American Journal of Nursing Research, 2023, Vol. 11, No. 1, 1-11
Available online at http://pubs.sciepub.com/ajnr/11/1/1
Published by Science and Education Publishing
DOI:10.12691/ajnr-11-1-1

Effect of Implementing Evidence Based Nursing Practices on Reducing Postoperative Pain among Patients Undergoing Abdominal Surgery

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Received November 14, 2022; Revised December 23, 2022; Accepted January 03, 2023

Abstract Postoperative pain is overwhelming for the patient, family, healthcare system, and society. Patients with postoperative pain have an increased risk of suffering, morbidity and mortality, emotional complications, and delayed healing. There is an increased risk of negative physiological effects, such as myocardial supply and demand mismatch, interruption of normal respiratory function, activation of the sympathetic nervous system, reduction in gastric motility, and coagulopathy. **Aim of the study:** To evaluate the effect of implementing evidence based nursing practices on reducing postoperative pain among patients undergoing abdominal surgery. **Research design:** This study utilized quasi-experimental design. **Setting of the study:** This study was conducted in surgical departments in one of the governmental hospitals. **The Study subjects**: This study recruited 80 patients from 8 surgical departments and 40 nurses from different surgical departments. **Data collection tools:** Two tools were used; first tool used to assess patient's demographic and medical data; second tool used to assess pain characteristics before and after implementing evidence based nursing practices. **Results:** This study proved that, there is a noticeable improvement of postoperative pain after 4 hours from implementing evidence based nursing practices in comparison to the pain in the first hour among patients in the study group. **Conclusion:** Implementing evidence based practices significantly reduced postoperative pain. Additionally, the current study provided empirical proof that evidence based nursing practices for managing postoperative pain significantly improved patient reported pain intensity. **Recommendations:** The current study recommended that, evidence based practices could improve outcome of post-operative pain and consequently it should be embedded in the management of postoperative pain in different clinical settings not only for surgical patients. The findings also imply the need for involving all the health team members in the managing of postoperative pain.

Keywords: *evidence, based practices, post-operative pain, abdominal surgery*

Cite This Article: Mona Mohamed Mayhob, and Manal Abd Elsalam, "Effect of Implementing Evidence Based Nursing Practices on Reducing Postoperative Pain among Patients Undergoing Abdominal Surgery." *American Journal of Nursing Research*, vol. 11, no. 1 (2023): 1-11. doi: 10.12691/ajnr-11-1-1.

1. Introduction

Pain is a complex phenomenon and has been variously defined by clinicians, researchers, and patients. The International Association for the Study of Pain defined pain as an unpleasant sensory and emotional feeling or experience associated with actual or potential tissue damage. Poorly managed pain can have a negative impact on physical and psychological consequences for patients. Therefore, nurses have a professional and ethical responsibility to ensure effective pain relief for their patients. Postoperative pain is a major health care problem inadequately managed; post-operative pain continues to be a major challenge. Postoperative pain is prevalent worldwide which adversely affects patients' experience and outcome, [1,2,3,4].

Postoperative pain that the patients suffer after surgery is related to the extent of tissue damage and the site of surgery. Pain has both sensory and emotional components that interact to produce an overall 'pain experience'. Unrelieved pain after surgery can interfere with sleep and physical functioning and can negatively affect a patient's well-being on multiple levels. This may extend into the rehabilitation period and delay hospital discharge and functional recovery. Postoperative pain management aims to minimize patient discomfort, facilitate early mobilization and functional recovery, and prevent acute pain developing into chronic pain. Postoperative pain remains one of the greatest concerns for patients following surgical procedures. The prevention and alleviation of post-operative pain are the core responsibilities for healthcare professionals; therefore nurses play an essential role in postoperative pain assessment and management,

especially within the first few days after surgery [5,6,7,8,9].

Evidence based practice (EBP) is defined as the conscientious and judicious use of current best evidence, including research results, experts' opinions, in conjunction with patient preference to guide health care decisions [10]. Also, it is defined as the use of scientific evidence in order to improve clinical decision making and procedures. The EBP is basis for advanced nursing practices, but it is not employed in all situations due to the lack of required skills. Implementation of EBP in nursing can fill the gap between research and clinical practices and develop professional identity of nurses. Applying EBP helps in utilizing large data in the shortest time, carry out practices with the most efficient and best standard methods, ensure provision of accurate care services, and improve quality of nursing care, health status and patient outcomes. Furthermore, it also improves patient's satisfaction, enhances wise decision making in a supportive environment, and pays specific attention to research evidence in nursing practices. Despite the importance of EBP in nursing and the necessity of using novel scientific methods in postoperative pain control as the major component of healthcare, the EBP has gained considerable ground in treatment and care, since it increases the quality of nurses' clinical care. Yet, EBP is less frequently employed despite its efficiency and importance. Pain management is an important component of nursing care and sufficient pain control has still remained as a challenge despite routine nursing practices that are already provided [11,12].

