

IMPACT OF DEVELOPED STANDARDS OF CARE ON POST-OPERATIVE OUTCOMES IN CHILDREN WITH INGUINAL HERNIA AT ASSIUT CHILDREN UNIVERSITY HOSPITAL

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ABSTRACT

Inguinal hernia is a common condition requiring surgical repair in the pediatric age group and it is one of the most commonly performed surgical procedures in the world. The incidence of inguinal hernias is approximately 3% to 5% in term infants and 13% in pre-term infants. The standards give direction and provide guidelines for performance of nursing staff, provide a baseline for evaluating quality of nursing care, increase effectiveness of care and improve efficiency, determine the degree to which standards of nursing care must be maintained and take necessary corrective action in time. This study aimed to identify the impact of developing and implementing standards of care on post-operative outcomes in children with inguinal hernia.

Methods: A quasi experimental research design was conducted among 120 patients at Pediatric Surgery Unit -Assuit Children University Hospital. Children were allocated to either study or control group, sixty child for each group. Three tools were used, Tool one: Structured interview sheet to collect socio - demographic data, tool two: where designed to develop standards of care and implemented and tool three: Evaluation sheet to compare the effect of standards of care versus routine hospital care.

Results: Post-operative complications were highly significant in the control group than the study group. With the increases in age, the occurrence of inguinal hernia decreases.

Conclusion: This study showed that standards of care can significantly decrease post-operative complications and reduce length of hospital stay.

Recommendations: Considering the key role of nurses in a health care team, the researchers hope that the results of this study can help them to implement it in hospitalized children who undergo inguinal hernia surgery.

Keywords: *Inguinal hernia, Processus vaginalis, Incarceration, Recurrence*

INTRODUCTION

Inguinal hernia repair is one of the most frequently performed pediatric surgical operations. The incidence of inguinal hernia has been reported to range between 10 to 20 per 1000 live births. The incidence is highest during the first year of life and is maximum during first month (Alam *et al.*, 2013). Inguinal hernia is much more common in boys than girls, with a male: female ratio of 6:1. About 60% of inguinal hernias occur on

the right side, 30% are on the left side, and 10% are bilateral. The incidence of bilateral hernias is higher in girls and appears to be 20-40%. About 162 cases inguinal hernia cases were admitted to pediatric surgery department approximately in 2015.

Congenital inguinal hernias are almost due to indirect arising from a patient processus vaginalis. The processus vaginalis is a peritoneal sac that passes through the inguinal canal with the testis as it descends

into the scrotum during the seventh to ninth month of gestation. In the last few weeks of gestation or shortly after birth, the layers of the processus vaginalis normally fuse together and obliterate the patency from the peritoneal cavity through the inguinal canal to the testes. Failure of the processus vaginalis to close allows fluid or abdominal viscera to escape the peritoneal cavity and accounts for a variety of inguinal-scrotal abnormalities seen in infancy and childhood (Coran *et al.*, 2006).

A history of an intermittent bulge in the groin area, labia or scrotum should be confirmed by examining the child upright, while straining or crying, or by putting pressure on the abdomen. When no bulge is seen, palpable thickening of the spermatic cord (the silk glove sign) must be detected for over 90% sensitivity and specificity for presence of an inguinal hernia (Brandt, 2008). An inguinal hernia doesn't resolve spontaneously, and early repair eliminates the risk of incarceration and the associated potential complications, particularly in the first 6-12 month of life. The timing of operative repair depends on several factors including age, general condition of the patient, and comorbid conditions. In infants <1 year of age with an inguinal hernia, repair should proceed promptly because as many as 70% of incarcerated inguinal hernias requiring emergency operation for reduction and repair occur in the 1st year of life. In addition the incidence of testicular atrophy after incarceration in infants <3 month of age has been reported as high as 30%. In children >1 year, the risk of incarceration is less and repair can be scheduled with less urgency (Nelson *et al.*, 2011).

