Assessment of Post-Operative Pain for Children Undergoing Abdominal Surgery

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Abstract

Background: Pain it is a multidimensional phenomenon with sensory, physiological, cognitive, affective, behavioral and spiritual components. The evidence-based nursing practice supports the use of non-pharmacologic interventions in relieving acute postoperative pain for children undergoing abdominal surgery. **Aim**: The study aimed to assess postoperative pain for children undergoing abdominal surgery. **Design**: A descriptive design was utilized to carry out this study. **Setting**: The study was conducted at Pediatric Surgical Departments in two university hospitals namely, Children's Hospital affiliated to Ain Shams University and Specialized Pediatric Hospital affiliated to Cairo University. **Subjects**: A purposive sample of 50 children undergoing abdominal surgery was selected according to predetermined inclusion criteria Children aged 6-16 years, from both genders and undergoing abdominal surgery. **Study tools**: (1) Child's assessment sheet to gather data related to characteristics of the studied children and data about abdominal surgery,(2) Pain assessment sheet to assess child's physical and physiological parameters of pain,(3) Ward-graphic rating scale to assess pain intensity. **Results**: The results of the studyrevealed that the mean of the studied children was 3.54±9.7 years and nearly two of them wereboys, nearly half of them had medium level of pain intensity at 1st and 2nd day of surgery. There was no statistical significant difference between 1stand 2ndday post-operative in studied children regarding to pain intensity. There was no statistical significant difference between level of pain intensity and age for studied children. **Conclusion**: It can be concluded from the study findings that, the most of the studied children had medium of pain. And there is no change in order to the level of postoperative pain intensity experienced by studied children at 1st and 2ndday of surgery. **Recommendations**: Emphasize the importance of using pain scale as a part of routine care as a fifth vital sings especially post- abdominal surgery

Key words: Pain- Post- operative pain- Abdominal surgery- Nursing- Children

Introduction

Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. It is a multidimensional phenomenon with sensory, physiological, cognitive, affective, behavioral and spiritual components **(World Health Organization WHO, 2012).** Postoperative pain is a consequence of tissue damage from surgical incision. Immediately after tissue damage, sensory nerve endings are suddenly exposed to a variety of cellular breakdown products and inflammatory mediators that trigger acute nociceptive activity. These chemical mediators generate local pain sensation. The pain message reaches the brain through dorsal horn. Where the pain sensation is recognized and interpreted. Perception of

pain is the end result of the neural activity of pain transmission ***(Chanif et al., 2013&Mohy, 2015).***

Abdominal surgery involves a surgical operation on organs inside the abdomen. This may include surgery on the small intestine, large intestine (colon), spleen and appendix. However,reasons for abdominal surgery include; obstruction, congenital anomalies and inflammatory bowel disease ***(Sutter Health, 2016).***

Acute postoperative pain needs to be managed. The modalities used in relieving acute postoperative pain include pharmacologic and non-pharmacologic management. Pharmacologic medications have side effects that can be life threatening. Moreover, non-pharmacological pain management has the potential to palliate acute postoperative pain ***(Chanif et al., 2013 &Vakili et al., 2015).***

Pain management is a very important aspect of nursing care of the pediatric patient. Pain management standards require that nurses be educated in the assessment and management of pain, and that they recognize the right of patients to appropriate assessment and management of pain. The role of the nurse in pain management encompasses the entire nursing process. The nurse assesses for the presence of pain, plans pharmacological and non-pharmacological pain management strategies with the medical team, implements the plan, and evaluates the effectiveness of the interventions ***(Stanley & Pollard, 2013).***

Significant of the study

Pain is a common sequel of surgery worldwide, unrelieved or poorly managed pain is a burden on the child, the health-care system and society. The Canadian Pain Coalition's Pain in Canada Fact Sheet (2012) mentioned that one in five Canadians children had moderate to severe persistent postoperative pain, and one-third of them had significant impact of post-operative pain on their health and their quality of life. In Egypt, many researches had been done to investigate the causes of abdominal pain in children. They found that acute or recurrent abdominal pain in children is the most common type of pain. The incidence of abdominal surgeries in Alexandria at Sporting Insurance Hospital is 4271 cases in 2013 for the age group 6 to 12 years ***(Mohy, 2015***). Postoperative abdominal pain is most important type of pain, So the pediatric nurse can assess pain post abdominal surgery to improve and maintain child health and wellbeing.