1.1. Significance of the Study

Postoperative pain is experienced by the majority of patients who undergo surgical procedures. Control of postoperative pain plays an essential role in facilitating a patient's recovery to normal function and reduces the incidence of adverse physiological and psychological effects associated with acute uncontrolled pain. The goal of postoperative pain management is to reduce the negative consequences associated with acute postsurgical pain and help the patient to make a smooth transition back to normal function [9]. It has been reported that pain management is an important part of intraoperative and postoperative care, approximately 30% to 75% of patients experience moderate to severe pain postoperatively. Therefore, effective pain management is an integral part of surgical operations. Post-operative pain should be prevented and controlled in order to prevent postoperative complications, to speed up wound healing, to minimize side effects caused by analgesics, to prevent acute pain from becoming chronic pain, and to reduce the frequency and severity of pain. Postoperative pain may prolong hospitalization and increase re-admission rates, which increases costs to the healthcare system. Additionally, the role of healthcare providers could not be neglected as they have an ethical responsibility to provide safe and high-quality acute postoperative pain management [8]. For these reasons, literatures proved that, there is a great importance of implementing scientific approaches such as evidence based nursing practices to manage and reduce intensity of post-operative pain [13].

1.2. Aim of the Study

To evaluate the effect of implementing evidence based nursing practices on reducing post-operative pain among patients undergoing abdominal surgery through:

- Assessing characteristics of postoperative pain (such as; quality, intensity, type and form of pain) of patients in the control group after 1 hour and 4 hours.
- Developing and implementing EBP for patients in the study group.
- Assessing postoperative pain characteristics of the patients in the study group to evaluate the effect of EBP.

2. Methods

2.1. Research Hypothesis

Implementing evidence-based nursing practices has a positive effect on reducing post-operative pain among patients undergoing abdominal surgery.

2.2. Research Design

This study used a quasi-experimental research design because this design is aiming to evaluate the effect of interventions without using randomization, and this design demonstrates causality between an intervention and an outcome that can be used in both pre-intervention and post-intervention measurements [14]. This study started from the beginning of February 2021 to the end of January 2022.

2.3. Setting of the Study

This study was conducted at 8 surgical departments for female and male patients, as each surgical department is divided into 2 sides; one side for the female patients and the other side for male patients, and this was conducted in one of the governmental hospitals in Cairo. The rational of the selection of a governmental hospital is because the flow of patients is considerably high, and most of the patients may have lack of awareness about post-operative management as well as resources to help them caring about their conditions.

2.4. Sample of the Study

To recruit the sample of this study, the investigators used the Epi info, version 6, to obtain the required sample, with taking into consideration that this study was an intervention study, and the investigators found that the accurate sample size for 94% confident level, 80% power and the sample size could be 94 and the investigators took 80 patients as the 14 patients could not continue due to their health condition. The total number was divided into two groups, the control group was 40 and the other 40 was for the study group. In this study, the investigators utilized a purposeful sampling technique.

2.5. Inclusion and Exclusion Criteria

Inclusion criteria included adult patients, aged 18 years and above, of both gender, and undergoing abdominal surgery. With regard to exclusion criteria; they included patients who were suffering from chronic diseases or patients who developed postoperative complications, these were excluded from the main study sample.

2.6. Data Collection Tools

Data were collected by using two tools; **First tool was: Patient's Demographic and Medical Data;** that was used to collect data about patient's gender, age, marital status, history of having surgery, and types of abdominal surgery. **Second tool was; the Arabic Version of Short Form of the McGill Pain Questionnaire (SF-MPQ),** this tool was adopted from [15,16], and the original long form of McGill Pain Questionnaire introduced by ***Melzack and Torgerson in 1971***, and this original long form was modified to a shorter one by [17], (Short-Form MPQ (SF-MPQ). The SF-MPQ is used to assess sensory and affective dimensions of pain, Present Pain Intensity Index (PPII), level of pain, and form of pain.

It is easy to be administered and usually takes about 5 minutes to be completed. The SF-MPQ consisted of a 15 items checklist that was assessing sensory dimension (throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting) through the first 11 items, and the last 4 items are used for assessing affective dimension (tiring-exhausting, sickening, fearful, and punishing-cruel) of the present pain experience. The 15 items are rated on four categories as follows; no pain, mild, moderate, and severe under level of pain. In addition to assessment of (PPII) scale, that was divided into five categories as follows; 0 = no pain, 1 = mild, 2 = discomfort, 3 = distressing, 4 = horrible, and 5 = excruciating. Additionally, patients were asked to rate the level of pain as follows; no pain, mild, moderate, or severe. Concerning the intensity level of pain it was assessed by using five points of the PPII as follows; 0 = no pain, 1 = mild, 2 = discomfort, 3 = distressing, 4 = horrible, and 5 = excruciating. Also, the patients were asked to describe the form of pain as follows; their pain was continuous, intermittent, or on short periods.

