Effect of Aromatherapy Massage on Postoperative Pain Among School Age Children

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Abstract

Background: Aromatherapy is one of the non-pharmacological methods, it is safe and effective for improving postoperative pain. **Aim:** This study was aimed to investigatethe effect of aromatherapy massage on postoperative pain among school age children. **Design:** A quasi- experimental research design was utilized. **Setting:** The study was conducted at the pediatric surgical unit in Assiut University Children Hospital**. Subjects:** It included 100 school age children who are suffering from postoperative pain. They were divided into two groups the experimental group (50 children who received aromatherapy massage beside the hospital routine ward care) and the control group (50 children who received the hospital routine ward care).**Tools**: Two tools were used to collect necessary data which included structured interview questionnaire for personal data and pain assessment scale.**Results**: It was found that the mean pain score of children in the experimental group was less than mean pain score of those in the control group with statistical significant difference. As well as statistically significant differences were found between the two groups as regards first, second, third, and fourth posttest of pain score post-operative. **Conclusion** Aromatherapy massage with lavender oil was an effective therapeutic option for postoperative pain **Recommendation**: Using aromatherapy massage as routine interventions for reducing postoperative pain in children.

Keywords: Aromatherapy Massage, School Age Children & Postoperative Pain.

Introduction

Pain is one of the most common problems and complaints experienced by children undergoing surgery. Pain is a subjective experience with cognitive, behavioral, and emotional dimensions which is affected by environmental, socio-cultural, and evolutionary factors of an individual. **(Alhani et al., 2010)**.

Acute postoperative pain is due to inflammation from tissue damage or direct nerve injury. Pain after surgery can occur after both major surgery and even relatively minor surgery. The day after surgery, pain scores of children undergoing different types of surgery are often high, as indicated **by Wong-Baker Faces Rating Scale** (**FPRS**), **1995**. More than 80% of children who undergo surgical procedures experience acute postoperative pain. Previous studies have reported that many children suffer from pain after surgery; on the first postoperative day, 30–43% of patients report moderate or severe pain **(Chou et al., 2016).**

The new trend in nursing is the use of complementary therapy to enhance the physical and mental well-being of the patient. Aromatherapy is one of the most widely used methods of complementary therapies. Aromatherapy refers to the medicinal or therapeutic use of essential oils absorbed through the skin or olfactory system **(Boehm et al., 2012).** Aromatherapy is used for controlling the pain, anxiety, depression, stress, and improves the sleep pattern. Children who had undergone surgery will perceive moderate to severe pain and it can have a significant effect on patient recovery. Aromatherapy is one of the most rapidly expanding areas among complementary therapy. Complementary therapies may have an important role in holistic pediatrics pain management (**Maclaren & Kain, 2008)**.

Postoperative pain can be managed through both pharmacological and non-pharmacological methods to relieve the pain and to provide comfort to a child. The non-pharmacological methods of pain management are considered as useful, desirable strategies, cheap, easy to use by patients, family and health care providers such as, music therapy, play therapy, relaxation technique, biofeedback, exercise and pharmacological methods includes use of opioids, nonsteroids anti-inflammatory drugs (NSAIDs) and non-narcotic analgesics because children need adequate pain medication (**Sadat et al., 2011).**

The nurse may be able to relieve post-operative pain immediately with interventions by aromatherapy massage or work with the health care team to assess

the pain issue in greater depth **(Hwang & Shin, 2015)** Nurses acting a key role in identifying causes of pain, minimize exposure to painful medical procedures, proactively assessing and treating pain. Also teaching the child and family about non pharmacologic methods of pain management, and reduction of pain by applying comfort measure. They must be evaluating efficacy of treatment methods by paralleling pre & post treatments and watching side effect frequently **(American Academy of Pediatrics, 2016).**

Significance of the study
Aromatherapy is one of the most rapidly expanding areas among complementary therapy. Complementary therapies may have an important role in holistic pediatrics postoperative pain management **(Browne & Flanigan, 2007).** Uncontrolled postoperative pain leading to increased hospital stay, stress ulcer, rigidity, muscle contraction, increase the rate of postoperative complications (e.g. atelectasis, pneumonia, thromboembolism, depressed immune function) increase risk of delayed recovery, development of chronic pain syndromes after discharge and prolonged healing process. The incidence of post-operative pain for school age children in the year 2016 was 26.7 % of the total admission to pediatric surgical unit (**Unpublished statistical data from Assiut University Children Hospital Records, 2016).**

Aim of the Study
The aim of this study was to investigate the effect of aromatherapy massage on postoperative pain among school age children.