A standard is a model of established practices that is commonly accepted as correct. The care provided by nurses is guided by standards of care. Standards of care were developed and implemented to define the quality of care provided. They are the basis for nursing care and draw on the latest scientific data from nursing literature. Clinical, administrative and academic experts have contributed to the development of standards of nursing practice (Taylor *et al.*, 2008). Standards give direction and provide guidelines for performance of nursing staff, provide a baseline for evaluating quality of nursing care, improve quality of nursing care, increase effectiveness of care and improve efficiency, improve documentation of nursing care provided, determine the degree to which standards of nursing care is maintained and help to take necessary

corrective action in time. The standard also helps supervisors to guide nursing staff members to improve performance, improve basis for decision-making and devise alternative system for delivering nursing care. Moreover the standard justifies demands for resources association (Marquis and Huston, 2010).

Nurses use theoretical and evidence-based knowledge of human experiences and responses to collaborate with healthcare consumers to assess, diagnose, identify outcomes, plan, implement, and evaluate care. Nursing interventions are intended to produce beneficial effects, contribute to quality outcomes, and above all, do no harm. Nurses evaluate the effectiveness of their care in relation to identified outcomes and use evidence-based practice to improve care (ANA, 2010).

Significance of the study

Few standards of clinical practice have been established. Most of these standards reflect current practice rather than a thoughtful analysis comparing two alternative approaches to care. One avenue for influencing the health care of children is the development of standards of practice and critical pathways for surgical disease in children. Other factors that influence the health of children involve developing referral guidelines and evaluating pediatric surgical practice (Grosfeld, 1996). Therefore the aim of this study is to identify the impact of developing and implementing standards of care on post-operative outcomes in children with inguinal hernia at Assiut Children University Hospital.

Hypothesis

Children group who will receive standards of care demonstrate rapid wound healing process and decreased post-operative complications than those who will receive routine hospital care.

MATERIAL AND METHODS

Research design: A quasi-experimental research design will be used to conduct this study.

Settings: This study will be conducted in the Pediatric Surgery Unit at Assiut Children University Hospital.

Subjects: The subject who were participated in this study include a sample of (120) children who were selected from the previous setting. They were randomly divided into two groups of children (60) child for each group.

Two groups were distributed as follows:

Group I for control group.

Group II for study group.

The criteria for the selection of the study subjects were as follow:

Inclusion criteria of the study subjects are:

1. Both sexes.
2. Children who will undergo inguinal hernia surgery.

Exclusion criteria of the study subjects are:

1. Children who were admitted with known systemic infections.
2. Children who had more than 24 hour from the time of surgery.

Tools of data collection:

Three tools for collecting data were used in this study:

Tool one: 'Assessment sheet of children and parents'. It was developed by the researcher after reviewing literature and divided into two parts:

Part I: Demographic characteristics of child (age, sex, birth order and residence) and parents (age, education, occupation and marital status (married, divorced, widowed) were noted.

Part II: Clinical data of the child's disease which include type and site of inguinal, date of admission, date of surgery, date of discharge, length of hospital stay, wound characteristics, medical history, previous surgery, etc.

Tool two: 'Designed Standards of Care'. It was designed by the researcher based on reviewing of literature including nursing care before and after surgery which were classified into six categories: admission care, preoperative care for the day before the operation, preoperative care for the operation day, immediate postoperative assessment, postoperative care and discharge care, each category divided into subcategories (Park, 2010; Pires *et al.*, 2013).

Tool three: 'Evaluation sheet'. It was used to compare the effect of standards of care versus routine hospital care on child's post-operative outcomes and include: vital signs, wound characteristics, post-operative complications and laboratory investigations.

Method of data collection

1. Official Permission was obtained from the director

of the Pediatric Surgery Unit.

2. Tool one was developed by the researcher after reviewing literature.
3. Validity of tool one was estimated by 5 expertise in pediatric field and it's result was 95%.
4. Reliability was estimated by Alpha crombach's test for tool one and it's result was $R=0.64$.
5. Validity of tool two will be estimated after it's translation in to Arabic by 9 expertise in pediatric field and it's result was 95%.
6. Reliability will be estimated by Alpha crombach's test for tool two and it's result was $R=0.68$.
7. A pilot study was carried out on 12 children who fulfilled the criteria of the study to test the feasibility and applicability of the tools Necessary modification was done. They were excluded from the sample.