2.7. Validity and Reliability

The SF-MPQ had its own content validity and reliability. For the Arabic translated version the researchers tested for its validity and reliability on Eastern Mediterranean Regions where most of the world's Arabic-speakers exist. This valid translated tool commonly used to describe pain and it can be used in various clinical situations for pain assessment.

2.8. Pilot Study

A pilot study was conducted before the actual data collection. The pilot study was done on 10% of the study subjects (8 patients) to ensure that carrying out the study plan and the tools were accurately working. The results of pilot study revealed that, the data collection tools needed some rewording to be written in simple way to be understood. Accordingly the patients who participated in the pilot study were excluded from the main study sample.

2.9. Ethical Considerations

Approval for conducting this study was obtained from the Hospital Director after explaining its aim, implementation plan, and the policy of maintaining the participants' rights and confidentiality throughout the study. Based on the hospital administration request the hospital name was kept. The investigators informed the participants that, they had the right to withdraw from the study at any time without giving any reason. In addition, the investigators informed them that, the data collection tools were anonymously designed. After all these clarifications, the investigators obtained approval from each participant that proved that she/he was willing to participate in the study.

2.10. Data Collection Process

This study was carried out over 11 months in three phases as follows: **Preparation phase**, it was the first phase, the investigators explained to the hospital administration and the head nurses the aim of the study, the process of data collection, the time schedule for implementing the study, the steps of implementing EBP, and the needed arrangement related to the process of data collection. Then, the investigators agreed with hospital administration and head nurses of surgical wards to inform them by the newly admitted patients who would be scheduled for undergoing abdominal surgery during the time of conducting the study, and met the inclusion and exclusion criteria of the study sample selection, and they agreed to participate in the study. Then, the investigators divided the selected subjects into two equal groups randomly, the control group who are provided the routine postoperative pain management which included prescription of analgesics for relieving postoperative pain according to the type of surgery as needed, and the follow up is usually done through asking the patients verbally about presence of pain, while, the second group was the study group who are provided the EBP nursing for postoperative pain management.

Assessment phase; the investigators worked first with the patients of the control group through provided the routine nursing care for postoperative pain management, and according to the process of data collection, the patients in the control group were assessed for their postoperative pain by using the first tool to assess patient's demographic and medical data, and the second tool to assess characteristics of postoperative pain after one hour and four hours postoperatively. Then, the investigators started working with the patients of the study group to complete the process of data collection and this was done as follows; the investigators first explained to the patients in the study group the process of implementing EBP to manage postoperative pain and the frequency of assessing the patient's response to EBP to manage it postoperatively after surgical operation and this

assessment would be done twice first time after one hour and the second time after four hours from postoperatively.

Implementation phase; the investigators explained to the hospital administration and the head nurses in the selected surgical wards the EBP that was implemented by them for all the patients in the study group, which consisted of three phases; **First phase of EBP** was called perioperative pain management**,** was completed through conducting three meetings and each meeting took 2 hours, and it included the following; establishment of institutional policies that contained the following principles; anesthesiologists participated in developing standardized institutional policies and procedures, anesthesiologists should be available at all times to check with nurses, surgeons, or other involved physicians, healthcare professionals were all trained on pain assessment, pain management techniques, and use any of non-pharmacologic techniques (such as; relaxation, imagery, inhalation therapy, and music therapy), adapted standardized, validated tool for pain assessment, documentation of pain intensity, the effects of pain therapy, and side effects caused by the medications used for pain management. In addition to, education to patients and caregivers about misbeliefs on pain, side effects induced by analgesia, and use of self-reporting pain tool. **Second phase of EBP** called pre-operative pain management and this phase took 2 months as the investigators agreed with the head nurses in each selected surgical department to inform them by the newly admitted patients undergoing abdominal surgery, and this was done until completing the number of the selected sample and it included; data collection and assessments of pain history for the patients in the study group, physical examination, and development of pain management plan. **Third phase of EBP** called: postoperative pain management included; education on pain management, pain assessment after one hour and then after four hours postoperatively, implementing pharmacologic therapy, monitoring of side effects, non-pharmacological therapy (imagery, aroma oil inhalation with oxygen if there is no contraindications, relaxation technique), and anesthesiologists directly evaluate patients who are experiencing pain. After that, the investigators provided the selected patients in the study group with EBP steps that designed by the investigators based on the literatures for postoperative pain management.

