery. Assessment of mothers' knowledge and reported practices were assessed as a pre-test. Evaluation of mothers' practical skills as regards the measurement of axillary temperature, wound care, and abdominal girth were done using observational checklists as a pre-test. Mothers in both groups applied the steps of axillary temperature and abdominal girth to their children, but the steps of the wound care procedure were applied to a doll with a surgical wound.

Implementation phase

The protocol of care was explained to the mothers of children in the study group during the preoperative period through three educational sessions (1 theoretical and two practical training sessions); each session took about 30- 45 minutes on an individual basis and sometimes for a group of mothers ranged from 2 to 5 mothers. The theoretical session of the protocol of care encompassed knowledge related to the care provided for children after abdominal surgeries, such as early ambulation, feeding, oral fluids, pain alleviating measures, signs of infection, warning signs, and follow-up. The session was conducted in the waiting room in the pediatric surgery unit using an illustrated Arabic booklet, pictures, and a PowerPoint presentation by the researcher.

As regards the practical sessions, it was applied during the day before surgery; the first session was focused on the steps of wound care. The second practical session emphasized how to measure axillary temperature and abdominal girth. It was demonstrated by the researcher using a doll and other realistic and virtual computer-based materials and videos. The practical sessions were validated by re-demonstration by the mothers. The second day of surgical operation until the third day postoperatively demonstrated early mobilization for the child with the mother's assistance after surgery.

Evaluation phase

Immediately after the implementation of the protocol of care, the knowledge of the mothers in the study group was assessed as a post-test, and the knowledge of the mothers in the control group was evaluated at the mothers' first visit to the outpatient clinic as a post-test. Mothers' reported practices and practical skills (except wound care) in both groups were evaluated as a post-test during the

second and third postoperative days (the researcher was excluded on the first postoperative day because children could be sedated or in severe pain and unable to move from the bed). Mothers' practical skills in both groups regarding wound care were evaluated at the first visit to the outpatient clinic.

For children in both study and control groups, the researcher observed, measured, and recorded postoperative outcomes. Measurement of vital signs and assessment of early postoperative complications was performed on the first postoperative day. Evaluation of pain intensity, gastrointestinal mobility indicators, wound condition, stopping of intravenous infusion, and starting of oral fluids were assessed on the second and third postoperative days. The length of the postoperative hospital stay was recorded on the day of discharge. In the follow-up for mothers in both groups after one week of the surgical operation at the outpatient clinic, the researcher assessed the knowledge and reported-practices and practical skills. Similarly, in the follow-up for children in both groups after one week, the researcher assessed the wound condition and detected any complications using the postoperative wound condition.

Results

Regarding personal data related to mothers of children, table (1) revealed that 48.6 % of mothers in the study group and 40% in the control group ages range from 25 to less than 30 years. More than half (54.3%) of mothers in the study group were just able to read and write and 37.1% of mothers in the control group had a university education. The mothers' highest percentages (62.9% & 51.4%, respectively) were housewives in both groups. Figure (1) illustrates that 54.3% and 45.7%, respectively, of children undergoing abdominal surgeries in both groups their age less than one year. Figure (2) shows that 54.3% and 62.9%, respectively, of children in both groups, were male.

Table (2) clarifies that 22.9% of children in the study group were diagnosed as having acute appendicitis, followed by Hirschsprung's disease (17.1%, & 14.3%, respectively). Concerning the control group, 31.4% had Hirschsprung's disease, followed by appendicitis (25.7% & 20.0%, respectively). Table (3) reveals that after implementing the protocol of care, there was a statistically significant difference between the total mean score of mothers' knowledge and reported practices in both groups ($p<0.01$). The results also show that before the implementation of the protocol of care, there were no statistically significant differences between the total mean scores of practical skills of mothers of children undergoing abdominal surgeries in both groups regarding the measurement of axillary temperature, steps of wound care and measurement of abdominal girth ($p>0.05$).

Table (4) explains that children in the study group were exposed to fever as an early postoperative complication less than children in the control group (25.7% & 40% in order). It was found that 5.7% of children in the study group had bleeding after surgery; this percentage increased to 14.3% among children in the control group. Children in the control group were exposed to nausea more than those in the study group (60% & 42.9%, respectively). More than one-third (34.3%) of children in the control group suffered from vomiting compared to 25.7% in the study group.

