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RESEARCH ARTICLE

EFFECTIVENESS OF NON-PHARMACOLOGICAL PAIN MANAGEMENT ON CHILDREN POST-SURGERY

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ABSTRACT
A quasi-experimental study design was conducted on non-probability (purposive sample), the study sample consist of (90) child from 3 to 12 years' old divided into three main groups. The study instrument includes the socio-demographic characteristics of children and their guardians sheet. It also includes assessment of children pain level by use objective pain scale(OPS), pain management methods. The study has been conducted in surgical wards of hospitals in ALAmara city (Al-Sadr Teaching Hospital and Al-Zahrawi Surgical Hospital) in Iraq. The data was collected through semi structure interview and observation methods with the participants. The OPS and the application of non-pharmacological pain methods were used for children postoperatively from the period 2nd of February to 14th of April 2022. Data were analysed using the statistical package for social science, version 26. The descriptive statistical measures of frequency, percent, mean, and standard deviation were used to analyse data. The result of this study revealed that there is a high significant differences between the pre-test and post-test scores for all groups of non-pharmacological intervention (video game, blowing bubble, deep breathing, music, the Quran listening, and foot message.

Keywords: non-pharmacological management, postoperative pain, children

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INTRODUCTION

Paediatric surgeries are common and painful for children. In the most recent data, 4.7% of children had surgical intervention each year, with an average of 3.9 million surgeries are performed on children 0-17 years of age annually in the United States (Rabbitts, & Groenewald, 2020). About 44 – 93% of pediatric patients have been reported to experience postoperative pain (Cai et al., 2017; He et al., 2010). Adequate control of postoperative pain is not reached in more than 80% of patients in United States.

Postoperative pain is most commonly treated with analgesics, but even when maximally treated with medications, pain is often still problematic (Davidson et al. 2016). post-operative pain remains as a common problem; because of difficulty in pain assessment and concerns about side effects of opioid analgesics in pediatric (Miladinia et al., 2016). Analgesics, particularly opioids, can also have side effects, such as nausea, vomiting, constipation, and potentially respiratory depression, thereby limiting safe and effective doses. Thus, whereas analgesics are an important part of postoperative pain management, children continue to experience significant pain and there is a need for additional pain intervention (Davidson et al. 2016).

There is a growing trend toward the use of non-pharmacological techniques to supplement analgesia in children. The use of non - pharmacological methods can help reduce opioid intake and potentially harmful physiological and psychological responses to pain. Non – pharmacological methods, which do not include the use of medications involve such strategies as cognitive - behavioral, physical methods, emotional support, help in daily activities and creating a comfortable environment can change children's pain perception and alter pain behavior as well as pain more tolerable and give children a sense of control over the painful situation and their experience (Goštautaitė et al., 2017).

Lack of the researches performed in Iraq about paediatric postoperative pain management using non-pharmacological methods and gaps in knowledge as for many non-pharmacological interventions there is inconclusive evidence of their efficacy (Boric et al., 2017, Davidson et al., 2017, Woragidpoonpol et al., 2013) motivated the researcher to go on about topic of the research.

METHOD

A quasi-experimental study design was conducted on non-probability (purposive sample) , the study sample consist of (90) child from 3 to 12 years' old divided into three main groups as (30) of them group (A) who receive of non-pharmacological pain management only and subdivide into six group each group consist of (5) child and receive one of selected non-pharmacological pain management strategies , (30) child group (B) who receive routine care (pharmacological pain management only), and (30) child group (C) who receive combination of non-pharmacological and pharmacological pain management and also subdivide into six group each group consist of (5) child who receive combination of one of selected non-pharmacological pain management strategies and pharmacological pain management. The study has been conducted in surgical wards of hospitals in ALAmara city (Al-Sadr Teaching Hospital and Al-Zahrawi Surgical Hospital) in Iraq. The study instrument is composed of three parts and these parts are: part I: the socio-demographic characteristics of children and their parents, part II: non-pharmacological pain management methods the children received post-surgery, part III: assessment of postoperative pain by use objective pain scale. Data were collected through the utilization of the study instrument (the questionnaire) and application of non-pharmacological pain relief methods upon children postoperatively which include video and video game, blowing bubbles, deep breathing, music, the Quran listening, and foot massage from the period 2nd February up to 14th April 2022.The data were collected by the researcher during morning and evening shifts for completing and application of non-pharmacological methods to children post-surgery. Descriptive and inferential statistical analyses were used to analyse the data.