Evaluation phase: In this phase the investigators assessed postoperative pain as follows: in the first hour and four hours after getting out from the operating room and implementing EBP and routine nursing care for both groups. Accordingly the investigators collected the findings from both groups.

2.11. Statistical Analysis

The studied sample data were collected using the Statistical Package for Social Sciences (SPSS), version 20, and the results were reported in the descriptive statistics formats (frequency, mean and standard deviation) and analytical statistics. Tables were used to describe the variables. The normality of data was measured by Kolmogorov-Smirnov test, and then with independent sample t-test, paired t-test, and Chi-square.

3. Results

Table 1 shows that, 55% of the patients in both groups were males. Regarding their age, it ranged between 30 to less or equal 70 years, with a mean age of $\bar{x}$ ± SD 53.62 ±10.24 years in the control group, while in the study group it was $\bar{x}$ ± SD 57.17 ± 9.35. Concerning the marital status the same table shows that, 82.5% and 90% of the patients were married in the control and the study groups respectively. As regards history of having surgery, this table presents that, 62.5% and 70% of the patients in the control and the study groups had history of having surgery. Meanwhile, 27.5%, 22.5%, 20%, 12.5%, 7.5%, and 10% of the control group had the following abdominal surgeries cholecystectomy, appendectomy, colectomy, gastroectomy, surgical operations of the pancreas, and intestinal exploration respectively. While for the patients in the study group the above table shows that, 30%, 17.5%, 30%, 12.5%, 2.5%, and 7.5%, of them had the following abdominal surgeries; cholecystectomy, appendectomy, colectomy, gastroectomy, surgical operation of the pancreas, and intestinal exploration respectively.

Table 2 indicates that, 65%, 50%, 52.5%, 37.5% and 52.5% of the patients in the control group their pain characteristics in relation to sensory and affection dimensions, level of pain, present pain intensity index, and form of pain after one hour from surgical operation were as follows; sensory and affective pain, severe, horrible, and continuous pain respectively. Meanwhile, pain characteristics for the same group after four hours, they were 65%, 50%, 45%, 30%, and 50% as follows; sensory and affective pain, severe, horrible, and continuous pain respectively. Concerning the patients in the study group their pain characteristics in relation to sensory and affective pain, level of pain, pain intensity index, and form of pain after one hour from postoperative pain management their pain characteristics were, 80%, 87.5%, 27.5%, 32.5%, and 72.5%, that represented; sensory and affective pain, moderate pain, horrible, and continuous pain respectively. While, after four hours from intervention pain characteristics these were 27.5%, 62.5%, 50%, 25%, and 62.5% that represented sensory and affective pain, moderate, discomforting pain, and interrupted pain respectively. There were statistical significant differences in the study group after 1 and 4 hours from intervention in relation to sensory and affective pain ($p < 0.05$).

Table 3 reveals that, there were highly statistically significant relations between decreasing level of pain after one hour from implementing evidence based nursing practices and patients' male gender, age, and types of abdominal surgery at $p < 0.001$ among the patients in the study group.

Table 4 reveals that, there were highly statistically significant relations between decreasing level of pain after four hours from implementing evidence based nursing practices and patients' age, types of abdominal surgery among the patients in the study group at $p < 0.001$.

Table 5 reveals that, there were statistically significant relations between pain intensity after one hour from implementing evidence based nursing practices and patients' male gender, age, marital status, history of having surgery at $P < 0.05$. Meanwhile, the same table

shows that, there was a highly statistically significant relation between levels of pain postoperatively and type of abdominal surgery among the patients in the study group ($p < 0.000$).

Table 1. Frequency and Percentage Distribution of Demographic Characteristics and Medical Data among the Studied Patients in the Control and Study Groups (n=80)

Items	Control group		Study group		Test of significance
	No.	%	No.	%	
Gender					
Male	22	55	22	55	0.621
Female	18	45	18	45	
Age (in years)					
30- < 40 years old	3	7.5	1	2.5	
40- < 50 years old	10	25	8	20	0.04*
50- < 60 years old	11	27.5	12	30	
60- ≤ 70 years old	16	40	19	47.5	
	$\overline{X}$ **± SD** 53.62±10.24		$\overline{X}$ **± SD 57.17 ± 9.35**		
Marital status					
Single	3	7.5	2	5	0.384
Married	33	82.5	36	90	
Widowed	4	10	2	5	
History of having surgery					
Yes	25	62.5	28	70	0.07
No	15	37.5	12	30	
Types of abdominal surgery					
Cholecystectomy	11	27.5	12	30	
Appendectomy	9	22.5	7	17.5	
Colectomy	8	20	12	30	0.61
Gastroectomy	5	12.5	5	12.5	
Surgical operation of pancreas	3	7.5	1	2.5	
Intestinal exploration	4	10	3	7.5	

*Statistically different for the age in the control and the study groups.