Table (5) clarifies that there were statistically significant differences between children in both groups regarding postoperative ambulation, return of bowel sound, passing of flatus, and return of appetite (p<0.001). Table (6) reveals that children in the study group demonstrated more favorable surgical wound conditions than those in the control group. Also, results indicate that children in the study group had fewer postoperative hospital stays and low postoperative pain intensity than children in the control group.

Table (1)
Personal Data Related to Mothers of Children undergoing Abdominal Surgeries in Study and Control group

Personal data	Study group (n=35)		Control group (n=35)		X^2	p
	N	%	N	%		
Mothers 'age/years: -						
< 20	0	0	0	0		
20 to < 25	6	17.1	5	14.3	43.56	0.334
25 to < 30	17	48.6	14	40.0		
30 to < 35	10	28.6	12	34.3		
35 to < 40	2	5.7	4	11.4		
Mothers' level of education: -						
Read and write	19	54.3	4	11.4		
Basic education	7	20.0	4	11.4		
Preparatory education	5	14.3	8	23.0		
Secondary education	0	0	6	17.1	56.46	0.0001*
University education	4	11.4	13	37.1		
Mothers 'occupation: -						
Working outside home	13	37.1	17	48.6	9.69	0.201
Housewife	22	62.9	18	51.4		

* Significant at p < 0.05 **Highly Significant at <0.01

Figure (1). Children' Age in the Study and Control Group (n=70)

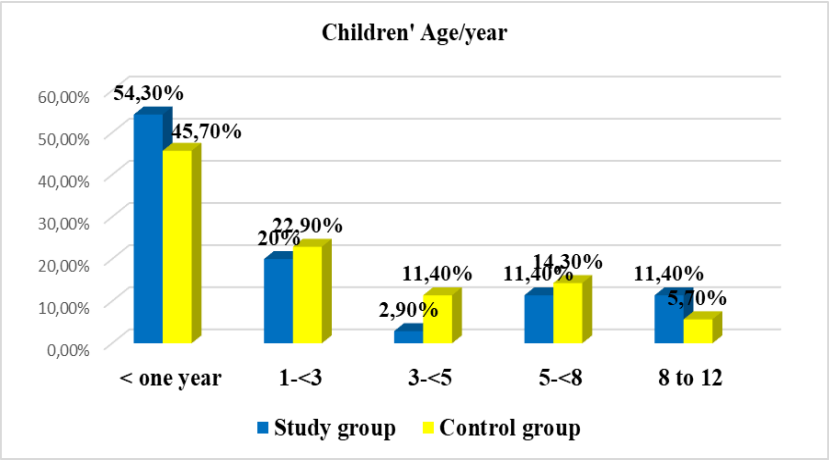

Figure (2): Children' Gender in the Study and Control Group (n=70)

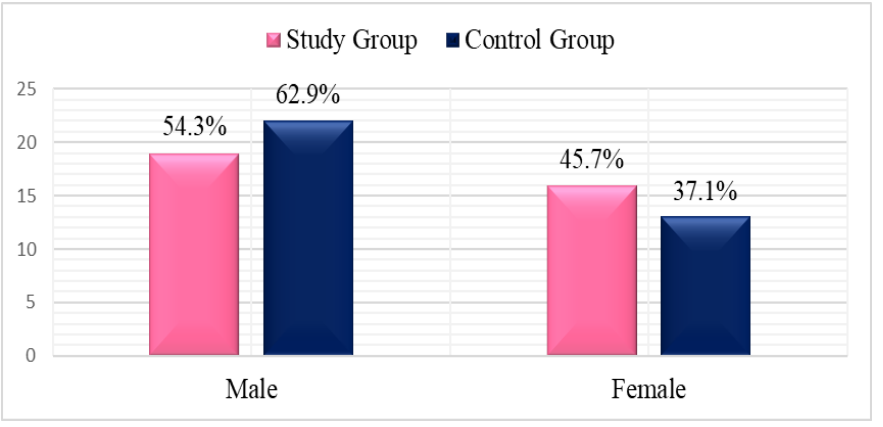

Table (2):
Diagnosis of Children Undergoing Abdominal Surgeries in the Study and Control Group