Ethical Consideration

1. Research proposal was approved from Ethical Committee in the Faculty of Nursing.
2. There was no risk for study subject during application of research.
3. The study was following common ethical principles in clinical research.
4. Written consent was obtained from patients or guardians willing to participate in the study, after explaining the nature and purpose of the study.
5. Confidentiality of the researcher was asserted. Explanation of the aim and methodology of the study was done to children's parents by the researcher. The right to refuse to participate in the study was emphasized to the children's parents.
6. Study subject have the right to refuse to participate or withdraw from the study any time.
7. Privacy of the study subject was maintained during collection of data.

Data collection

Assessment of socio-demographic characteristics of children and their parent's conditions were done by the researcher through using tool one (part I) for the two groups (study group and control group). Clinical data of the child's disease were obtained by using using

tool one (part II) for the two groups (study group and control group). The children in group one (control group) followed the routine hospital care. The researcher explained standards of care for the health care team who were responsible for child's care pre and post operatively and then observed them during the implementation of this standard for group two (study group). Data were collected during the period from the beginning of December 2015 to the end of March 2017; each questionnaire was filled within 15 minutes time.

Statistical analysis

Data were collected, tabulated and analyzed. Data entry was done using compatible personal computer (Microsoft Excel 2007 computer software package), while statistical analysis was done using SPSS 16.0 statistical software package and Excel for figures. The content of each tool was analyzed, categorized and then coded. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and standard deviations for quantitative variables. Qualitative variables were compared using Chi-square and ANOVA tests. Statistical significance was considered at *P*-value <0.05.

RESULTS

In the present study it was revealed that more than two thirds of subjects in the study group (43.3%) and more than half of them in control group (35%) were in the age group (birth-↓1 years), while more than half of subjects in the study group (36.7%) and nearly half of them in control group (28.3%) were in the age group

Table 1: Percentages and frequency distribution of the studied children in the study and control groups regarding to their socio-demographic characteristics

Item	Group				P value
	Study		Control		
	No.	%	No.	%	
Age					
Mean ± SD	30.8±38.2		39.2±42.8		0.121
Birth up to 1 year	26	43.3	21	35.0	0.246
1 year - ↓3 year	22	36.7	17	28.3	
3 year - ↓6 year	6	10.0	12	20.0	
6 year - ↓12 year	4	6.7	9	15.0	
12 year and more	2	3.3	1	1.7	
Gestational age/m					
Mean ± SD	8.6±0.6		8.8±0.4		0.000**
Birth weight/g					
Mean ± SD	2830±513		2821.7±764.3		0.003**

(1-↓3 years). The mean age in the fifth age groups was (30.8±38.2 & 39.2±42.8) years in the study and control groups respectively. The mean gestational age was (8.6±0.6 & 8.8±0.4) month in the study and control group respectively. The mean birth weight was (2830±513kg & 2821.7±764.3kg) in the study and control groups respectively.

Table 2 showed the percentages for the distribution of children in the study and control groups regarding clinical data of the disease. It was revealed that the Mean± SD of hospital stay in study and control groups was 3.2±0.5 & 4.9±2.1 respectively. From the study it was evident that more than half of children (58.3%) in study group were with none complicated inguinal hernia compared to more than two thirds of them (70%) in control group. Nearly one third of children (31.7%) in study group were with complicated inguinal hernia compared to nearly one fourth of them (21.7%) in control group, with only 10% & 8.3% of children in both study and control groups with recurrent inguinal hernia.