Table 2. Pain Assessment for the Patients in both Control and Study Groups after 1 and 4 Hours from the Surgical Operation

Characteristics of pain	Control group post-operative				Study group post-operative				After 1 hr.		After 4hr.	
	1 hr.		4 hrs.		1 hr.		4 hrs.		P-value	Sign.	P-value	Sign.
	No.	%	No.	%	No.	%	No.	%				
Type of pain												
Sensory pain	26	65	26	65	32	80	11	27.5	0.148	0.363	0.315	0.04*
Affection pain	20	50	20	50	35	87.5	25	62.5	0.026	0.873	.474	0.002*
Level sensory and affective pain												
No pain	0	0	2	5	0	0	2	5				
Mild	9	22.5	8	20	2	5	13	32.5	0.133	0.413	0.007	0.964
Moderate	10	25	12	30	11	27.5	20	50				
Severe	21	52.5	18	45	27	27	5	12.5				
Present Pain Intensity Index (PPII)												
Mild	4	10	4	10	1	2.5	6	15				
Discomforting	8	20	8	20	4	10	10	25	0.123	0.449	0.157	0.333
Distressing	8	20	10	25	12	30	9	22.5				
Horrible	15	37.5	12	30	13	32.5	10	25				
Excruciating	5	12.5	6	15	10	25	5	12.5				
Form of pain												
Continuous	21	52.5	20	50	29	72.5	6	15	0.195	0.227	0.05	0.761
Interrupted	15	37.5	16	40	11	27.5	25	62.5				
On short periods	4	10	4	10	0	0	9	22.5				

Table 3. Relations between Demographic Characteristics of the Patients in Study Group and Level of Pain after 1 Hour

Items	Levels of pain after 1 hour						X^2	Sign.
	Mild		Moderate		Severe			
	No.	%	No.	%	No.	%		
Gender								
Male	0	0	3	7.5	19	47.5	8.43	0.015*
Female	2	5	8	20	8	20		
Age (in years)								
30- < 40	0	0	1	2.5	0	0		
40- < 50	2	5	5	12.5	1	2.5	73.176	0.004*
50- < 60	0	0	5	12.5	7	17.5		
60- ≤ 70	0	0	0	0	19	47.5		
Marital status								
Single	0	0	1	2.5	1	2.5	1.242	0.87
Married	2	5	9	22.5	25	62.5		
Widowed	0	0	1	2.5	1	2.5		
History of having surgery								
Yes	2	5	10	25	16	40	4.630	0.09
No	0	0	1	2.5	11	27.5		
Types of abdominal surgery								
Cholecystectomy	0	0	7	17.5	5	12.5		
Appendectomy	2	5	4	10	1	2.5		
Colectomy	0	0	0	0	12	30	46.176	0.000*
Gastroectomy	0	0	0	0	5	12.5		
Surgical operation of pancreas	0	0	0	0	1	2.5		
Intestinal exploration	0	0	0	0	3	7.5		

* P < 0.000. Highly statistically significant relations between level of postoperative pain and patient's male gender, age, and types of abdominal surgery in the patients in the study group after 1 hour.

Table 4. Relations between Demographic Characteristics of the Patients in Study Group and Level of Pain after 4 Hours

Items	Levels of pain after 4 hours								X^2	Sign.
	No pain		Mild		Moderate		Severe			
	No.	%	No.	%	No.	%	No.	%		
Gender										
Male	0	0	5	12.5	14	35	3	7.5	5.75	0.12
Female	2	5	8	25	6	15	2	5		
Age (in years)										
30- < 40	0	0	0	0	1	2.5	0	0		
40- < 50	2	5	5	12.5	1	2.5	0	0	93.97	0.01*
50- < 60	0	0	7	17.5	5	12.5	0	0		
60- ≤ 70	0	0	1	2.5	13	32.5	5	12.5		
Marital status										
Single	0	0	0	0	2	5	0	0	2.67	0.848
Married	2	5	12	30	17	42.5	5	12.5		
Widowed	0	0	1	2.5	1	2.5	0	0		
History of having surgery										
Yes	2	5	9	22.5	12	30	5	12.5	3.95	0.266
No	0	0	4	10	8	20	0	0		
Types of abdominal surgery										
Cholecystectomy	0	0	9	22.5	3	7.5	0	0		
Appendectomy	2	5	3	7.5	2	5	0	0		
Colectomy	0	0	1	2.5	8	20	3	7.5	54.41	0.001*
Gastroectomy	0	0	0	0	4	10	1	2.5		
Surgical operation of pancreas	0	0	0	0	0	0	1	2.5		
Intestinal exploration	0	0	0	0	3	7.5	0	0		

* P < 0.001. Highly statistically significance relations between levels of postoperative pain and types of abdominal surgery after 4 hours.

