In- service Training Program Regarding Nurses' performance for Non- Pharmacological Pain Management Among Orthopedic Patients

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Abstract

Pain management is an important aspect of patient care and nurses play a significant role in providing pain assessment and management. Non-pharmacological pain management refers to interventions that do not involve the use of medications to treat pain. They found to be effective with less side effects and complications.This study aimed to determine the effect of in- service training program on nurses' performance towards Non- Pharmacological Pain Management among orthopedic patients in El-Hadra hospital. A quasi-experimental design was conducted on fifty orthopedic nurses that were divided into two equal groups as study and control. Three tools were used data collection: Tool I: demographic data assessment sheet, Tool II: Nurses' knowledge regarding non-pharmacological pain relieves methods questionnaire, and Tool III: Nurses' Performance towards Non- Pharmacological Pain Management assessment sheet. Results of the present study revealed that: The difference was highly statistically significant as regard the nurses' knowledge and their level of performance toward non- pharmacological pain management either within the study group nurses or between the control and study groups nurses post the in surface training program. Conclusion and recommendation, the use of non -pharmacological methods is the most effective way for relieving orthopedic procedural pain. Therefore, it is important to conduct this study.

Keywords: Pain, Non- Pharmacological management, orthopedic patients.

Introduction

Pain is a common and frequent symptom of many disease processes which forces individuals to seek out medical advice, it is considered as a foremost distress influencing all aspects of patient's life**.** World Health Organization (WHO), 2019 stated that the greatest proportion of persistent pain conditions is accounted by musculoskeletal conditions that are considered the second largest contributor to disability worldwide **(Lunkuse, 2017 & Grunau, 2013 & WHO, 2019).**

Many orthopedic patients are admitted with injuries that need long term management and are prone to developing neuropathic chronic pain. The presence of pain is an indicator that may be structural or functional disorder of the body. Joint or musculoskeletal pain can persist and become chronic after orthopedic trauma, which in turn impair physical ability, delay return to work, cause psychological distress, cause low satisfaction with health care, and failure to participate in physical therapy. A significant cause of poor pain management is the tendency to overlook patient report of pain, the complex and multi-dimensional approach of pain management. Therefore; optimal and effective pain management necessitates knowledgeable trained healthcare practitioners, and appropriate attitudes and assessment skills. **(Nwaneri , et al ., 2018., Büyükyılmaz .,2014 & Renan ,et al .,2017).**

In the light of this, pain management is an important aspect of patient care; it includes both pharmacological and non-pharmacological approaches .As regard pharmacological approach, various drugs are effective for pain management during orthopedic treatment, non-steroidal anti-inflammatory drugs (NSAIDs) being the most commonly used. Pharmacological or drug interventions may have some negative side effects and some patients may even be allergic to them. On the other hand, the use of non-pharmacological pain relief techniques has been found to be effective with less side effects and complications, inexpensive, easily performed at

the clinical settings and most of them are non-invasive .They achieve their effects in numerous ways, not only by rely on the inhibition of pain signaling but also by managing the emotional components, consequently reducing anxiety, facilitating coping skills, providing a sense of control, enhancing comfort, promoting sleep, reducing fatigue and improving quality of life. **(Gokhale, 2017, Strydom, 2012, Pak, 2015 & Nwaneri, et al., 2018).**

Non-pharmacological pain management refers to interventions that do not involve the use of medications to treat pain; they include stimulation methods (e.g. massage, heat or cold packs, transcutaneous nerve stimulation), cognitive-behavioral methods (e.g. Meditation, relaxation techniques, hypnotherapy, music therapy, bio-feedback) and other methods (e.g. positioning, exercises, acupuncture, acupressure & reflexology). Massage is the process of rubbing and manipulation of body parts, especially joints and muscles with hands to relieve pain and decrease tension. Massage can interrupt the patient's cycle of distress. It can increase the blood circulation as well as lymphatic circulation. Massage can also initiate an analgesic effect to the area being rubbed and decrease inflammation and edema. Moreover, it can relieve muscle spasms manually while increasing endogenous endorphin release, and conflicting sensory stimuli that override pain signals. **(Nwaneri, et al., 2018, Pollack, et al., 2020)**