Research Hypotheses
Children in the experimental group who are receiving (aromatherapy massage) will have better reduction of the severity and intensity of post-operative pain than those in the control group who are receiving the routine care only.

Subjects & Method
Research Design
A Quasiexperimental research design was utilized in this study.

Setting
The study was conducted at the Pediatric Surgical Unit in Assiut University Children Hospital which served the Upper Egypt from Elfum to Aswan**.** Pediatric surgery unit established an 1986 transfer to Assiut university hospital on 2001 located on the fourth floor consists of 4parts. The part specialized for patient consists of 7 rooms each room containing 8 beds patient examination room, room for supervisor nurse, room for resident doctor and 3 bath

rooms. The care for this patient introduced by5 professors,1resident doctor,1supervisor nurse,9 technical nurse,6 diploma nurse and 3workers .

Subjects
A convenience sample of 100 children from 6-12 years had postoperative pain selected from the previous setting. The study subjects were divided randomly into two groups: The experimental group (50children who received aromatherapy massage beside the hospital routine ward care) and the control group (50 children who received the hospital routine ward care).

Inclusion Criteria
1-Both sexes.
2-Children aged 6-12 years undergoing surgery.
3-Children who were conscious and able to participant in the study.

Exclusion Criteria included
1. Children who were having postoperative complications after surgery.
2. Children with foot ulcer and arthritis.
3. Children who were having epilepsy, hypoglycaemia, kidney problem, fracture of one or both limbs and who are taking sedatives such as tranquiliser.

Tools of data collection
Two tools were used to collect the required data for this study.

Tool I:Astructured interview questionnaire
It was developed by the researcher after reviewing of related literature and it divided into two parts:
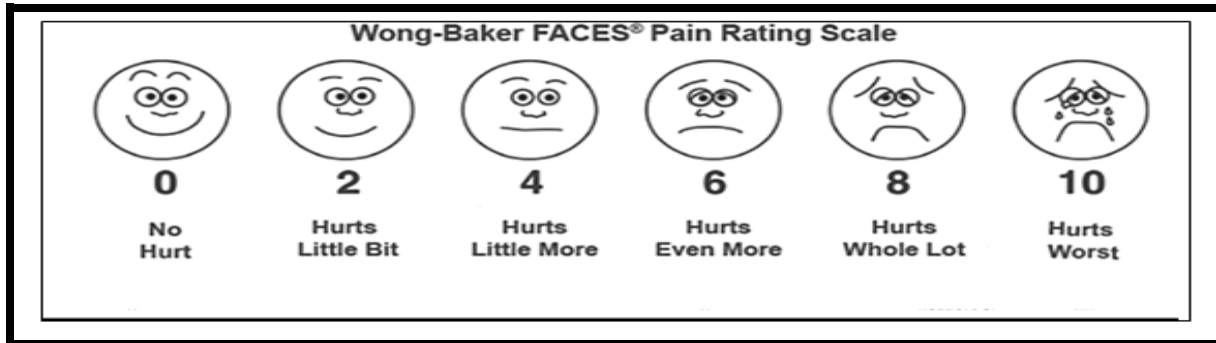
Part (I): Personal data about children and their mothers
It included questions about (child's age, sex, weight and birth order), and mother's age, education and occupation.

Part (II): Clinical data questionnaire: It was
included questions about preoperative laboratory investigation, trauma of surgery, types of anesthesia and length of the hospital stay.

Tool (II): Pain assessment scale
It was adopted from **Wong Baker's FACES Pain Rating Scale (FPRS) (1995**). The scale was used to assess the degree of pain and explained to the child that each face was for a person who felt happy because they had no pain (hurt) or sad because they had some or a lot of pain. The FACES were valid and reliable self-reporting pain assessment tool. Faceswerereported to be an appropriate tool for children mainly due to its ease of usage in observing and reporting pain. It utilizes cartoon-like (line) drawings of six faces that portray children's pain levels ranged from (0 – 10) degree.