Table 5. Relations between Demographic Characteristics of the Patients in Study Group and Present Pain Intensity Index after 1 Hour

Items	Present Pain Intensity Index (PPII) after 1 hour										X^2	Sign.
	Mild		Discomforting		Distressing		Horrible		Excruciating			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Gender												
Male	0	0	0	0	5	5	10	40	7	17.5	10.40	0.03*
Female	1	2.5	4	10	7	17.5	3	7.5	3	7.5		
Age (in years)												
30- < 40	1	2.5	0	0	0	0	0	0	0	0		
40- < 50	0	0	4	10	4	10	0	0	0	0	123.1	0.008*
50- < 60	0	0	0	0	7	17.5	3	7.5	2	5		
60- ≤ 70	0	0	0	0	1	2.5	10	40	8	20		
Marital status												
Single	1	2.5	0	0	0	0	0	0	1	2.5	22.87	0.004*
Married	0	0	4	10	11	27.5	13	32.5	8	20		
Widowed	0	0	0	0	1	2.5	0	0	1	2.5		
History of having surgery												
Yes	1	2.5	3	7.5	11	27.5	5	12.5	8	20	9.79	0.04*
No	0	0	1	2.5	1	2.5	8	20	2	5		
Types of abdominal surgery	0											
Cholecystectomy	1	0	1	2.5	10	25	0	0	1	2.5		
Appendectomy	0	2.5	3	7.5	2	5	0	0	1	2.5	71.01	0.000**
Colectomy	0	0	0	0	0	0	8	20	4	10		
Gastroectomy	0	0	0	0	0	0	2	5	3	7.5		
Surgical operation of pancreas	0	0	0	0	0	0	0	0	1	2.5		
Intestinal exploration		0	0	0	0	0	3	7.5	0	0		

*P < 0.05 Statistically significant relations between level of postoperative pain and patient's male gender, age, marital status, and history of having surgery after 1 hour.
** P < 0.000 Highly statistically significant relations between level of postoperative pain and types of abdominal surgery after 1 hour.

Table 6. Relations between Demographic Characteristics of the Patients in Study Group and Present Pain Intensity Index after 4 Hours

Items	Present Pain Intensity Index (PPII) after 4 hours										X^2	Sign.
	Mild		Discomforting		Distressing		Horrible		Excruciating			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Gender												
Male	0	0	5	12.5	7	17.5	6	14	4	10	10.68	0.03*
Female	6	14	5	12.5	2	2.5	4	10	1	2.5		
Age (in years)												
30- < 40	1	2.5	0	0	0	0	0	0	0	0		
40- < 50	4	10	4	10	0	0	0	0	0	0	101.6	0.152
50- < 60	1	2.5	5	12.5	5	12.5	1	2.5	0	0		
60- ≤ 70	0	0	1	2.5	4	10	9	22.5	5	12.5		
Marital status												
Single	1	2.5	0	0	0	0	1	2.5	0	0	7.51	0.482
Married	5	12.5	9	22.5	9	22.5	9	22.5	4	10		
Widowed	0		1	2.5	0	0	0	0	1	2.5		
History of having surgery												
Yes	4	10	10	25	4	10	7	17.5	3	7.5	7.35	0.118
No	2	5	0	0	5	12.5	3	7.5	2	5		
Types of abdominal surgery												
Cholecystectomy	2	5	8	20	2	5	0	0	0	0		
Appendectomy	4	10	2	5	0	0	1	2.5	0	1		
Colectomy	0	0	0	0	5	12.5	5	12.5	2	5	55.48	0.02*
Gastroectomy	0	0	0	0	1	2.5	2	5	2	5		
Surgical operation of pancreas	0	0	0	0	0	0	1	2.5	0	0		
Intestinal exploration	0	0	0	0	1	2.5	1	2.5	1	2.5		

* P < 0.05. Statistically significant relations between pain intensity index and patient's male gender, and type of abdominal surgery after 4 hours.

Table 6 shows that, there were highly statistically significant relations between pain intensity after four hours from implementing evidence based nursing practices and patients' male gender, and types of abdominal surgery among the patients in the study group at P < 0.05.