Concerning exercise/movement therapies, positioning is a physical intervention that includes maintaining a proper body alignment, it helps to prevent further complications, reduces the risk for developing injuries, prevents developing bed ulcers and most importantly reduce pain, stress and anxiety. For many years, the treatment choice for chronic pain included recommendations for rest and inactivity. However, exercise may have specific benefits in reducing the severity of chronic pain, as well as more general benefits associated with improved overall physical and mental health, and physical functioning **(Edmond, et al., 2018, Geneen, et al., 2017).**

Acupressure, acupuncture and reflexology mainly based on the same fundamental principle, they produces muscle relaxation and promotes feeling of comfort .According to gate control theory , pressure at specific point passes pleasurable impulses to the brain at a rate four times faster than painful stimuli, continuous impulses shut the neural 'GATES' and slower messages of pain are blocked from reaching the brain and helps to improve or strengthen the pain perception threshold of body. Furthermore alleviate pain by increasing endorphin and serotonin transmission to the brain and specific organs through nerves and meridians **(Metha, et al., 2017).**

In this context, Nurses considered the cornerstone and a crucial position for pain management in clinical practice as they are the closest health personnel to the patients and as such are in very good position to provide non pharmacological pain control, but unfortunately, studies in other parts of the world report that nurses have poor knowledge in the application of these alternative pain relief measures **(Edmond, et al., 2018, Geneen, et al., 2017).**

Although pain control for hospitalized patients is considered a central concern for all health care providers, crucial barriers to pain management are presented by nurses' lack of knowledge; insufficient assessment and pain relive measures skills. For which nurse has to earn more knowledge about pain and its management. The nurse has a responsibility to understand the experience of pain and to initiate measures that provide relief or help the patients learn to cope with it. Therefore; this study aims to increase nurse's knowledge and practice regarding non-pharmacological pin relive measures **(Fishman, et al., 2013&Ali. 2010)**

Aim of the study:

This study aimed to determine the effect of in-service training program on nurses' performance towards Non- pharmacological pain management among orthopedic patients in El-Hadra hospital.

Research hypothesis:

- In-service training program will improve nurses, knowledge and performance level regarding non-pharmacological pain management.

Subjects and Methods

Design: A quasi-experimental design was utilized for this study.

Setting: The study was conducted at El-Hadra hospital at Alexandria main University Hospital.

Subjects: The subjects of the present study included a convenience sample 50 orthopedic nurses according to Epi-info program.

The study subjects were recruited and assigned randomly and alternatively into two equal groups; 25 nurse each, namely:

• Control group (I): not enrolled to the in-service training program.

• Study group (II): were enrolled to the in-service training program.

Tools: Three tools were used for data collection in this study:

Tool I: Demographic data assessment sheet: demographic characteristics of the studied nurses were collected that included age, qualification, years of experience, as well as the attendance of previous educational sessions related to non-pharmacological pain management.

Tool II: Nurses' knowledge regarding non-pharmacological pain relieve methods questionnaire: This tool was developed by the researchers after reviewing literature (**Khalil., 2018, Alotaibi., 2019**, **Mwanza & Munemo.,2019**) .It consisted of 20 question related to non-pharmacological pain relieve methods and the answer scored as incorrect (0) and correct (1). The total score was ranged between 0 to20; the mean percentage of the total score was classified as the following:
▪ Poor level of knowledge (< 60%).
▪ Average level of knowledge (60 %- < 75%).
▪ Good level of knowledge (≥ 75%).