Table 2: Percentages distribution of children regarding clinical data of the disease

Item	Group				P value
	Study		Control		
	No.	%	No.	%	
Length of hospital stay/days					
Mean ± SD	3.2±0.5		4.9±2.1		0.000**
Type of inguinal hernia					0.396
Non complicated inguinal hernia	35	58.3	42	70.0	
Complicated inguinal hernia	19	31.7	13	21.7	
Recurrent inguinal hernia	6	10.0	5	8.3	

There was no significant difference in wound type as almost all children (100%) in both study and control groups were with clean surgical wound. A highly significant difference was found between the study and control groups regarding wound swelling at the *P*-value of (0.000**) There was more than half of children (51.7%) in control group with swelling compared to only (13.3%) of them in study group. There was one third (21.7%) of children in control group with wound discharge compared to none of them in study group, fourth of children (15%) in both groups were with

Serogenous discharge compared to only (3.3%) with pus and blood discharge in both groups (Table 3).

Table 3: Percentages distribution of children in study and control groups regarding wound character

Item	Group				P-value
	Study		Control		
	No.	%	No.	%	
Type of surgical wound					
Clean wound	60	100.0	60	100.0	NA
Swelling					
No	52	86.7	29	48.3	0.000**
Yes	8	13.3	31	51.7	
Bleeding					
No	60	100.0	57	95.0	0.079
Yes	0	0.0	3	5.0	
Presence of discharge					
No	60	100.0	47	78.3	0.000**
Yes	0	0.0	13	21.7	
Type of discharge if yes					
Serogenous	9	15.0	9	15.0	NA
Pus	2	3.3	2	3.3	
Blood	2	3.3	2	3.3	

A highly significant difference was found between the study and control groups regarding scrotal swelling and fever at the P -value of ($<0.001^{**}$) where in the third day of operation there was more than two thirds of children (70%) in study group with scrotal swelling compared to the majority of them (96.7%) in control group. In the first week, more than two thirds of children (81.7%) in control group had scrotal swelling compared to only (8.3%) of them in study group. First month, 6.7% of children in control group with scrotal swelling compared to none of them in study group. Nearly half of children (48.3%) in control group had fever compared to only 13.3% of them in study group in the 3rd day of surgery. A highly significant difference was found between the study and control groups at the P -value of (0.003**). It was noticed that (13.3%) of children in control group had recurrent inguinal hernia compared to none of them in study group after six month of surgery (Table 4).

A highly significant difference was found at the P -

Table 4: Percentages and frequency distribution of the studied children regarding to their post-operative complications

Item	Group				P-value
	Study		Control		
	No.	%	No.	%	
Scrotal swelling					
3 days	42	70.0	58	96.7	$<0.001^{**}$
1 week	5	8.3	49	81.7	$<0.001^{**}$
1 month	0	0.0	4	6.7	0.127
6 month	0	0.0	0	0.0	-
Superficial wound infection	0	0.0	0	0.0	-
Fever					
3 days	8	13.3	29	48.3	$<0.001^{**}$
1 week	8	13.3	25	41.7	0.001**
1 month	2	3.3	8	13.3	0.048 *
6 month	2	3.3	11	18.3	0.008 **
Urinary retention					
3 days	5	8.3	12	20.0	0.067
1 week	4	6.7	10	16.7	0.088
1 month	4	6.7	15	25.0	0.006 **
6 month	1	1.7	14	23.3	$<0.001^{**}$
Recurrence					
3 days	0	0.0	0	0.0	-
1 week	0	0.0	0	0.0	-
1 month	0	0.0	0	0.0	-
6 month	0	0.0	8	13.3	0.003**

value of (0.000**) between study and control groups in relation to their post-operative management of surgical wound (Table 5). Among these prepare of equipment and supplies were not done among 30% of children in control group, compared to none of them in study group. Not using clean exam gloves and mask affected 31.70% of children in the control group none of them in study group. Use of single gauze for each wipe, from least contaminated to more contaminated area was not done in 65% of children in control group compared to none of them in study group. Brief description of the wound site was not given to all the children of control group compared to only 8.30% of them in study group.