Items	Study group (n=35)		Control group (n=35)		X^2	p
	N	%	N	%		
Diagnosis:-						
Intussusception	4	11.4	6	17.1		
Hirschsprung's disease	6	17.1	11	31.4	1.306	0.028
Biliary atresia	5	14.3	7	20.0		
Appendicitis	8	22.9	9	25.7		
Congenital hypertrophic pyloric stenosis	3	8.6	0	0		
Abdominal hernia	2	5.7	0	0		
Splenomegaly	3	8.6	0	0		
Imperforated anus	4	11.4	0	0		
Abdominal impalement injuries	0	0	2	5.7		

* Significant at p < 0.05 **Highly Significant at <0.01

Table (3):
Comparison Between Total Mean Score of Mothers' Knowledge and Reported Practices After Implementation of the Protocol of Care and one Week after Surgery in Both Groups

Item	Study group (n=35)	Control group (n=35)	t-test	P
The total mean score of mothers' knowledge after Implementation protocol of care			-40.745	0.0001*
Minimal	29	3		
Maximum	36	16		

Mean ± SD	33.14± 2.04	6.97± 2.67	
The total mean score of mothers' knowledge after		-30.855	0.0001*
One week of surgery			
Minimal	35	7	
Maximum	36	26	
Mean ± SD	35.94± 0.23	13.17± 4.34	

* Significant at p < 0.05 **Highly Significant at <0.01

Table (4):
Early Postoperative Complications Among Children After Abdominal Surgery in The Control and Study Group

Items	Study group (n= 35)				Control group (n=35)				X^2	P
	Present		Not present		Present		Not present			
	N	%	N	%	N	%	N	%		
Fever	9	25.7	26	74.3	14	40	21	60	11.17	0.169
Bleeding	2	5.7	33	94.3	5	14.3	30	85.7	14.44	0.263
Nausea	15	42.9	20	57.1	21	60	14	40	8.82	0.136
Vomiting	9	25.7	26	74.3	12	34.3	23	65.7	5.76	0.413

* Significant at p < 0.05 **Highly Significant at <0.01

Table (5):
Postoperative Gastrointestinal Motility Among Children After Abdominal Surgeries in Groups

Items	Control group (n=35)		Study group (n=35)		t	P
	N	%	N	%		
Time of first postoperative ambulation:					4.212	0.0001*
<12 hours	8	22.9	14	40		
12-<24 hours	12	34.3	12	34.3		
≥ 24 hours	15	42.9	9	25.7		
Time of return of bowel sound:					4.547	0.0001*
<12 hours	7	20.0	15	42.9		
12-<24 hours	12	34.3	11	31.4		
≥ 24 hours	16	45.7	9	25.7		
Time of first passing of flatus:					5.729	0.0001*
<12 hours	4	11.4	13	37.1		
12-<24 hours	8	22.9	13	37.1		
≥ 24 hours	23	65.7	9	25.7		
Time of return of appetite:					3.260	0.003*
<24 hours	9	25.7	16	45.7		
24-<48 hours	18	51.4	14	40		
≥ 48 hours	8	22.9	5	14.3		
≥ 48 hours	8	22.9	6	17.1		

*Significant at p< 0.001

Table (6):
Postoperative Wound Condition Among Children in Groups

Items	Control group (n=35)				Study group (n=35)				X^2	P
	Present		Not present		Present		Not present			
	N	%	N	%	N	%	N	%		
Swelling	18	51.4	17	48.6	4	11.4	31	88.6	4.761	0.0001*
Oozing	13	37.1	22	62.9	2	5.7	33	94.3	3.191	0.003*
Local redness	20	57.1	15	42.9	2	5.7	33	94.3	5.413	0.0001*
Purulent exudates	14	40	21	60	5	14.3	30	85.7	2.172	0.037
Localized pain	17	48.6	18	51.4	13	37.1	22	62.9	0.849	0.402
Poor healing	15	42.9	20	57.1	3	8.6	32	91.4	3.431	0.002
Rupture suture	6	40	0	0	3	8.6	0	0		
Bad odor	5	33.33	0	0	0	0	0	0		
Darkening skin	4	26.66	0	0	0	0	0	0		