Tool III: Nurses' Performance towards Non- Pharmacological Pain Management assessment sheet: The researchers developed it after reviewing the related literature (**Munkombwe & Petersson., 2020, Khalil., 2018. Alotaibi ., 2019**), to assess nurses' practices concerning non-pharmacological pain management methods before and after implementation of the in-service training program. The sheet consisted of three parts:

Part (I): Nurses utilization of non-pharmacological pain management methods: This part included 12-item developed by the researchers, using a 4-point

numerical rating scale, ranged from 0 to 3; 3 = always, 2 = sometimes, 1= Very seldom and 0= not at all. The possible scores were ranged from zero to 36 (**Munkombwe & Petersso, 2020).**

Part (II): Nurses' Performance towards Non- Pharmacological Pain Management checklist: this part used by the researchers to evaluate nurses' performance regarding two aspects: **the first** aspect was pain including (assessing patient in pain, using a pain assessment tool, documenting findings after pain assessment and discussing scores and pain management during nurse-to-nurse report. **The second** nurses' performance toward non-pharmacological pain management including (deep breathing exercise, reflexology, heat and cold application, and modification of environmental stimuli as controlling light and noise) (**Khalil 2018., &Alotaibi., 2019**).

Scoring system of the tool II: Scores were estimated to evaluate the nurses' practices based on the researcher's observation sheet and checklists; which evaluated as follows:

- Completely done was given the score: 2

- Incompletely done was given the score: 1

- Not done was given the score: 0

Part III: Nurses' perceived Barriers to use non-pharmacological pain management methods: this part developed by the researchers after reviewing literature (**Khalil .,2018**), the nurses were asked to choose the statement that resemble their perceived barrier to use non-pharmacological pain management.

Method

1- An approval from the Ethical Research Committee, Faculty of Nursing, Alexandria University was obtained.

2- Permission to get an approval for conducting the study to access the orthopedic section and conduct the study was obtained from the head of El-Hadra Hospital after showing title and the purpose of the study.

3- **Development of the study tools**: All tools were developed and translated into Arabic by the researchers.

4- **Validity testing:** Data collection tools were presented to five experts in the medical surgical nursing sector at the Faculty of Nursing to evaluate the validity of the content. The modifications were made according to the experts' judgment on the clarity of the sentences, the adequacy of the content and the sequence of the elements. Experts agree with the content, but recommend minor changes in the language that would make the information clearer and more accurate. Suggested changes have been made.

5- **Reliability testing:** The reliability of tools was tested by means of Cronbach's alpha. Reliability coefficient for tool II was (0.905) and tool III was (0.827) which means all tools were reliable.

6- **A pilot study** was conducted on 10% of the total sample size (5 orthopedic nurses) to test the feasibility and applicability of the tools, and to assess the time required to fulfill the tools.

7- **Sample size:** Based on Epi-info 7 program, all available subjects of 50 orthopedic nurses. They were recruited and assigned randomly and alternatively into two equal groups; 25 nurse each, namely:
   • Control group (I): not enrolled to in surface training program.
   • Study group (II): were enrolled to in surface training program

8- **Data collection:** After securing the administrative approval, the data collection was started, and continued from a period of six months from August 2019 to February 2020. The researchers were available at different times on morning and afternoon shifts for data collection.

   The study was carried out through four phases:

I. Assessment Phase:
• Initial assessment was carried out for nurses individually after careful listening and documenting their demographic data, the assessment includes: nurses' knowledge regarding pain , its non-pharmacological management and which non-pharmacological methods were the nurses used during the painful procedure, in addition; to nurses' perceived barriers to use non-pharmacological pain management methods Using tool II tool and tool III.

• The assessment session took from 30-60 minutes on individual basis.
• Subsequent assessment was done after 4 weeks in order to evaluate nurses' progress.

II. Planning phase:
• Based on the data collected from the assessment phase and literature review **(Khalil., 2018, Alotaibi .,2019)**. , the in-service training program goals, priorities, contents, and expected outcomes were developed by the researchers according to nurses' individual needs.
• Illustrated colored booklet in Arabic language was developed by the researchers and was distributed to each nurse in the implementation phase.
• Goals and expected outcomes of the in-service training program:
   1. Improve nurse's knowledge toward non pharmacological pain management methods.
   2. Ensure nurses correct application of non-pharmacological pain management methods
• Furthermore, the researchers received a special training in the field of reflexology at the Faculty of Physical education, Alexandria University.