Table 7. Relations between Demographic Characteristics of the Patients in the Study Group and Form of Pain after 1 Hour

Items	Form of pain after 1 hour						X^2	Sign.
	Continuous		Interrupted		On short periods			
	No.	%	No.	%	No.	%		
Gender								
Male	19	47.5	3	7.5	0	0	4.71	0.03*
Female	10	25	8	20	0	0		
Age (in years)								
30- < 40	0	0	1	2.5	0	0		
40- < 50	2	5	6	15	0	0	28.2	0.16
50- < 60	8	20	3	7.5	0	0		
60- ≤ 70	19	47.5	1	2.5	0	0		
Marital status								
Single	1	2.5	1	2.5	0	0	1.12	0.56
Married	27	67.5	9	22.5	0	0		
Widowed	1	2.5	1	2.5				
History of having surgery								
Yes	18	45	10	25	0	0	3.15	0.07
No	11	27.5	1	2.5	0	0		
Types of abdominal surgery								
Cholecystectomy	7	17.5	5	12.5	0	0		
Appendectomy	1	2.5	6	15	0	0		
Colectomy	12	30	0	0	0	0	27.38	0.001*
Gastroectomy	5	12.5	0	0	0	0		
Surgical operation of pancreas	1	2.5	0	0	0	0		
Intestinal exploration	3	7.5	0	0	0	0		

*P < 0.05. Statistically significant relations between form of pain and patient's male gender, and types of abdominal surgery after I hour.

Table 8. Relations between Demographic Characteristics of the Patients in Study Group and Form of Pain after 4 Hours

Item	Form of pain after 4 hours						X^2	Sign.
	Continuous		Interrupted		On short periods			
	No.	%	No.	%	No.	%		
Gender								
Male	3	7.5	17	42.5	2	2.5	5.67	0.05*
Female	3	7.5	8	20	7	17.5		
Age (in years)								
30- < 40	0	0	0	0	1	2.5		
40- < 50	0	0	2	2.5	6	15	53.39	0.157
50- < 60	0	0	10	25	2	5		
60- ≤ 70	6	15	13	32.5	0	0		
Marital status								
Single	0	0	1	2.5	1	2.5	2.27	0.68
Married	6	15	23	57.5	7	17.5		
Widowed	0	0	1	2.5	1	2.5		
History of having surgery								
Yes	6	15	14	35	8	20	6.43	0.04*
No	0	0	11	27.5	1	2.5		
Types of abdominal surgery								
Cholecystectomy	0	0	8	20	4	10		
Appendectomy	0	0	2	5	5	12.5		
Colectomy	3	7.5	9	22.5	0	0	29.4	0.04*
Gastroectomy	1	2.5	4	10	0	0		
Removal part of the pancreas	1	2.5	0	0	0	0		
Intestinal exploration	1	2.5	2	2.5	0	0		

* Statistical significant relations between form of pain and patient's male gender, history of having surgery, and types of abdominal surgery after 4 hours.

Table 7 states that, there were statistically significant relations between form of pain after one hour from implementing evidence based nursing practices and patients' male gender at $p < 0.05$, and types of abdominal surgery among the patients in the study group at $P < 0.001$.

Table 8 states that, there were statistically significant relations between forms of pain after four hours from implementing evidence based nursing practices and patients' male gender, history of having surgery at $p < 0.05$ and types of abdominal surgery at $p < 0.05$ among the patients in the study group.

4. Discussion

Pain is an important problem for postoperative patients, and postoperative pain management is an important part of patient care in surgical wards. Every year, millions of people undergo surgery and experience postoperative pain at various levels. It has been reported that nearly three quarters of patients undergoing surgical interventions have acute pain and that 20% to 80% of post-operative patients experience moderate to severe levels of pain in the first 24 hours after surgery pain [18].

In the current study, an equal percentage of more than half of the patients in the control and study groups were males. As regards their age, it ranged between 30 to less or equal 70 years with a mean age of 53.62. ± 10.24 years in the control group and 57.17± 9.35 years in the study group. Concerning their marital status, the majority of the patients in both groups were married. The same study reported that, less than two thirds of the patients in control group had history of having surgery and more than two thirds of the patients in study group had history of having surgery. Regarding types of abdominal surgery, this study results indicated that, around one third of the patients in both groups had cholecystectomy, and the rest of the patients in both groups had different types of surgical operations with percentage ranging between less to one third and minorities as appendectomy, surgical operations of the pancreas, and intestinal exploration.

These study findings reported that, the majority of the patients in the study group had sensory and affective pain in the first hour while after four hours from implementing EBP, the current study results revealed that, less than one third and less than two thirds of the study group had sensory and affective pain respectively. However, for the patients in the control group who received the routine nursing care for pain management, this study indicated that, slightly less than two thirds of the patients in the control group had the same type of pain sensory and half of them had affective pain after one hour and four hours of starting the routine postoperative pain management. Additionally, around half on the patients in the control group had severe postoperative pain after one hour from starting the routine nursing care for managing postoperative pain, and more than two fifth of them still have severe pain after passing four hours from routine interventions. Concerning, the patients in the study group, results proved that, more than quarter of them had severe pain after one hour from starting implementation of EBP, while after passing four hours around only tenth of them had severe pain.