Wong-Baker FACES® Pain Rating Scale

0	2	4	6	8	10
No Hurt	Hurts Little Bit	Hurts Little More	Hurts Even More	Hurts Whole Lot	Hurts Worst

- **Scoring system**

- **Degree of pain**

0= No pain

2-4= Mild pain

6-8= Moderate pain

10= Sever pain

Field of the work

This study was carried out through a period of eight months from the beginning of March (2018) to the ending of October (2018). Aromatherapy massage was applied to children in the experimental group by the researcher who was trained by therapist and skilled in aromatherapy massage. The researcher received training on massage in the department of physical medicine that is located in the first floor of main Assuit university hospital 3 days per week (Sunday, Tuesday and Thursday) for 6 months and the researcher had getting a certificate and had signatures by head of department of physical medicine and the director of main the university hospital. The researcher went to hospital three days per week (Sunday, Monday & Tuesday),were specified for data collection two times per day in the morning and evening at the first postoperative day from1-4 hours (when the anesthesia had fully worn off). To assess pain intensity and after one hour of the first**.**second, third and fourth aromatherapy massages for children in the experimental group. (children were received the hospital routine care as postoperative to improvepainmeasures, and the time needed for every child was 35minutes (20-minutes foot and hand massage 5 minutes to each extremity) and 15 minutes for filling questionnaire. A 20-minutes foot and hand massage (5minutes to each extremity) was provided one hour after intervention. It was significantly reduces both pain intensity and distress that were resulting from incision pain on the first postoperative day (**Mazlum, et al., 2013).** Pretest was conducted for both the experimental and the control groups. school age children in the control group was received the usual hospital care only and assessedpainat the same times for the experimental group without aromatherapy massage.

Intervention

Aromatherapy massage

In the experimental group, children were received hand and foot massage beside the hospital routine care as follow aromatherapy massage was used with effleurage, petrissage, friction, joint massage and tapping movements with mild to moderate pressure using lavender oil as the best that helped to relieve postoperative pain (**Abbaspoor & Shahri, 2013**). Foot and hand massage technique applied 1-2 drops of the essential oil to the reflex point, placed all four fingers flat on the skin. Also using medium pressure rollup onto the finger tips, continued rolling over the fingernails, released and moved forward about 1/4 of an inch, repeat this motion until the reflex point is covered and repeated technique two times per day (**Chang, 2004).**

- After the intervention in experimental group were evaluated for their outcomes using tool I &II.

- Children in the control group were assessed by using tool I &II without application of massage.

- Finally, the researchers coded and transformed the row data into coding sheets and then, analysis and interpretation of the collected data were done.

Pilot study

- A pilot study was carried out on ten children (10%) to test the clarity and applicability of the study tool. Necessary modifications were not done. The pilot study sample was included in the study sample.

- Tool one was developed by the researcher after reviewing the literature and it was tested for its content validity by five experts (three professors of pediatric nursing and two professors of pediatric surgery field) where its value was 0.98. Reliability coefficient of tool one was estimated by Alpha Cornbrash's test and it value was r=0.719.

Ethical Considerations

The ethical research considerations in this study was included the following:

- Research proposal was approved from the ethical committee in the faculty of nursing.

- There was no risk for study subject during application of the research.

- The study was following common ethical principles in clinical research.

- Written consent was obtained from parents that are willing to participation of their children in the study was obtained after explaining the nature and purpose of the study.

- Confidentiality and anonymity was assured.

- Study subject had the right to refuse to participate or withdraw from the study without any rational any time**.**

- Study subject privacy was considered during collection of data.

Statistical analysis

Date entry and data analysis were done using SPSS version 19 (Statistical Package for Social Science). Data were presented as number, percentage, mean, standard deviation, median and range. Chi-square test were used to compare between qualitative variables. In case of parametric data, Independent samples t-test was used to compare quantitative variables between groups. While in case of non-parametric data, Mann-Whitney testwas used to compare quantitative variables between two groups and Kruskal Wallis test for more than two groups. P-value considered statistically significant when P<0.05.

Results

Table (1): Personal data of the studied children.