III. Implementation phase (non-pharmacological pain management methods sessions for the study group):
   Nurses were divided into small groups; five in each group, various teaching methods were used in the form of lectures, group discussions, group activities questions, brain storming, demonstration and re-demonstration. Numerous teaching media were used, such as power point, figures, flipcharts, pens, papers and illustrated videos. The program was carried out in the orthopedic units and in the conference room. The program was consisted with theoretical and practical sessions. The program included the following items:

A. Nurses education sessions:
• Two sessions of nurses' education were carried out to provide the nurses with new knowledge and skills. The duration of each session lasted approximately from 30 to 40 minutes depending on the nurses' ability and needs.
• An illustrated booklet in Arabic language was used as a teaching learning aid during each session. The nurses kept the booklet

for remembering the instruction and being a motivator for following it.

The first session: It was included theoretical information about: pain definition & perception**,** its symptoms, types and pain assessment methods.

- Pain management.

The second session: Patients received information about:

- Meaning of non-pharmacological pain management.
- Aim of non-pharmacological pain management.
- Types of non-pharmacological pain management.

B. Non-pharmacological pain management methods training sessions:

- It was carried out through five sessions, one session per day. Duration of each session was from 25 to 30 minutes. Sessions were supported with demonstration and re-demonstration method. Illustrated posters were used as a guide.
- The first session: include training about the correct use of heat and cold applications, and the correct positions to decrease pain.
- The second session: include training about breathing exercise.
- The third ,fourth &fifth sessions: include training about reflexology, this sessions incudes:
  - Massage the foot all over slowly but firmly to loosen it up, beginning at the toes moving down towards the heel, for about thirty seconds.
  - Leg &toes rotation technique.
  - Midline soles massage.
  - Foot extension technique.
  - Alternating pressure with the palms of the hand.
  - Squeeze and stretch the foot techniques.
  - Thumb walks technique.
  - Meridian points stimulation on the foot.

Evaluation phase:

Every nurse in the study group was re-evaluated after four weeks using tools II and III to determine the effectiveness of the in -Service training program on Nurses' Performance towards Non- Pharmacological pain management among orthopedic patients in El-Hadra hospital.

8- Ethical considerations:

- Written informed consent was obtained from each nurse after explanation of the study aim.
- Nurses 'anonymity, and confidentiality were ascertained.
- Nurses right`s to withdraw at any time of research participation was considered and respected.

8- Statistical Analysis:

- The collected data were revised, coded, tabulated and analyzed by using the number and percentage distribution.
- Data were analyzed using compatible personal computer using the Statistical Package for Social Sciences (SPSS) for Windows version 22 (SPSS Inc., Chicago, IL, USA).
- Graphics were done by using Excel program.
- Chi-square test (χ2), Fisher exact test used to estimate the statistical significance between variables of the study.
- A significant difference was considered when (P < 0.05).

Results

Table (1): Frequency and percentage distribution of nurses of both groups according to their demographic characteristics:

Reveals that the majority of the control and study group (84%- 68%) were female respectively and (56%) of control group and (44%) of study group were between age group (31- 40 years old). Furthermore, (56%) of control group had a diploma degree and (48%) of study group had a technical nursing institute. Concerning the year of experience 60% of control group had 5-10 years of experience and (40%) of study group had 1 to less than 5 years of experience. Furthermore, all (100%) of control and study group had no attendance training courses about non-pharmacological pain relieve methods. This table also showed that there was no statistically significant difference between the two groups in relation to sociodemographic characteristics. There was no statistical significance difference between the control and study group patients regarding all items of demographic data.

Table (2): Comparison between control and study group nurses' regarding their knowledge about Non- Pharmacological

Pain Management pre and post in- service Training Program.

This table illustrated that (84% - 80%) of both control and study groups nurses had poor knowledge pre the in- service training program and about (76%) of the control group had poor knowledge while 76% of study group had good knowledge post the in- service training program. There was a highly statistically significant difference regarding nurses' knowledge about Non- Pharmacological Pain Management either within the study group or between the control and study groups nurses post the in- service training program (P= 0.000*,P=0.000*) respectively.

Table (3): Differences among control group nurses' regarding their utilization of non-pharmacological pain management methods pre and post in- service Training Program.