RESULTS

The findings in Table (1) shows that the most common age groups in the study sample 23 (25.6%) of children are within the age group (3 –4 years), with arithmetic mean of age and standard deviation (7.22 ± 3.070), while their gender shows that the more half of participants 52(57.8%) were male. Regarding residency represented the two-third of children are living in urban area were 62(68.9%). Concerning birth order status in the study sample the half of children were middle born 55(61.1%), and approximately two-thirds of the sample was collected from Al-Sadr teaching hospital 58(64.4%), as shown all children have presence of caregiver with child 90(100%). Concerning the kinship to the child who caregiver shows half of children, have both (mother and father) were providing care to their 51(56.7%), It showed the number of caregivers with the child was two 65(72.2%). In addition, the hospitalization showed that three-quarter of study sample were not have previous hospitalization 69(76.7%), and majority of the children participants had not previous surgery 75(83.3%).

Table (2) shows that there is a high significant differences between the pre-test and post-test scores for all groups of non-pharmacological intervention (video game, blowing bubble, deep breathing, music, the Quran listening, and foot message).

Table (3) Show that the level of pain at before application of nursing strategies of pain management for pediatric post-surgery, the most of participants in groups [non-pharmacological intervention 13(43.4%), analgesics 22(73.3%) and combination 16(53.3%)] were pain score levels have them (sever, and very severe pain), with arithmetic mean and standard division (4.93 ∓ 1.552), (7.77 ∓ 0.858), and (5.67 ∓ 1.446) respectively. This table Also, shows high improvement after application of nursing strategies of pain management to no pain level for both groups strategies 13(43.4%), and combination 19(63.3%), with arithmetic mean and standard division (2.33 ∓ 2.682), and (1.30 ∓ 2.184), while participants in analgesics group most of them13(43.3%) remain in severe pain level, with arithmetic mean and standard division (5.07 ∓ 2.434). This reflect the effectiveness of application of nursing strategies of non-pharmacological pain management on the pediatric post-surgery.

Table 1. Distribution of the socio-demographic characteristics for children

Variables	Categories (n=90)	Frequency	Percent
Age	3 - 4 years	23	25.6
	5 - 6 years	20	22.2
	7 - 8 years	12	13.3
	9 - 10 years	18	20.0
	11 - 12 years	17	18.9
	$\bar{x}$ ∓ Std. Dev.	7.22 ± 3.070	
Gender	Male	52	57.8
	Female	38	42.2
Residence	Urban areas	62	68.9
	Rural areas	28	31.1
Birth order	First born	18	20.0
	Middle born	55	61.1
	Last born	17	18.9
Hospital	Al-Sadr Teaching Hospital	58	64.4
	Al-Zahrawi Surgical Hospital	32	35.6
Presence of caregiver with child	Yes	90	100.0
	No	0	0.0
Kinship to the child	Mother	22	24.4
	Father	1	1.1
	Father & Mother	51	56.7
	Other	16	17.8
Number of caregiver with child	One	23	25.6
	Two	65	72.2
	Four	2	2.2
Previous hospitalization	Yes	21	23.3
	No	69	76.7
Previous surgery	Yes	15	16.7
	No	75	83.3

n= sample size; $\bar{x}$ ∓ Std. Dev. = Standard deviation

Table 2. Mean of Pain Intensity Based on Objective Pain Scale in Non-pharmacological pain intervention groups

Non-pharmacological intervention		Mean	Std. Deviation	Sig. (2-tailed)
Video Game	pre-test	5.67	1.633	0.001
	post-test	2.27	2.492	
Blowing bubble	pre-test	6.60	1.724	0.001
	post-test	2.40	2.947	
Deep Breath	pre-test	6.33	1.915	0.003
	post-test	4.20	2.731	
Music	pre-test	6.93	1.280	0.001
	post-test	2.33	2.920	
Quran Listening	pre-test	6.80	1.207	0.002
	post-test	2.93	2.890	
Foot Message	pre-test	6.40	1.724	0.002
	post-test	3.27	3.327	

Table (3): Overall assessment of pain score levels of children among strategies, analgesics & combination group, at before & after Application

Pain Management	Pain Scale Levels	Before Application		After Application	
		F	%	F	%
non-pharmacological intervention (n=30)	No Pain (0) : 1	-	--	13	43.3
	Mild Pain (1- 2): 2	-	--	4	13.3
	Moderate Pain (3 - 4): 3	6	20.0	7	23.3
	Sever Pain (5 - 6): 4	13	43.3	4	13.3
	Very Severe Pain (7 - 8): 5	10	33.3	1	3.3
	Worst Pain Possible; (9 - 10):6	1	3.3	1	3.3
	Total	30	100.0	30	100.0
	$\bar{x} \mp$ Std. Dev.	4.93 ± 1.552		2.33 ± 2.682	
pharmacological intervention (n=30)	No Pain (0) : 1	-	--	4	13.3
	Mild Pain (1- 2): 2	-	--	1	3.3
	Moderate Pain (3 - 4): 3	-	--	3	10.0
	Sever Pain (5 - 6): 4	1	3.3	13	43.3
	Very Severe Pain (7 - 8): 5	22	73.3	8	26.7
	Worst Pain Possible; (9 - 10):6	7	23.3	1	3.3
	Total	30	100.0	30	100.0
	$\bar{x} \mp$ Std. Dev.	7.77 ± 0.858		5.07 ± 2.434	
Combination: (non-pharmacological intervention & Analgesics) (n=30)	No Pain (0) : 1	-	--	19	63.3
	Mild Pain (1- 2): 2	-	--	5	16.7
	Moderate Pain (3 - 4): 3	5	16.7	2	6.7
	Sever Pain (5 - 6): 4	16	53.3	3	10.0
	Very Severe Pain (7 - 8): 5	8	26.7	1	3.3
	Worst Pain Possible; (9 - 10):6	1	3.3	-	--
	Total	30	100.0	30	100.0
	$\bar{x} \mp$ Std. Dev.	5.67 ± 1.446		1.30 ± 2.184	