Personal data	Experimental group(n= 50)		Control group(n= 50)		P-value
	No.	%	No.	%	
1) Child's age / years					
6 - < 8 yrs	10	20.0	19	38.0	0.127
8 - < 10yrs	11	22.0	10	20.0	
10 – 12yrs	29	58.0	21	42.0	
Mean ± SD	9.74 ± 2.20		8.84 ± 2.40		0.056
Range	6.0 – 12.0		6.0 – 12.0		
2) Child's sex					
Male	34	68.0	37	74.0	0.509
Female	16	32.0	13	26.0	
3) Child's Weight/ kg					
< 25 kg	18	36.0	21	42.0	0.660
25 – 30 kg	16	32.0	12	24.0	
> 30 kg	16	32.0	17	34.0	
Mean ± SD	28.36 ± 8.59		27.54 ± 7.43		0.611
Range	18.0 – 55.0		18.0 – 50.0		
4) Child's birth order					
1st	19	38.0	14	28.0	0.686
2nd	13	26.0	11	22.0	
3rd	11	22.0	16	32.0	
4th or more	7	14.0	9	18.0	

Table (2): Personal data of the studied children mothers.

Personal data	Experimental group(n= 50)		Control group(n= 50)		P-value
	No.	%	No.	%	
1-Mother's age /Years:					
< 30yrs	9	18.0	13	26.0	
30 - < 40yrs	25	50.0	27	54.0	0.335
≥ 40yrs	16	32.0	10	20.0	
Mean ± SD	35.26 ± 6.46		34.02 ± 6.06		0.352
Range	22.0 – 50.0		22.0 – 47.0		
2-Mother's education					
Illiterate	22	44.0	17	34.0	
Read and write	4	8.0	5	10.0	
Basic education	7	14.0	7	14.0	0.775
Secondary	14	28.0	15	30.0	
University	3	6.0	6	12.0	
3-Mother'soccupation					
Housewife	31	62.0	36	72.0	0.288
Employee	19	38.0	14	28.0	

P value=21

Table (3): Clinical data of the studied children.

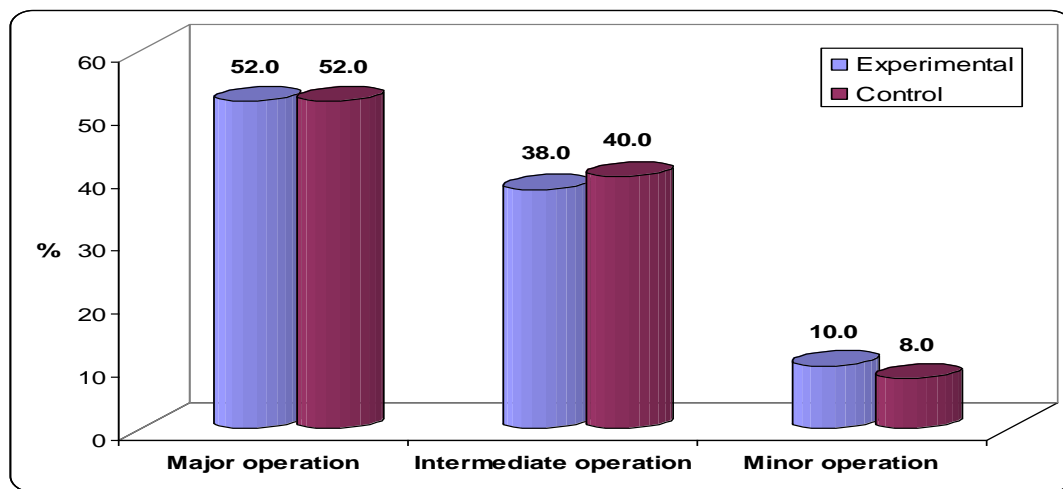| Clinical data	Experimental group (n= 50)		Control group(n= 50)		P-value
	No.	%	No.	%	
1-Preoperative laboratory investigation					
Blood picture	50	100.0	50	100.0	--
Prothrombin time	50	100.0	50	100.0	--
Serum sodium &potassium	46	92.0	44	88.0	0.505
Urea & keratinized	46	92.0	44	88.0	0.505
2-Length of hospital stay					
2 - 3 days	22	44.0	24	48.0	
4 – 5days	19	38.0	22	44.0	0.591
> 5 days	9	18.0	7	14.0	