It is obvious that all nurses within the control group not utilized non-pharmacological pain management methods either pre or post the applied time of the in- service training program.

Table (4): Differences among study group nurses' regarding their utilization of non-pharmacological pain management methods pre and post the in- service Training Program.

This table clarified that (84.0%, 80%, 100.0%, 64.0%, 100.0%, 100.0%, 100.0%, 68.0%, 100.0%, 80.0%, 60.0%.100.0%) of nurses within the study group does not utilize all methods of non-pharmacological pain management pre the in- service training Program. While, post the in- service training program (80.0%, 100.0%, 72.0%) of the nurses remain **not utilize** distraction and imagery, music, and breathing exercise respectively. Also, (56.0%) not utilize relaxation technique. On the other hand; (48.0%, 40.0%, 48.0%, 44.0%, 40.0%) of nurses sometimes utilize position changing, heat/cold application, exercise, quit, and reflexology respectively .In

addition to; (40.0%, 40.0%, 48.0%) of the nurses became always utilize massage, comfort, and elevation of the extremities respectively.

Table (5): Comparison between control and study group nurses' regarding their level of performance toward Non- Pharmacological Pain Management pre and post in- service Training Program.

This table illustrated that (100.0%, 92.0%) of the control group had unsatisfactory performance toward non- Pharmacological pain management pre and post the in- service training program respectively. While the study group (84.0%) had unsatisfactory performance pre in- service training program and (72.0%) satisfactory performance post the in- service training program. The difference was highly statistically significant as regard the level of performance toward non- pharmacological pain management either within the study group nurses and between the control and study groups nurses post the in- service training program (p=0.000*, p=0.000*) respectively.

Table (6): Frequency and percentage distribution of nurses of both groups according to their perceived barriers to use non-pharmacological pain management methods:

This table clarified that nurses perceived barriers to use non pharmacological pain management methods, the majority of nurses (88.0%) perceived lack of knowledge regarding non-pharmacological pain management methods as the main barrier to utilize the non-pharmacological pain management methods, followed by lack of time (76.0%), excess workload (72.0%), Patient unwilling (20.0%), being the pain is very severe (14.0%) and patients refuse non pharmacological methods perceived as the least barrier to utilize the non-pharmacological pain management (10.0%).

Table (1): Frequency and percentage distribution of nurses of both groups according to their demographic characteristics.

demographic characteristics	(N= 50)				Significance test
	Control Group		Study Group		
	N= 25	%	N= 25	%	
21-30	5	20.0	9	36.0	
31-40	**14**	**56.0**	**11**	**44.0**	
41-50	4	16.0	4	16.0	
51-60	2	8.0	1	4.0	
Total	25	100	25	100	Mc= 0.620
X ± SD	35.88±7.694		32.68±7.631		P= 0.201
Sex Male	4	16.0	8	32.0	χ2= 0.185
Female	**21**	**84.0**	**17**	**68.0**	P =0.321
Total	25	100	25	100	
Level of education Bachelor's degree in nursing science	5	20.0	4	16.0	
Technical nursing institute	6	24.0	**12**	**48.0**	Mc= 0.236
Diploma of nursing	**14**	**56.0**	9	36.0	P =0.298
Total	25	100	25	100	
Years of experience < 1 Years	2	8.0	3	12.0	
1- < 5 Years	5	20.0	**10**	**40.0**	Mc= 0.238
5 - < 10 Years	**15**	**60.0**	8	32.0	P=0.207
≥ 10 Years	3	12.0	4	16.0	
Total	25	100	25	100	
Attendance training courses about non-pharmacological pain relieve methods No	**25**	**100**	**25**	**100**	- -
Yes	0	0.0	0	0.0	
Total	25	100	25	100	

SD: standard deviation   Mc=Monte carlo test

Table (2): Comparison between control and study group nurses' regarding their knowledge about Non- Pharmacological Pain Management pre and post In -service Training Program.