Regarding pain intensity, in the control group, there was slight decrease in pain intensity in the first hour and after four hours postoperatively as the pain intensity remained horrible as reported by less than two fifth and less than one third of them respectively. However, in the study group there was noticeable difference between pain intensity as horrible in the first hour and after four hours postoperatively. This happens due to patients' commitment to steps of EBP interventions that is concerned about all factors that could aggregate pain will control pain and decrease its severity and intensity. These findings are in the same line with those of [19], who clarified that, educational interventions supported by evidence based resulted in reducing the intensity of pain and the use of narcotic drugs.

Concerning level of pain for sensory and affective dimensions, this study result showed that, in the study group, there was less than half of the male patients had severe pain, and their age ranged between 60 to less or equal 70 years, and more than one quarter had history of having surgery and less than one third of them the surgical operation that they had was colectomy, while after 4 hours from intervention there was noticeable improvement in pain characteristics as less than tenth of the patients in the study group had severe pain from those who had colectomy. This might happened due to that EBP steps are covering all items related to managing postoperative pain which means no factors that could cause pain were left behind, and pain management using standardized protocol has significant effect on reducing postoperative pain.

These previous findings are supported by those of several scattered studies as [11,20,21], as well as findings of a very recent study of [22], who stated that EBP could significantly reduce postoperative pain. They reported also that, evidence-based nursing practices could significantly alleviate different types of pain whatever the reasons of the pain, as well as evidence based nursing management positively influence patients' pain intensity. In the same line with these previous findings, [23], recently recommended that, EBP should be integrated in nursing curricula and it should be implemented to improve postoperative pain management. As well, [24] in another recent study, highlighted that, EBP intervention focuses on the emotional and psychological aspects of pain following surgery since some of the common EBP interventions include emotional behavioral therapy and physical therapy in addition to the need for EBP that includes pharmacological and non-pharmacological interventions to manage pain among surgical patients.

The present study results showed that, among the patients in the study group, there were highly statistically significant relations between patients' male gender, their age, and marital status, history of having surgery, and types of abdominal surgery, in the first hour from implementing EBP. Meanwhile, after 4 hours, there were statistically significant relations between pain intensity, and patient's male gender and types of abdominal surgery. This may be due to that; male patients have freedom to express their pain because if they experienced pain this means it is real, however, some people when they found females complain of pain they considered this as not serious. Regarding patients' age, this study proved that the old age patients reported too much pain because they

might focus on it too much due to not having too many activities to divert their attention away from it. As well, using standardized steps on managing postoperative pain could help in controlling postoperative pain. These findings are supported by those of [21], who indicated that the pain management program positively influenced patient-reported pain intensity. However, this finding is against those of [25,26], who stated that, female patients were expressing too much pain, and younger patients were expressing pain much more than older patients.

The current study results revealed that, there were highly statistically significant relations between pain intensity index and patient male gender and type of abdominal surgery after one hour from implementing evidence based nursing practices among the patients in the study group. This finding might be attributed to the use of standardized steps on managing postoperative pain which could help in controlling postoperative pain. This finding is supported by that of [21], who indicated that pain management program positively influenced patient-reported pain intensity, and similarly, [11], reported that, implementing EBP could significantly reduce postoperative pain. The EBP provides healthcare solutions by integrating the best scientific research results and clinical expertise with patients' desires and values. Implementing EBP results in effective decision making, prevents casual repetitive care provision, facilitates the provision of various nursing practices, and enhances the capability of healthcare providers to maintain and improve patients' health and all these could have positive consequences on managing postoperative pain.

5. Conclusion

From this study it can be concluded that, patients of the control group experienced severe postoperative pain. Meanwhile, for the study group who was provided by the nursing EBP had significantly decreased pain postoperatively after four hours from starting intervention. Additionally, the current study provides empirical proof that evidence based nursing practices for managing postoperative pain is significantly improved in intensity as patients reported.

6. Recommendations

The current study recommended that, EBP could improve outcome of postoperative pain and it should be embedded in management of postoperative pain in different clinical settings and for different patients not only for surgical ones. The findings of the current study also imply the need for involving all the health team members in the managing post-operative pain. As well, this study should be implemented on a larger sample in order to be able to generalize the results.

7. Limitations

The current study had some limitations**;** since it utilized a purposeful sampling technique, therefore, the results could not be generalized to a larger population. Nevertheless, the study findings in the reduction of postoperative pain are promising and warrant further investigations with a larger sample size and should involve all the health team members.

Acknowledgments

The authors would like to extend their deep appreciations to the patients, hospital administration, and head nurses in the surgical departments for their cooperation and assistance in conducting this study.

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