Figure (1):Types of surgery of the studied children in the experimental and the control groups.
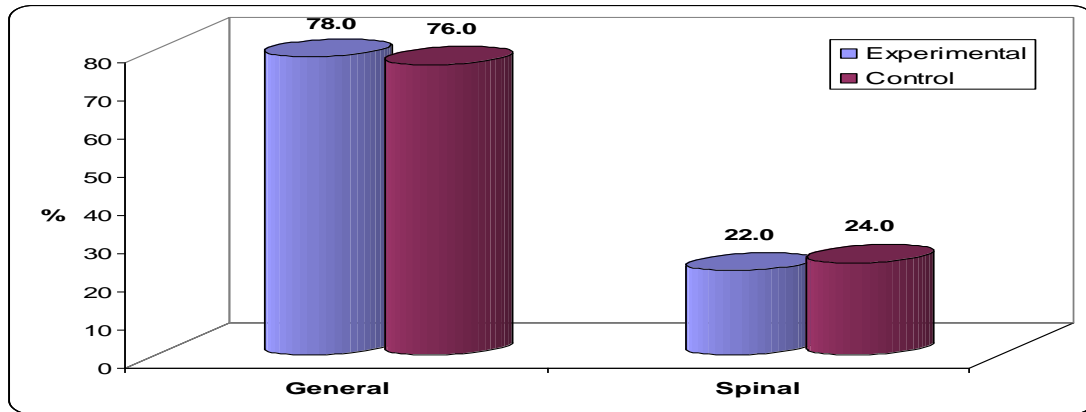
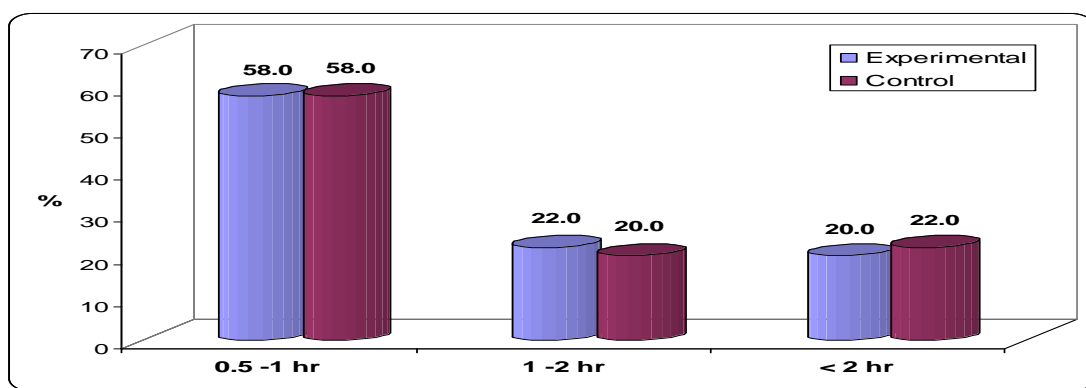**Figure (2): Types of anesthesia of the studied children in the experimental and the control groups.**

Figure (3): length of operationintraoperativeof the studied children in the experimental and the control groups.

Table (4): Mean pain score of the studied children in the experimental and control groups.

Pain score	Experiment group (n= 50)	Control group (n= 50)	P-value[1]
1- Pretest:			0.531
Mean ± SD	9.36 ± 0.94	9.24 ± 0.98	
Median (Range)	10.0 (8.0-10.0)	10.0 (8.0-10.0)	
2- First posttest:			0.000*
Mean ± SD	7.00 ± 1.09	9.16 ± 1.00	
Median (Range)	6.0 (6.0-10.0)	10.0 (8.0-10.0)	
P-value[2]	0.000*	0.159	
3- Second posttest			0.000*
Mean ± SD	4.96 ± 1.01	6.88 ± 1.00	
Median (Range)	4.0 (4.0-6.0)	6.0 (6.0-8.0)	
P-value[2]	0.000*	0.000*	
4- Third posttest			0.000*
Mean ± SD	2.96 ± 1.01	4.60 ± 0.93	
Median (Range)	2.0 (2.0-4.0)	4.0 (4.0-6.0)	
P-value[2]	0.000*	0.000*	
5- Fourth posttest			0.000*
Mean ± SD	0.52 ± 0.89	2.12 ± 0.75	
Median (Range)	0.0 (0.0-2.0)	2.0 (0.0-4.0)	
P-value[2]	0.000*	0.000*	

statistically significant d [fferernces

Table (5): Relation between personal data of the studied children and first posttest pain score in the experimental group.