Knowledge level	group (N= 50)								Significance test	
	Control Group (N= 25)				Study Group (N= 25)					
	Pre		Post		Pre		Post		Pre	Post
	No	%	No	%	No	%	No	%		
Poor knowledge	**21**	**84.0**	**19**	**76.0**	**20**	**80.0**	6	24.0		
Good knowledge.	4	16.0	6	24.0	5	20.0	**19**	**76.0**	χ2= 0.135 P =0.712	χ2 = 13.520 **P =0.000***
Total	25	100	25	100	25	100	25	100		
Significance test within group	χ2= 0.500 P = 0.479				χ2= 15.705 **P =0.000***					

χ2 = Chi-Square.   *Significant difference at P level ≤ 0.05.

Table (3): Differences among <u>control</u> group nurses' regarding their utilization of non-pharmacological pain management methods pre and post In - service Training Program.

Non-pharmacological pain management methods	Control Group (N= 25)																Significance test
	Pre								Post								
	Not at all		Very seldom		Sometimes		Always		Not at all		Very seldom		Sometimes		Always		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
▪ Position changes	22	88.0	3	12.0	0	0.0	0	0.0	20	80.0	2	8.0	3	12.0	0	0.0	FET= 3.295 P =0.192
▪ Massage	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Distraction and Imagery	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Heat /cold application	21	84.0	4	16.0	0	0.0	0	0.0	20	80.0	2	8.0	3	12.0	0	0.0	FET= 3.691 P =0.157
▪ Music	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Relaxation technique	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Breathing exercise	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Comfort	17	68.0	5	20.0	3	12.0	0	0.0	15	60.0	6	24.0	4	16.0	0	0.0	FET= 0.358 P = 0.835
▪ Exercise	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -
▪ Quit	20	80.0	5	20.0	0	0.0	0	0.0	20	80.0	5	20.0	0	0.0	0	0.0	FET= - P = -
▪ Elevation of extremities	18	72.0	3	12.0	4	16.0	0	0.0	19	76.0	3	12.0	3	12.0	0	0.0	FET= 0.169 P = 0.918
▪ Reflexology	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET= - P = -

FET = Fisher's exact test.   *Significant difference at P level ≤ 0.05.

Table (4): Differences among study group nurses' regarding their utilization of non-pharmacological pain management methods pre and post In -service Training Program.

Non-pharmacological pain management methods	Study Group (N= 25)																Significance test
	Pre								Post								
	Not at all		Very seldom		Sometimes		Always		Not at all		Very seldom		Sometimes		Always		
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
▪ Position changes	21	84.0	4	16.0	0	0.0	0	0.0	3	12.0	4	16.0	12	48.0	6	24.0	FET = 31.500 P = 0.000*
▪ Massage	20	80.0	3	12.0	2	8.0	0	0.0	6	24.0	4	16.0	5	20.0	10	40.0	FET = -10.761 P = 0.013*
▪ Distraction and Imagery	25	100	0	0.0	0	0.0	0	0.0	20	80.0	3	12.0	2	8.0	0	0.0	FET = 5.555 P = 0.620
▪ Heat /cold application	16	64.0	4	16.0	5	20.0	0	0.0	6	24.0	6	24.0	10	40.0	3	12.0	FET = 9.612 P =0.012*
▪ Music	25	100	0	0.0	0	0.0	0	0.0	25	100	0	0.0	0	0.0	0	0.0	FET = - P = -
▪ Relaxation technique	25	100	0	0.0	0	0.0	0	0.0	14	56.0	4	16.0	7	28.0	0	0.0	FET = 14.102 P = 0.000*
▪ Breathing exercise	25	100	0	0.0	0	0.0	0	0.0	18	72.0	4	16.0	3	12.0	0	0.0	FET = 8.139 P = 0.017*
▪ Comfort	17	68.0	7	28.0	1	4.0	0	0.0	7	28.0	4	16.0	4	16.0	10	40.0	FET = 16.556 P = 0.000*
▪ Exercise	25	100	0	0.0	0	0.0	0	0.0	10	40.0	3	12.0	12	48.0	0	0.0	FET = 21.428 P = 0.000*
▪ Quit	20	80.0	5	20.0	0	0.0	0	0.0	7	28.0	4	16.0	11	44.0	3	12.0	FET = 12.724 P = 0.002*
▪ Elevation of extremities	15	60.0	5	20.0	5	20.0	0	0.0	6	24.0	5	20.0	2	8.0	12	48.0	FET = 17.142 P = 0.000*
▪ Reflexology	25	100	0	0.0	0	0.0	0	0.0	4	16.0	5	20.0	10	40.0	6	24.0	FET = 28.125 P = 0.000*

FET = Fisher's exact test.   *Significant difference at P level ≤ 0.05.