Aim of the study:

This study aims to assess postoperative pain for children undergoing abdominal surgery.

Research questions:

1.What is the children's level of pain intensity post abdominal surgery?

2.What are the relation between level of pain intensity and age, gender of studied children post abdominal surgery?

Subjects & Methods:

Research design:

A descriptive design was utilized to conduct this study.

Setting:

This study was conducted at Pediatric Surgical Departments in two university hospitals, which are Children's Hospital affiliated to Ain

Shams University and Hospital affiliated to Cairo University .The researcher selected these two hospitals due to its highly flow rate of admission, and specialization in management of children with rare and critical conditions.

Subjects:

A purposive sample composed of 50 children undergoing abdominal surgery based upon predetermined inclusion criteria. 25 children from Specialized Pediatric Hospital affiliated to Cairo University and 25 children from Children's Hospital affiliated to Ain Shams University.

I: Child's Assessment Sheet: that was designed by the researcher after reviewing the related literature (**Wong 2015, Mohy 2015 &Journal of Pain and Symptom Management, 2106**) to gather data. regarding to characteristics of the studied sample including (child's name, age, gender, child's ranking in the family, academic year and child's diagnosis,the type of abdominal surgery, date of surgery, type of analgesic and name, dose, frequency and route of administration of medication post abdominal surgery).

II: Pain Assessment Sheet: It was adopted from ***Wong et al., (2015)*** to gather data post abdominal surgery in studied children at 1st and 2nd day post abdominal surgery. It was composed of 4 parts to assess physiological parameters including (heart rate, respiratory rate, blood pressure andtemperature), physical parameters including (gastrointestinal tract and general manifestations), child's Behavior including (verbal behavior, facial expression and body movement), and type and site of pain.

III. Word-Graphic Rating Scale [Figure1]: adopted from ***Tesler, et al., (1991)***. It is a self- report pain scale; used to measure the pain intensity.It uses

The following inclusion criteria:

Children aged 6-16 years, from both genders and undergoing abdominal surgery.

Exclusion criteria:

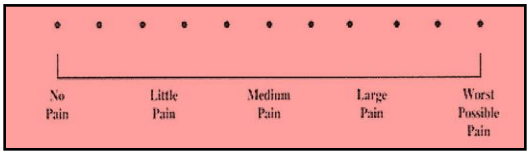
Children whose are suffering from chronic illness orwho are suffering from post-operative abdominal surgical complications.

Tools of Data Collection:

Data was collected through the following tools

descriptive words to denote varying intensities of pain, applicable for children aged 4-17 years. Words were used to describe how much pain the child has, ranged from no pain to worst possible pain explained to child "this is a line with words to describe how much pain the child may have. This side of the line means no pain, and over here the line means worst possible pain", point with the child's finger where no pain is and run finger along the line to worst possible pain as the child says it " if the child has no pain, would mark like this" "if the child has some pain, would mark somewhere along the line, depending on how much pain the child has" " the more pain that child has, the closer to worst pain would mark the worst pain possible is marked like this".

Figure (1) Word-Graphic Rating Scale



Wong, D., Hockenberry, M., J., and Wilson, D. (2015): Wong's Essentials of Pediatric Nursing. 9th

ed., Jeff Patterson,United States of America. P 154-155**.**

Operational Design:

The operational design for the present study included: preparatory phase, content validity and reliability, pilot study and field work.

Preparatory phase:

A review of past, current, local and international related literature to cover the various aspects of the research problem using articles, periodicals, journals, text books and internet to get acquainted with various aspects of the research problem and to develop the study tools.

Content validity and reliability:

It was ascertained by a group of experts (3) in the field of pediatric nursing, to test its content validity by reviewing the tools clarity relevance, comprehensiveness & simplicity. Minor modified were done in the form of rephrasing. Reliability refers to the accuracy and consistency of the measuring tool. It was tested statistically by cronbach test=0.9 (P<0.001).

Ethical considerations:

Prior to the pilot study, ethical approval was obtained from the Scientific Research Ethical Committee of Faculty of Nursing Ain Shams University. An oral informed consent was obtained from each participant (children and their accompanying mothers). The researcher explained the aim of the study to children included in the study. In addition, the children were assured that the study is harmless, anonymity and confidentiality would be guaranteed and they have the right to withdraw from the study at any time without any reason.