*Significant at $p< 0.01$

Discussion

The results of the current study demonstrated that the highest percentage of mothers of children undergoing abdominal surgeries in the study group and two fifth of mothers in the control group ages ranged from 25 to less than 30 years old. These results were consistent with the Egyptian study held by El Mwafie and Abduallah (2020), which evaluated the efficacy of predefined discharge instructions for 80 mothers on the quality of life and postoperative recovery of their children after abdominal surgery. It was found that nearly half of the studied mothers' age ranged from 20 to less than 30 years. Regarding mothers' education level, the current study highlighted that more than half of mothers in the study group were just able to read and write; in comparison, more than one-third of mothers in the control group had a university education. The result of the current study suggested a higher literacy rate among mothers in the study group than in the control group. According to Egypt's Demographics Profile (2022), the literacy rate among females was 65.5%.

As shown in the current study, more than half of the children in the study group and more than two-fifths of children in the control group were aged less than one year, and the highest percentages in both groups were male. These results were in agreement with Abdel Fattah and El-Rouby (2020), who conducted a randomized controlled trial to assess the success of the application of Enhanced Recovery after Surgery Protocol in pediatric emergency laparotomy among 60 children in Egypt. It was found that the highest percentage in both study and control groups were male, and their age ranged from 2 months to 10 years.

The current study results clarified that the highest percentage of children in the study group had acute appendicitis, followed by Hirschsprung's disease. Concerning the control group, the highest percentage of children had Hirschsprung's disease, followed by appendicitis. Moreover, recent empirical evidence and previously cited literature by Schleef (2022) reported that

appendicitis, intussusception, Hirschsprung's disease, and volvulus were the common reasons for surgical interventions in children.

In the current study, a significant difference was detected between mothers in the control and study groups regarding their levels of knowledge and reported-practices related to the care of their children after abdominal surgeries. These results could be related to that mothers in the control group received routine hospital care, which may be insufficient to prepare them for the appropriate care needed for their children after abdominal surgeries. This interprets why all mothers' knowledge in the control group didn't reach the satisfactory level compared to mothers in the study group, who 100% of them had satisfactory levels of knowledge and reported-practices.

The results proved that before the implementation of the protocol of care, all of the mothers in both groups had unsatisfactory practical skills. There were no statistically significant differences between the total mean scores of practical skills of mothers of children undergoing abdominal surgeries in both groups regarding the measurement of axillary temperature, steps of wound care, and measurement of abdominal circumference. These results indicate that the mothers urgently need education and training regarding the measurement of axillary temperature, steps of wound care, and abdominal circumference for their children.

The results of the current study demonstrated that after the implementation of the protocol of care and one week after surgery, all of the mothers of children in the study group gained a satisfactory level of practical skills applying the protocol of care and at one week after surgery compared to mothers of children in the control group who still had unsatisfactory levels. Statistically significant differences were noticed between the total mean scores of practical skills of mothers in both groups regarding the measurement of axillary temperature, steps of wound care, and measurement of abdominal girth. These results indicated the effectiveness of the protocol of care in improving mothers' practices in the study group. These results also support the current study's proposed hypothesis (1).

Khalafallah, Ahmed, Mohamed, Bassim, and Mohamed (2017) studied the impact of the protocol of care for 60 mothers of children with a ventriculoperitoneal shunt on the occurrence of postoperative complications. The study results revealed that most mothers in the study group had higher mean scores and satisfactory levels of knowledge and practice after implementing the protocol of care than mothers in the control group. Statistically significant differences were noticed between mothers in both groups regarding the total mean score of knowledge and practice after implementing the protocol of care.

As regards early postoperative complications among children after abdominal surgery in both groups, the current study showed that children in the study group were exposed to fever, bleeding, nausea, and vomiting as some early postoperative complications than children in the control group. This could be inferred that the protocol of care offered for mothers has positive effects on reducing the incidence of early postoperative complications among their children after abdominal surgery. Children in the study group were less exposed to early

postoperative complications, and these results provide additional support to the second proposed hypothesis in the current study.