Personal Data	First posttest pain score Mean ± SD	P-value
1-Child age/ years		
6 - < 8yrs	6.80 ± 1.03	
8 - < 10yrs	6.91 ± 1.04	0.721
10 – 12yrs	7.10 ± 1.14	
2-Child sex:		
Male	7.06 ± 1.13	0.583
Female	6.88 ± 1.02	
3-Child weight/ kg		
< 25 kg	6.89 ± 1.02	
25 – 30 kg	7.00 ± 1.03	0.825
> 30 kg	7.13 ± 1.26	
4-Child birth order:		
First	7.14 ± 1.29	
Second	6.71 ± 0.99	0.727
Third	7.09 ± 1.04	
Fourth or more	7.09 ± 1.04	

Table (6): Relation between personal data of the studied children andsecondposttest pain score in the experimental group.

Personal Data	Second post-test pain score Mean ± SD	P-value
1- Child age / years		
6 - < 8yrs	5.00 ± 1.05	
8 - < 10yrs	4.91 ± 1.04	0.979
10 – 12yrs	4.97 ± 1.02	
2- Child sex:		
Male	5.00 ± 1.02	0.687
Female	4.88 ± 1.02	
3- Child weight/ kg		
< 25 kg	5.00 ± 1.03	
25 – 30 kg	5.00 ± 1.03	0.923
> 30 kg	4.88 ± 1.02	
4-Child birth order:		
First	5.00 ± 1.04	
Second	4.71 ± 0.99	0.759
Third	5.09 ± 1.04	
Fourth or more	5.09 ± 1.04	

Table (7): Relation between personal data of the studied children and Third posttest pain score in the experimental group.

Personal Data	Third post-test pain Mean ± SD	P-value
1-Child age/ years		
6 - < 8yrs	3.00 ± 1.05	0.979
8 - < 10yrs	2.91 ± 1.04	
10 – 12yrs	2.97 ± 1.02	
2-Child sex:		
Male	3.00 ± 1.02	0.687
Female	2.88 ± 1.02	
3-Child weight / kg		
< 25 kg	3.00 ± 1.03	0.923
25 – 30 kg	3.00 ± 1.03	
> 30 kg	2.88 ± 1.02	
4-Child birth order:		
First	2.86 ± 1.03	0.542
Second	2.71 ± 0.99	
Third	3.27 ± 1.01	
Fourth or more	3.09 ± 1.04	

Table (8): Relation between personal data of the studied children and fourth post test pain score in the experimental group.

Personal Data	Fourth post-test pain score Mean ± SD	P-value
1- Child age/ years		
6 - < 8yrs	0.40 ± 0.84	0.658
8 - < 10yrs	0.73 ± 1.01	
10 – 12yrs	0.48 ± 0.87	
2 -Child sex		
Male	0.53 ± 0.90	0.913
Female	0.50 ± 0.89	
3- Child weight/ kg		
< 25 kg	0.56 ± 0.92	0.711
25 – 30 kg	0.63 ± 0.96	
> 30 kg	0.37 ± 0.81	
4- Child birth order		
First	0.43 ± 0.85	0.144
Second	0.14 ± 0.53	
Third	0.73 ± 1.01	
Fourth or more	0.91 ± 1.04	

Table (1): Shows the personal data of the studied children. It was found that more than half (58%) of studied children in the experimental group were in the age group from10 – 12 years compared to more than two-fifths (42%) of children in the control group with mean age was 9.74 ± 2.20 in the experimental group and 8.84 ± 2.40in the control group. As regards child's sex more than two-thirds (68%) of children in the experimental group were male compared to 74% of them in the control group.

In addition to child's weight more than one-third(36.0%) of children in the experimental group their weight was <25 kg compared to more than two-fifths(42%) in the control group. Children's mean weight was 28.36 ± 8.59 in the experimental group and 27.54 ± 7.43 in the control group. Regarding child's birth order more than one- third (38.0%) of children in the experimental group were in the first birth order compared to more than one- fourth (28.0%) in the control group. Also there were no

statistical significant differences were found between the two groups concerning the personal data.

Table (2): Shows the personal data of the studied children others. It was indicated that 50% of the studied mother in the experimental group their age ranged from 30 - < 40 years compared to 54% of them in the control group. The mean age was 35.26 ± 6.46 vs. 34.02 ± 6.06 respectively in the experimental and control groups. Moreover regarding mother's education; more than two-fifths(44%) of mother's in the experiment algroupwere illiterate compared to more than one-third (34%) in the control group. Regarding mother's occupation; more about two- thirds 62% of the mother's in the experimental group were housewives compared to 72%of them in the control group. Likewise the statistic al significant differences were not found between the two groups as regard personal data of the studied mothers.