Pilot study:

A pilot study was applied on 10% (n=5) of the studied children (50) to test applicability and clarity of the study tools, as well as to estimate the time needed to fill each tool. The studied children were not excluded from the study sample.

Field of the work:

The actual fieldwork was carried out during the period from January to August 2018 where the researcher was available 2 days per week for each study setting from 8.30 am to 4-6 pm to gather data. The researcher met the children and their accompanying mothers to obtain their oral consent. Data was gathered from each child and his/her accompanying mother who were interviewed individually where necessary. The researcher selected the child according to eligibility criteria identified and recruited. The researcher greeted, introduced herself to the child and accompanying mother, and explained the technique & purpose of the research. The baseline data was collected, which included characteristics, basic physical assessment data about diagnosis, type of abdominal surgery and analgesics. The researcher assesses the level of pain intensity post-operative abdominal surgery for the studied children at 1st and 2nd day after surgeryused pain scale.

Administrative Design:

Administrative approval to carry out the study was obtained through an issued letter directed to administrators of the previously mentioned study setting. The agreement consent (oral approval) was obtained from the children and their accompanying mothers.

Statistical Design:

Data were revised, coded, tabulated, analyzed and presented using the Statistical Package for Social Sciences (SPSS V24). Inferential statistics was used to answer research hypotheses. Frequencies, percentages, arithmetic mean and standard deviations were used for quantitative variable using (Minitab V17), Chi-Square test used for quantitative variable; Student T-test and Z-test were used for comparisons. The qualitative data were analyzed applying appropriate statistical methods to determine whether there was a statistically significant difference or not. A statistically significant difference considered at Level of significance threshold at 0.05 (P> 0.05 = insignificant, P< 0.05 = significant and P < 0.001 = highly significant).

Limitations of the study

Few numbers of beds lead to decrease of pediatric patients numbers flow in the children's Hospital affiliated to Ain Shams University. So, the researcher added Specialized Pediatric Hospital affiliated to Cairo University to research settings.

Results:

Table (1): Number and percentage distribution of the studied children according to their characteristics (n=50)

Characteristics	No.	%
Age (year):	34	**68.0**
6-<10		
10- < 14	11	22.0
14-≤16	5	10.0
X ±SD	9.7±3.54	
Gender:		
Males	31	**62.0**
Females	19	38.0
Child's ranking in the Family:		
1st	23	**46.0**
2nd	13	26.0
3rd	8	16.0
4th	3	6.0
5th	3	6.0
4. **level of education**		
Primary	42	**84.0**
Preparatory	4	8.0
Secondary	4	8.0

In relation to characteristics of the studied children in Table (1) it was found that, two thirds (68%) of the studied children was aged from 6 to10 years with mean 9.7±3.54 years. And observed that, 62% of them wereboys.Near to half (46%)of study sample was ranked as 1st. The majority (84%) of them had a primary level of education as well.

Table (2): Number and percentage distribution of the studied children according to their diagnosis (n=50)

Child's diagnosis	No.	**%**
Intestinal obstruction	12	24.0
Urological obstruction	5	10.0
Appendicitis	17	**34.0**
Severe abdominal pain	5	10.0
Hernia	2	**4.0**
Gall stone	6	12.0
Congenital spherocytosis	3	6.0

As noticed in this table (2), appendicitis was the common diagnosis among the studied children as 34% of them,and only 4% of them were diagnosed as hernia.

Table (3): The relation betweenstudied children regarding to physiological parameters at the 1st and 2nd days post abdominal surgery compared with their normal peers (n=50)

Physiological parameters	studied children				**Z-test P-value**
	1st day post-surgery one hour before 2nd dose of analgesic		**2nd day post-Surgery** one hour before 2nd dose of analgesic		
	No	%	No	%	
1.Respiratory rate					
Normal	26	**52.0**	25	50.0	0.841
Abnormal	24	48.0	25	**50.0**	0.841
2.Blood pressure	(n=15)*		(n=15)*		
Normal					
Abnormal	11	**73.3**	13	86.7	0.639
	4	26.7	2	**13.3**	0.398
3.Heart rate					
Normal	30	**60**	29	**58.0**	0.839
Abnormal	20	40	21	**42.0**	0.839
4.Temperature					
Normal	33	**66.0**	29	58.0	0.408
Abnormal	17	34.0	21	42.0	0.408

***Significant statistical differences P< 0.005 and insignificant statistical differences P> 0.005**

- ***Total number is not mutually exclusive**
- **Z= relation between 1st and 2nd day in control group**

As regard physiological parameters. Table (3) showed that, there was no statistical significant difference between 1st and 2nd day post- surgery of the studied children in relation to respiratory rate, blood pressure, heart rate and temperature.