n= sample size; $\bar{x} \mp$ Std. Dev. = Standard deviation; F= Frequencies; %=Percentages

DISCUSSION

The findings revealed that there is a high significant differences between the pre-test and post-test scores for all groups of non-pharmacological intervention (video game, blowing bubble, deep breathing, music, the Quran listening, and foot message).

This finding are in consistent with a randomized controlled trial study done by Kaheni et al. (2016) in Iran who mentioned that pain intensity mean (FLCC scale score) in the interventional group (2.575 ± 1.807) had significant changes in comparison with the control group (8.025 ± 1.187) at (P < 0.001). 70% of children in the control group experienced severe pain due to dressing change, but most children in the study group (77.5%) had a little pain.

This may be due to that video and video games help the child concentrate on video or play rather than distress. In other words, it inhibits the pain signals from reaching the brain by stimulating visual and auditory sense.

In relation to blowing bubble that used in the current study and there effect on reduction of postoperative pain are in consistent with the finding of study done by Longobardi et al. (2018) in Italy who presented that there is a significant reduction of perceived pain while waiting for the medical examination (T1), whereas no difference was found after the medical examination (T2).

Regarding deep breathing that used in the current study and there effect on reduction of postoperative pain in children are in consistent with a study done by Bagheriyan et al. (2011) in Iran who showed a significant difference in the mean pain scores (based on numeric scale and pain behavior scale) between the control group and deep breathing groups after the injection where the mean pain score based on the numerical scale was 5.60 ± 3.13 in the control group and 1.85 ± 1.42 in the breathing exercise group and the mean score of behavioral pain symptoms was 3.80 ± 2.80 in the control group and 0.96 ± 0.75 in the breathing exercise group.

This result may be due to that deep breathing is one methods of distraction which depend on touch–motion distraction that help the child concentrate on breathing rather than distress and make him to relax.

In relation to music and its effect on postoperative pain of children the finding of this study are in agreement with an experimental study done by Miladinia1 et al., (2016) revealed that children were placed in the music and control groups. In the music group, pain intensity was measured before start intervention (baseline). Then, this group listened to two non-speech music for 20 minutes. Then, pain intensity was measured with numeric rating scale, immediately after intervention, 1 hour, 3 hours and 6 hours after intervention, respectively. Also, in the control group, pain intensity was measured in times similar to music group after analysis the study presented that the mean of pain intensity did not significantly different between the 2 groups at baseline (P>0.05). The results of repeated measure ANOVA showed that, trend of pain intensity between 2 groups was significant (P<0.05), so that pain intensity in the music group had more decrease than control group. Also, mean of used narcotic (Pethidine) in the music group was significant lower than the control group (P<0.05).

Concerning the Quran listening and its effect on relief postoperative pain the finding of this study are in consistent with the result of a quasi-experimental study done by Fadholi1 and Mustofa (2020) in Indonesia who presented that there is a significant difference in the decrease in intensity of postoperative pain in the intervention group and the control group with 0.009 where the experimental group showed a decrease in intensity more effectively than the control group.

In relation to foot massage and its effect on relief postoperative pain the finding of this study are in consistent with the result of study done by Karamisefat1 et al. (2021) in Iran to assess the effect of foot massage on pain intensity among hospitalized preschoolers undergoing venipuncture who revealed that the mean ± SD of pain intensity in the experimental group and in the control group immediately and two minutes after intravenous catheter insertion were 2.71±1.36 and 1.11±0.86, and 7.54±1.33 and 4.20±1.52, respectively. The mean of pain intensity immediately and two minutes after venipuncture revealed a significant difference between the experimental and control groups (P<0.001).

CONCLUSIONS

This study concludes that all methods of non-pharmacological intervention (video game, blowing bubble, deep breathing, music, the Quran listening, and foot message) which used in this study were effective in reducing postoperative pain in children.

ETHICAL CONSIDERATIONS COMPLIANCE WITH ETHICAL GUIDELINES

This study was completed following obtaining consent from the University of Baghdad.

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AUTHOR'S CONTRIBUTIONS

Study concept, Writing, Reviewing the final edition by all authors.

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