Table 5: The relationship between study and control groups in relation to their post-operative management of surgical wound

Item	Group								P value
	Study				Control				
	Not done		Done		Not done		Done		
	No.	%	No.	%	No.	%	No.	%	
Prepare equipment & supplies	0	0.00	60	100.00	18	30.00	42	70.00	0.000**
Explain the procedure to child's parent	60	100.00	0	0.00	53	88.30	7	11.70	0.006**
Wash hands	0	0.00	60	100.00	0	0.00	60	100.00	NA
Protects child's privacy	5	8.30	55	91.70	21	35.00	39	65.00	0.000**
Apply clean gloves & mask	0	0.00	60	100.00	19	31.70	41	68.30	0.000**
Assess need for pain medication	19	31.70	41	68.30	58	96.70	2	3.30	0.000**
Remove old dressings	0	0.00	60	100.00	0	0.00	60	100.00	NA
Checking wound for: color, cleanness etc	0	0.00	60	100.00	0	0.00	60	100.00	NA
Remove and discard gloves. Use a pair of clean gloves	60	100.00	0	0.00	60	100.00	0	0.00	NA
Clean wound with antiseptic solution									
Use one gauze for each wipe, from least contaminated to more contaminated area	0	0.00	60	100.00	39	65.00	21	35.00	0.000**
Dry wound using sponge in same motion	0	0.00	60	100.00	36	60.00	24	40.00	0.00**
Apply prescribed antibiotic ointments	0	0.00	60	100.00	1	1.70	59	98.30	0.315
Remove and discard gloves. Apply sterile gloves	60	100.00	0	0.00	60	100.00	0	0.00	NA
Apply clean dressing on wound	0	0.00	60	100.00	1	1.70	59	98.30	0.315
Remove and discard gloves	0	0.00	60	100.00	1	1.70	59	98.30	0.315
Wash hands	0	0.00	60	100.00	0	0.00	60	100.00	NA
Documentation and report.									
Date and time of dressing done	2	3.30	58	96.70	58	96.70	2	3.30	0.000**
Brief description of the wound site	5	8.30	55	91.70	60	100.00	0	0.00	0.000**
Brief description of the site care done and dressing applied	60	100.00	0	0.00	60	100.00	0	0.00	NA

Table 6 showed the relationship between study and control groups in relation to their post-operative preventive care of pulmonary complications. A highly significant difference was found at the *P*-value of (0.000**).

Assessment the child's respiratory status was done in 60% of children in study group compared to none of them in control group. Chest physiotherapy was done in all children (100%) in study group compared to none of them in control group.

Table 6: The relationship between study and control groups in relation to post-operative preventive care of pulmonary complications

Item	Group								<i>P</i> value
	Study				Control				
	Not done		Done		Not done		Done		
	No.	%	No.	%	No.	%	No.	%	
Assesses the child's respiratory status	24	40.00	36	60.00	60	100.00	0	0.00	0.000**
Administers oxygen as prescribed	0	0.00	60	100.00	0	0.00	60	100.00	NA
Documents rate of oxygen flow hourly	58	96.70	2	3.30	60	100.00	0	0.00	0.154
Perform chest physiotherapy	0	0.00	60	100.00	60	100.00	0	0.00	0.000**

Discussion

Health-care professionals frequently request systematic evidence-based guidance to facilitate decision-making in the provision of clinical care. They also need adequate support from hospital management to lead changes in practice. One approach to the provision of such guidance is the use of standards of care as an implementation tool. They are often developed by translating guidelines into local protocols for application in clinical practice. Although standards of care are being used worldwide, evidence about their usefulness has been unclear (WHO, 2004; Rotter *et al.*, 2010).

This study was conducted to analyze the impact of developing and applying standards of care based on a literature review of the pre- and postoperative nursing care of children with inguinal hernia on patient outcomes (complications) and length of hospital stay. The nursingcare standards developed in this study will improve not only the quality of nursing care but also the expertise of nurses. They may also be used to educate nursing students and novice nurses in the pre- and postoperative nursing care of children with inguinal hernia.