Brock et al. (2022) have demonstrated that surgery can be a high-risk, high-cost therapy and postoperative complications contribute significantly to disease burden and healthcare expenditure in countries around the world. Postoperative complications in children are dissimilar from classic complications seen in adults due to the challenges of operating on smaller anatomical structures and specific age-related pathophysiologic processes. Therefore, dedicated research efforts are needed to evaluate underlying risk factors of postoperative complications in the unique population of pediatric surgical patients. El Rifai and Zaghal (2021) highlighted that despite the similarities in surgical principles between adult and pediatric surgery, it is imperative to appreciate the remaining differences. With this in mind, surgical pathologies in the pediatric age group remain the most diverse and intriguing yet challenging cases.

Regarding postoperative gastrointestinal motility among children after abdominal surgeries in the study and control group, the study results revealed that children of the mothers who received the protocol of care demonstrated earlier gastrointestinal motility indicators after surgery than those children in the control group. There were statistically significant differences between children in both groups regarding postoperative ambulation, return of bowel sound, passing of flatus, and return of appetite ($p<0.001$). These results could have attributed to the effectiveness of the protocol of care offered to mothers in the study group in improving the indicators of gastrointestinal motility among their children. The current study results were supported by Rothman, Garvanc, and Neu (2016), who study about the impact of early ambulation in pediatric postoperative appendectomy, and reported that return appetite and start feeding were earlier in the study group, but there was no statistically significant difference.

The current study highlighted that children of mothers who received the protocol of care demonstrated more favorable surgical wound conditions after surgery than those children in the control group. Children in the study group were exposed to surgical wound complications less than those in the control group. These results support the proposed the third hypothesis. Zabaglo and Sharman (2021) emphasized that postoperative wound infection is a common healthcare problem. The process of wound infection is multifaceted and involves an interplay between several biological pathways. Wound infections account for high morbidity and mortality. Contemporary data indicates that surgical site wound infections account for over two million nosocomial infections in patients who have been hospitalized in the United States. Also, results suggest that children in the study group had fewer postoperative hospital stays and low postoperative pain intensity than children in the control group. Similarly, Abdel Fattah and El-Rouby (2020) found that compared to the conventional protocol, the designed protocol resulted in better postoperative outcomes among children regarding better pain control and shorter hospital stay.

The study revealed statistically significant correlations between the total mean score of mothers' practical skills in axillary temperature measurement, wound care, and measurement of abdominal circumference after implementation of the

protocol of care and their age, level of education, occupation, and place of residence. These results correspond with Elzeky et al. (2022), who found a significant correlation between the mothers' demographic characteristics and total mothers' knowledge and practice scores after intervention. Regarding the correlation between mothers' practical skills about wound care after implementation of the protocol of care and the wound condition. The study results demonstrated no statistically significant correlations between the total mean score of mothers' practical skills regarding wound care after implementing the protocol of care and the wound condition among their children. American Pediatric Surgical Nurses Association (2020) asserted that preoperative and postoperative education offered to parents of children leads to fewer surgery-related wound complications.

Conclusion

The current study results concluded that after the implementation of the protocol of care, there was a significant improvement in the level of knowledge, reported-practices, and skills among mothers in the study group regarding the care of their children after abdominal surgery. The current study also concluded that children of the mothers who received the protocol of care were exposed to less early postoperative complications and had improved postoperative outcomes than children in the control group. Children in the study group had average vital signs, less pain intensity, better wound condition, and less length of hospital stay than those in the control group.

Recommendations

- Integrating the care protocol for mothers in the pediatric surgery ward and incorporating it into the discharge plan is essential.
- Investment in workforce capacity building is needed to train nurses in the pediatric surgery units and address the specific perioperative and postoperative needs of children undergoing abdominal surgeries and their families.
- Apply the innovative trend of telenursing for follow-up of mothers having children with abdominal surgery
- Extensive prospective randomized studies are needed to have recommendations to improve postoperative outcomes among children undergoing abdominal surgeries.

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