Table(3): Regarding preoperative laboratory investigation the table demonstrate that 100% of children in both groups were doing blood pictureandpro thrombin time. Concerning length of hospital stay more than two- fifths(44%) of children in the experimental group stayed from 2-3 days at hospital compared to nearly half of them (48%) in the control group. No statistically significant differences were found between the two groups as regards the clinical data of the studied children.

Figure(1): Types of surgery of the studied children in the experimental and the control groups .It was noticed that (52%) of both groups had major operation. While more than one -third (38%) of children in the experimental group compared to more than two- fifths (44%) of the min the control group had intermediate operation. Also (10%) of children in the experimental group compared to (8%) of those in the control group had minor operation. No statistically significant differences was found between the two groups concerning trauma of surgery.

Figure (2): Types of anesthesia of the studied children in the experimental and the control group. It was indicated that the majority of both groups were receiving general anesthesia (78% and 76%) respectively in the experimental and control groups. No statistically statistical significant difference was found between the two groups as regards types of anesthesia of the studied children (P-value = 0.812).

Figure (3): Length of operation of the studied children in the experimental and control groups. It was noticed that more than half (58.0%) of both groups were having from 0.5 - < 1hrduring the operation. No statistically significant difference was

found between the two groups as regards the length of operation of the studied children.

Table (4): Shows the mean pain score of the studied children in the experimental and the control groups. It was found that statistically significant differences were found between the two groups as regards first posttest, second, third, and fourth (P- value^1 = 0.000* respectively). While no statistically significant differences were found between the two groups in the pretest concerning pain score in the experimental and the control groups.

Moreover, it was noticed that there were statistically significant differences found between pretest and first posttest, first posttest and second posttest, second posttest and third posttest, and third posttest and fourth posttest (p-value^2= 0.000* respectively) within the studied children in the experimental group. Also, the statistical significant differences were found between first posttest and second posttest, second posttest and third posttest, and third posttest and fourth posttest (p-value^2= 0.000* respectively) concerning pain score within the studied children in the control group. While no statistically significant difference was found between pretest and first posttest concerning pain score in the control group.

Table (5): Presents relation between first posttest pain score and their personal characteristics in the experimental group. It was found that no statistically significant differences were found between first posttest mean score of pain of child weight, child sex. child age, and child birth order.

Table (6): Presents relation between second posttest pain score and their personal characteristics in the experimental group. It was found that no statistically significant differences were found between second posttest mean score of pain of child weight, child sex. child age, and child birth order.

Table (7): Presents relation between third posttest pain score and their personal characteristics in the experimental group. It was found that no statistically significant differences were found between third posttest mean score of pain of child weight, child sex. child age, and child birth order.

Table (8): Presents relation between fourth posttest pain score and their personal characteristics in the experimental group. It was found that no statistically significant differences were found between fourth posttest mean score of pain of child weight, child sex. child age, and child birth order.

Discussion

Postoperative pain management is challenging for nurses especially in pediatrics even though adequate analgesics are available to control the pain. The new

trend in nursing is the use of complementary therapy to enhance the physical and mental well-being of the patient. Aromatherapy is one of the most widely used methods and most rapidly expanding areas among complementary therapy.. Aromatherapy is used for controlling the pain, anxiety, depression, stress, and improves the sleep pattern. Children who had undergone surgery will perceive moderate to severe pain and it can have a significant effect on patient recovery. Foot and hand massage is one of the cheapest and cost effective methods to reduce pain and improving sleep pattern among post-operative patient. Massage is a simple and noninvasive technique, which could be regarded as a part of nursing care. (**Rostami et al., 2014).**

The findings of the study revealed that majority of child's age near two- thirds in the experimental group as well as more two-fifths in the control group were in the age group of 10 – 12 years. Majority of children in the experimental and the control groups were males. These findings were inconsistency with **Al-Rafay & Ali, (2013)** who found that no significant differences existing between characteristics of children in both the control and the experimental groups. Moreover, all children were at the stage of elementary school. This sums up that more homogeneity between the two involved groups of children.