The results of this study revealed that indirect inguinal hernias can occur at all ages. The majority of

cases were diagnosed in the 1st year of life. More than one third of children with congenital inguinal hernia (43.3% & 35%) in both study and control groups respectively were in the age group (from birth up to one year). Also only 3.3% of children in the study group and (1.7%) of children in control group had inguinal hernia at the age group (12 years and more) (Table 1). This findings was consistent with the study that revealed that the prevalence of PPV is highest during infancy and declines with age (Osifo & Osaigbovo, 2008; O'Neill *et al.*, 1998). Also McGregor *et al.*, (1980) reported that inguinal hernia is predominant at birth and declines with increasing age.

It was reported that a 64% rate of contralateral PPV identified at the time of inguinal hernia repair in infants younger than 2 months. Reported rates of contralateral PPV decrease to between 33% and 50% in children younger than 1 year of age and are as low as 15% by 5 years of age (Saad *et al.*, 2011).

It's important to report the incidence of inguinal hernia by GA (Gestational Age), as the development and maturation of the inguinal canal and processus vaginalis is related to GA rather than BW (Birth Weight). The results also revealed that the mean gestational age was 8.6±0.6 & 8.8±0.4 month in the study and control

groups respectively and the mean birth weight was (2830±513 & 2821.7±764.3) kg in the study and control groups respectively (Table 1). This was supported by Vasantha *et al.*, (2002) as they reported that the incidence of IH (Inguinal Hernia) was highest at 23 weeks GA, and gradually decreased with increasing GA. From the current results infants of 28 weeks GA or less were at the highest risk for inguinal hernias. Infants with 29±32 weeks GA were at lower risk, and the risk increased with lower BW, and male gender.

Also Grosfeld (1989) reported that the incidence of inguinal hernias is approximately 3% to 5% in term infants and 13% in infants born at less than 33 weeks of gestational age. Also these findings were supported by Rescorla & Grosfeld (1984) who reported that the incidence of bilateral hernias is approximately 10% in full-term and nearly 50% in premature and low-birth-weight infants.

The results of this study revealed that the majority of inguinal hernia cases were male (85% & 98.3%) in both study and control groups respectively (Figure 1) this was consistent with Snyder and Greany (1969) where they reported that the prevalence of PPV is as high as 80% in term male infants. Also Skoog and Conlin (1995); Skinner and Grosfield (1993) reported that Such hernias are 4 times as common in boys than in girls and more common in preterm infants. The relation of the processus vaginalis with testicular descent is thought to explain why more than 90% of pediatric inguinal hernias are diagnosed in boys (Grosfeld, 1989). But these results were in contrast with Given and Rubin (1989) where they revealed that sex and age variables did not show any statistically significant differences in children with inguinal hernia.

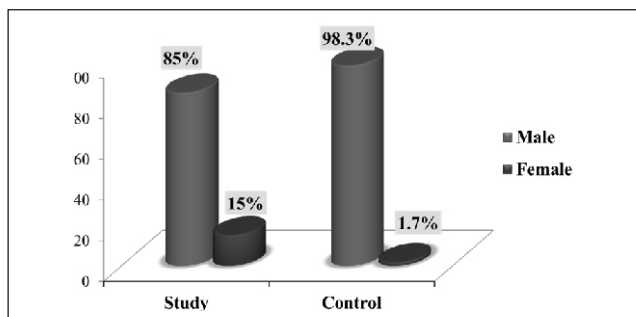


Figure 1: Percentages distribution of children in the study and control groups regarding to their gender

The right-sided preponderance is related to the later descent of the right testicle and later obliteration of the processus vaginalis (Brandt, 2008). Furthermore a study of 392 children with inguinal hernia were conducted between January 1986 and June 1992, at a tertiary care level center, in India were there was 212 (54%) right sided, 150 (38.3%) left sided and 30 (7.7%) bilateral hernias (Gupta and Rohatgi, 1993). This is consistent with the observation that more than two thirds of children (70%) in study group and nearly half of them (48.3%) in control group had right sided inguinal hernia (Figure 2).