Table (4): Physical parameters of the studied children at the 1st and 2nd days post abdominal surgery(n=50)

Items	The studied children				T-test P-value
	1st day		2nd day		
	Mean	S.D	Mean	S.D	
Children's general manifestations	1.7200	1.48516	1.7000	1.44632	0.569
Children's GITmanifestations	1.5400	1.03431	1.5000	1.09265	0.569
Children's verbal behavior of their pain	1.8600	1.24556	1.8600	1.24556	1.000
Children's facial expression	2.4600	1.55459	2.3600	1.54867	0.133
Children's body movement	2.4200	1.14446	2.4200	0.14446	1.000
Children's sleeping, appetite, activity level	0.7000	0.81441	0.5600	0.64397	0.051

***Significant statistical differences P< 0.05 & insignificant statistical differences P> 0.05**
T1= relation between 1st and 2nd day in studied children

Table 4, illustrate that there were no statistical significant differencesbetween general manifestations, GIT manifestations, children's verbal behavior of their pain and Children's facial expression, children's body movement and children's sleeping, appetite, activity level.

Table (5): Pain intensity of the studied children at the 1st& 2nd days post abdominal surgery (n=50)

Pain intensity	**The studied children**				**Z-test P-value**
	1st day post- abdominal surgery one hour before 2nd dose of analgesic		**2nd day post- abdominal surgery one hour before 2nd dose of analgesic**		
	NO	**%**	**NO**	**%**	
Little pain	6	12.0	12	26.0	0.114
Medium pain	15	**46.0**	14	**44.0**	0.826
Large pain	19	38.0	14	28.0	0.285
Worst pain	10	4.0	10	2.0	1.000

***Significant statistical differences P< 0.005 and insignificant statistical differences P> 0.005**
Z= relation between 1st and 2nd day in control group

In relation to pain intensity table (5) it was found nearly half (46%), (44%) of them had medium pain at 1st and 2nd day post abdominal surgery respectively. There was no statistical significant difference in relation to pain intensity.

Table (6): Relation between children's level of pain intensity and their age(n=50)

Pain intensity / Age in year	The studied children: Little pain No.	%	Medium pain No.	%	Large pain No.	%	Worst pain No.	%
6-<10	7	20.6	8	23.5	12	35.3	7	20.6
10- < 14	4	36.4	3	27.3	1	9.1	3	27.3
14-≤16	1	20.0	3	**60.0**	1	20.0	0	0.0
X^2 (P- value)				**0.376**				

*Significant statistical differences P < 0.05 & insignificant statistical differences P> 0.05

As shown in table (6), there was no statistical significant differences (P-value= 0. 376) between level of pain intensity and children age where 60% of them aged between 13-≤16 had medium pain.

Table (7): Relation between children's level of pain intensity and their gender (n=50)

Pain intensity / Gender	The studied children: Little pain No.	%	Medium pain No.	%	Large pain No.	%	Worst pain No.	%
Boys	9	29.0	12	**38.7**	9	29.0	1	3.2
Girls	4	21.0	10	52.6	5	26.3	0	0.0
X^2 P- value				**0.694**				

*Significant statistical differences P < 0.05 and insignificant statistical differences P> 0.05

As observed from table (7), there was no statistical significant differences (p- value= 0.694) between children's level of pain intensity and gender Where 38.7% of them in relation to medium pain wereboys.