The findings of the present study revealed that statistically significant differences were found between the two groups as regards first, second, third, and fourth posttest of pain score post-operatively. This finding was congruent with **Kaul& Bhatia, (2010**) who found that majority of the children in the experimental and the control group had severe pain on postoperative day 1 and pain intensity decreased gradually to mild pain in the experimental group from day 1 to day 2 which shows that there was a statistical significant difference on the level of pain in the experimental group compared to the control group and also supported by **Wente, (2013)**who demonstrated that massage group showed significant decrease in pain, anxiety, and tension after the intervention and they were highly satisfied and no major barriers to implementing massage therapy were identified due to foot and hand massage appears to be an effective, inexpensive, low-risk, flexible, and easily applied strategy for postoperative pain.

In the present study no statistically significant differences were found between the two groups in the pretest concerning pain score in the experimental and the control groups. The present study was supported by **Su et al., (2014)** which indicated that the pain scores in the two groups were not showing significant differences at pretest and also the present study was supported by **Nesami et al., (2014)** who showed that aromatherapy by using lavender essence is effective in reducing pain after intervention with lavender oil.

The findings of the present study revealed that statistically significant differences were found between pretest &first posttest, first &second posttest, second & third posttest, and third & fourth posttest within the studied children in the experimental group. The present study was supported by **Su et al., (2014)** who showed that mean posttest pain scores of day 1 and day2 (morning, evening) were significantly lower than the mean pretest scores on postoperative day 1. The difference in the pain scores of postoperative children in the morning and evening on day1 and day2 was found significantly in the experimental group. Massage, a complementary non pharmacological intervention, could play an important role in enhancing pharmacological analgesia and maximizing pain relief.

The present study revealed that there were no statistically significant difference was found between pretest and first posttest concerning pain score in the control group. The present study was supported by **Shah & Mathur, (2010)** who found that there was significant difference in pain intensity immediately and 24 hours of the intervention. The pain severity of the intervention group was significantly lower than the control group, and also supported by **Degirmen et al., (2010)** who reported that 20 minutes of foot and hand massage significantly reduced postoperative pain within the first 24 hour. Massage on the foot and hands at points used for pain reduction.

In the present study, it was observed that the majority of both groups were receiving antibiotics and also more than two-thirds of children in the experimental group were receiving analgesic compared to more than one-half of them in the control group. This result is a fact because after operation all children are receiving antibiotics and analgesic as routine care. In addition the basic nursing role is to prevent infection and complications after operation.

As regard types of anesthesia of the studied children in the experimental and the control groups. Findings of the present study revealed that no statistically statistical significant difference was found between the two groups as regards types of anesthesia of the studied children. These finding was went on line with **Soltani et al., (2013)** who found that children recovering from appendectomy when they treated with lavender aromatherapy slept better and required

41% less acetaminophen than children in the control group. Massage group had significant decrease sleep disrupt, anxiety, and tension, stress after the intervention and they were highly satisfied.

In the present study, preoperative laboratory investigation100.0% of children in both groups were doing blood picture and prothrombin time. No statistically significant differences were found between the two groups as regards preoperative laboratory investigation of the studied children. In my opinion and experience agree with these results all children admission to hospital make all investigation to get correct diagnosis, good operation, improving sleep pattern and providing suitable nursing care.

Regarding length of hospital stay more than two-fifths of children in the experimental group stayed from 2-3 days at the hospital compared to nearly half of those in the control group. These finding using of because aromatherapy massage with lavender oil it which is in relaxation, had sedative effects, had a positive effect on the quality of sleep and decrease anxiety so it is help recovery and decrease hospital stay in the experimental group than the control group.

Conclusion

From the current study results it was concluded that: Applying aromatherapy massage with lavender oil by using a 20 minutes foot and hand massage intervention for school-age children in the postoperative period was effective in relieving the postoperative pain with a statistic al signify cant difference be tween the experimental and the control groups.

Recommendations

Based on the results of the current study, the following recommendations are suggested

1. Educational programs should be provided to increase knowledge and skills for nurses and parents in applying non-pharmacological intervention in relieving post-operative pain in children during any invasive surgical procedures.

2. Increasing the likelihood use of foot and hand massage with lavender oil should be accepted as routine nursing interventions for pain management in children.

3. Using aromatherapy massage as routine interventions for relieving postoperative pain in children.

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