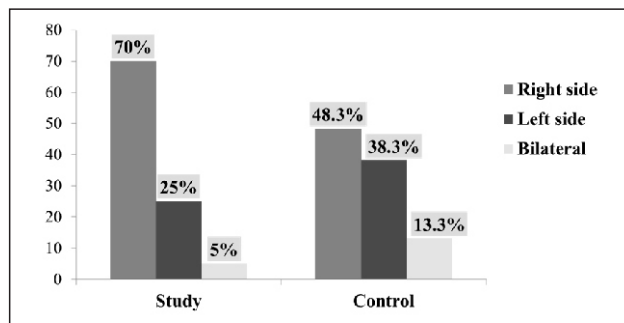


Figure 2: Percentages distribution of children in study and control groups regarding site of inguinal hernia.

Result of the current study from the comparison between the study and control groups revealed that there was a highly significant difference between both group as regard to length of hospital stay ($P=0.000^{**}$). Where Mean ± SD was 3.2±0.5 & 4.9±2.1 in the study and control groups respectively (Table 2). The results of this study revealed that more than half of children (58.3%) in study group and more than two thirds of them (70%) in control group were with indirect non complicated inguinal hernia (Figure 3) this can be explained by that indirect inguinal hernias, the most common type in children, pass lateral to the deep epigastric vessels through the inguinal canal. Direct inguinal hernias are medial and inferior to the deep epigastric vessels and do not go through the inguinal canal. Direct inguinal hernias are rare in children and usually follow an indirect inguinal hernia repair (Bronsther *et al.*, 1972).

It was found that there is no significant difference regarding wound type where almost all children (100%) in both study and control groups were with clean surgical wound (Table 3). There was no evidence

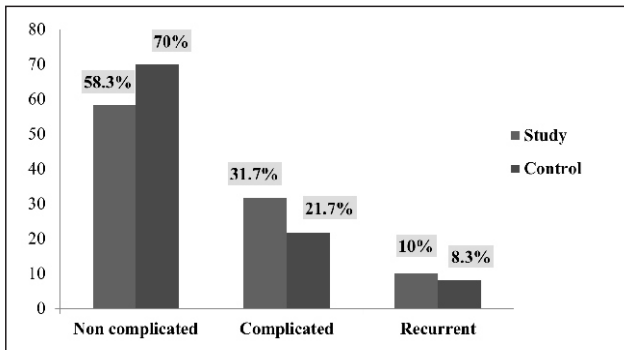


Figure 3: Percentages distribution of children regarding their type of inguinal hernia

of superficial wound infection which was consistent with Jay and Grosfeld (1989) work where they reported low incidence of wound infection (1%) noted in their study including young age group was similar to that seen in the general pediatric hernia population (ages 1 year to 16 years) and less than that reported for adults (Rescorla and Grosfeld, 1984).

While there was more than half of children (51.7%) in control group with swelling compared to only 13.3% of them in study group. Also 5% of children in control group were with wound bleeding compared to none of them in study group. There was one third (21.7%) of children in control group with wound discharge compared to none of them in study group, one fourth of children (15%) in both groups were with serogenous discharge compared to only 3.3% with pus and blood discharge in both groups.

Regarding the comparison between the study and control groups in relation to their post-operative complications (Table 4) there is a significant difference in scrotal swelling, fever and recurrence, between children placed on the standard of care and those who had usual care. *P*-value (<0.001**) was more than two thirds (70%) of children in study group compared to the majority of them (96.7%) in control group had post-operative scrotal swelling at the third day (Table 4). This was consistent with Goldstein (2002); Lloyd and Rintala (1998) & Weber and Tracy (2000). They reported that most postoperative scrotal hydroceles after pediatric inguinal hernia repair are small, asymptomatic and disappear within a few months.

Sigmund *et al.*, (2009) reported that the incidence of a very large recurrent symptomatic postoperative scrotal

hydrocele after repair of a pediatric inguinal hernia is 0.06% and usually occurs in older boys. More than two thirds (81.7%) of children in control group had scrotal swelling after one week of surgery compared to only 8.3% of them in study group (Table 4). This can be explained by the fact that the study group are cared by the health team to whom standards of care are explained and they implement it. So, effective application of the standards of care is very important.