Discussion

Moderate to severe pain remains a common outcome in pediatric surgical procedures and the majority of children experienced pain after surgery. More than 5 million children undergo surgery every year, it is reported that up to 80% of school age children experience moderate to severe pain even when receiving analgesics. Managing children's pain is a growing priority in the hospital setting with increasing attention given to minimizing the painful aspects ***(Sazzad, 2018).***

In relation to the characteristics of the studied children table 1, the study findings were revealed that, one third of them their age ranged from 6 to10year, above of half of them were boys and the majority of them had primary level of education. These The study findings supported by ***Suresh and De Oliveira (2015)*** study which entitled "The effect of audio therapy to treat postoperative pain in children undergoing major surgery: a randomized controlled trial" who reported that the children aged from 12.4 (9.8–14.6), but contradicted in relation to girls where higher than boys for study group and slightly closed for studied children. While is not supported by findings of ***Mohy (2015),*** study which entitled; "the effect of reflexology technique on post-operative pain among school-age children undergoing abdominal surgery" who reported that, the age group from 10-12

years. While contradicted regard to girls were slightly higher than boys. On the other hand the study of ***Thomas (2011)*** study which entitled "Study to assess the effectiveness of guided imagery on education of pain among post-operative children selected hospital at Kerala" who cited Level of education Regarding the educational, majority 45% child were Preparatory level, this is disagree with this study findings where the majority 84% of children were primary level.

The findings of the current study reported that appendicitis is the most common diagnosis among studied children; table 2. It contributed to ***Gajbhiye et al. (2013)***, study which entitled; "perforated appendicitis in children" who reported, that the appendicitis is mostly affects teens between the age 10 to 19 years old, and is rare in preschool children and infants. The researcher opinion that is mainly due to delaying to seek medical advice from of parents about the disease, self-medication and delay in reporting to hospital.

Regarding the physiological parameters Table 3, illustrated that, there was no statistical significant difference between 1st and 2nd day post-operative abdominal surgery of the studied children. this findings of the study were congruent with the results ***Jones et al. (2012)*** which" Is there a specific hemodynamic effect in reflexology" who cited that there was no significant difference noted in the heart rate and blood pressure. Moreover, these findings disagree with ***Mohy (2015),*** who showed that there was no change of body temperature. The researcher thinks, elevation of vital signs after surgery increased as physiological response to postoperative pain, which is believed to be due to an over activity of the sympathetic nervous system.

In relation to pain intensity table 5, showed that the nearly half of studied children have medium pain and there was no statistical significant difference between 1st and 2nd day post-operative abdominal surgery of the studied children. These findings result were not supported with ***Han & Lee (2012)*** study which entitled; "The effect of back massage on degree of pain, state anxiety and quality of sleep of postoperative patient with gastrostomy" he cited that the degree of pain intensity was significantly difference.

Concerning the relation between intensity of postoperative pain and age Table 6, these study findings reported that the older children have medium more than younger children regarding to studied children and there is no statistical difference between level of pain intensity and age, this goes in the same line with that ***Huth et al (2016)*** study which entitled "what school age children tell us about imagery" who reported that the older children reported the worst level of pain than younger children. The researcher thinks the older children have better understanding of the relationship between disease and pain and can determined the cause of pain. Also, may be older children can express about their pain and recognized the type of pain.

Concerning the relation between intensity of postoperative pain and gender Table 7, these findings of the current study showed that, the most of the studied children were boys have a medium pain. This disagreed with ***Chienget al (2013)*** study which entitled " Exploring influencing factors of post-operative pain in school age children undergoing elective surgery" with the findings of the present study in relation to medium pain intensity for studied children he cited that boys reported less degree of postoperative pain than girls with significant difference between gender and post-operative pain .

Moreover ***Moura and Pereriar (2011)*** study which entitled "Post-operative pain in children a gender approach" who mentioned that girls reported higher pain level than boy. The researcher thinks these differences related to our cultural wise paly important role that the girls can't express her pain by clearly voice and expression, differences of individual pain tolerance and different type of surgery.

Conclusion:

It can be concluded from the study findings that, the most of the studied children had medium of pain. And there is no change in order to the level of postoperative pain intensity experienced by studied children at 1st and 2nd day of surgery. There no relation between pain ratings intensity and children's age, gender and level of education.

Recommendations:

- The results of this study provide a baseline from which research should continue and build. The following recommendations for future research are presented:

- Emphasize the importance of using pain scale as a part of routine care as a fifth vital sings specially post-surgery

- Increase awareness for the nurses about important of post-operative pain assessment and right way to select special scale according the child age.

- Use of larger sample size is recommended in another study focuses on effect based nursing intervention on pain management for children undergoing abdominal surgery.

- Examine the factors hinder or promote nurses from using pain alleviation methods in the clinical practice. Future research could also investigate the efficacy of different interventions, especially in pediatric surgical nursing.

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