Regarding fever it was revealed that nearly half of children (48.3%) in control group had fever compared to only 13.3% of them in study group in the 3rd day of surgery. More than two thirds (41.7%) of children in control group had fever compared to only 13.3% of them in study group in the 1 week (Table 4). This was consistent with a systematic review of 18 studies on the effect of nursing practice guidelines, the use of such guidelines was found to be effective in changing the process such as improving the accuracy of nursing records and outcome of nursing activities such as decreasing the incidence of complications (Thomas *et al.*, 1998).

It was revealed that 20% of children in control group had urinary retention compared to only 8.3% of them in study group in third day of surgery. While one fourth of children (25% & 23.3%) in control group had urinary retention compared to only 6.7% & 1.7% of them in study group at the first and six month respectively (Table 4). It was noticed that (13.3%) of children in control group had recurrent inguinal hernia compared to none of them in study group after six month of surgery (Table 4). This was consistent with Steinau *et al.*, (1995) & Meier and Ricketts (2003). They revealed that incidence of developing a recurrent inguinal hernia is around 0.8%. Most recurrences occur two years after the initial surgery. Several factors play a role in increasing hernia recurrence. These are: 1) Infection of the wound after hernia repair predisposing to tissue breakdown and a higher recurrence rate. 2) Growth failure and poor nutrition. So that it is important to implement post-operative management of wound care and nutrition to reduce recurrent rate as evidenced in this results.

These results were in contrast with Jay and Grosfeld (1989) where they reported low incidence of hernia recurrence (1%). Post-operative period is critical stage

which needs immediate intervention to save life, prevent discomforts and complications. Post-operative nursing care is a care directed towards the re-establishment of the patient's physiologic equilibrium and the prevention of pain and discomfort (Brunner, 1989).

The results regarding the relationship between study and control groups in relation to their post-operative management of surgical wound revealed that there is highly significant difference (at the P -value of 0.000**) (Table 5). Brief description of the wound site was not done in all children of control group compared to only 8.30% of them in study group. The study group was cared by the health team to whom standards of care are explained and they implement it. This resulted reflected that effective application of the standards of care regarding wound care is very important.

There is highly significant difference (at the P -value of 0.000**) between study and control groups in relation to their post-operative preventive care of pulmonary complications (Table 6).

Orem (1985) pointed that the breathing and coughing exercises are important to help remove secretions and prevent atelectasis and pneumonia so it is important to perform chest physiotherapy post-operatively for children.

Also the beneficial effect of standard implementation was supported by Vichinsky *et al.*, (2000); Wales *et al.*, (2001) & Siddiqui and Ahmed (2003). They revealed that the risk of ACS (Acute Chest Syndrome) is inversely proportional to age with the highest incidence in low birth weight children. Abdominal surgery is a high risk situation to develop postoperative ACS with characteristic basilar atelectasis after either open or laparoscopic surgery as inguinal hernia. It was noted that post-operative preventive care reduces pulmonary complications and is beneficial. Finally, it can be concluded that developing and implementing nursing

care standards is considered a corner stone in providing efficient and accurate nursing care for the surgical patients in general and patients with inguinal hernia specifically.

CONCLUSION

Based on the results of the present study, it could be concluded that the inguinal hernia is a common congenital condition in children. Age is an effective factor in the inguinal hernia occurrence and as the age increases, the occurrence of inguinal hernia decrease. Also standards of care can significantly decrease post-operative complications and reduce length of hospital stay.

This study can be replicated and expanded to include a larger sample, focusing on outcomes with different children populations undergoing a variety of surgical operations in various settings. Similar study should be done to evaluate the effect of implementation of the proposed nursing care standards at Pediatric surgery Unit of Assiut Children University Hospital generalizable results.

RECOMMENDATIONS

Based on the result of this study, the following recommendations are suggested:

1. The use of standards of care is effective method in management for children undergoing inguinal hernia surgery.
2. Increasing the likelihood of use of standards of care should be accepted as routine interventions for management in Pediatric Surgery Unit (PSU).
3. Educational programs should be provided to increase the skills of health care professionals in applying pre and postoperative nursing care standards for children undergoing inguinal hernia surgery.

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