Table (5): Comparison between control and study group nurses' regarding their level of performance toward Non- Pharmacological Pain Management pre and post in -service Training Program.

Performance level	Group (N= 50)								Significance test	
	Control Group (N= 25)				Study Group (N= 25)				Pre	Post
	Pre		Post		Pre		Post			
	No	%	No	%	No	%	No	%		
▪ Un Satisfactory	**25**	**100**	**23**	**92.0**	**21**	**84.0**	7	28.0	$\chi2$= 4.347 P =0.037	$\chi2$ = 21.333 **P =0.000***
▪ Satisfactory	0	0	2	8.0	4	16.0	**18**	**72.0**		
Total	25	100	25	100	25	100	25	100		
Significance test within group	$\chi2$= 2.083 P = 0.148				$\chi2$= 15.9.9 **P =0.000***					

$\chi2$ = Chi-Square.   *Significant difference at P level ≤ 0.05.

Table (6): Frequency distribution and percentage of nurses of both groups according to perceived barriers to use non-pharmacological pain management methods.

Perceived Barriers to use non-pharmacological pain management	(N= 50)				Total	
	Control Group		Study Group		No= 50	%
	N= 25	%	N= 25	%		
▪ Lack of nurse's knowledge regarding non-pharmacological pain management methods	25	100.0	19	76.0	**44**	**88.0**
▪ Lack of time	20	80.0	18	72.0	38	76.0
▪ Excess workload	21	84.0	15	60.0	36	72.0
▪ Patient unwilling.	5	20.0	5	20.0	10	20.0
▪ Being the pain is very severe.	4	16.0	3	12.0	7	14.0
▪ Patients refuse non-pharmacological methods.	3	12.0	2	8.0	5	10.0
Total	-	-	-	-	-	-

DISCUSSION

Pain management is an important aspect of nursing care in order to promote healing, prevent complications and reduce suffering. In this context, nurses play a significant role in providing pain assessment and treatment **(Edmond, et al., 2018& Geneen, et al., 2017)**. Traditionally, pain management tends to emphasize on the use of pharmacological agents. However, pain is influenced by physical and psychosocial factors, and patients differ in their response to pain and to analgesics. Therefore, it is important to have a range of options, including non-pharmacological therapies. Therefore; the use of non-pharmacological pain relief techniques has been found to be effective with less side effects and complications associated with them **(Mwanza & Munemo, 2019).**

As regard nurses' demodraphic data, the present study demonstrated that the majority of the both groups were females; the

mean age (±SD) of the control group nurses was 35.88±7.694 years, while the mean age (±SD) of the study group nurses was 32.68±7.631 years. In relation to nurses' level of education; more than half of the control group had a diploma degree and around half of the study group had a technical nursing institute. Furthermore, more than half of control group had 5-10 years of experience and about one third of the study group had 1 to less than 5 years of experience. It was obvious that, all nurses among both groups had not attended any training courses about non-pharmacological pain relieve methods.

These results supported by the results of **(Salim, et al., 2019)** who study the effect of a nursing In-Service education program on nurses' knowledge and attitudes towards pain management in a governmental hospital in the United Arab Emirates and found that ;the mean age (±SD) of the participants was 35.43 ± 8.134 years, while the mean experience was 11.88 ± 6.289 years. Otherwise found that 62.5% had received training education related to pain management, while 37.5% had never attended any sessions related to pain management. This result also is in agreement with **(Mwanza, et al., 2019)** who found that the highest number of nurses were in the age group 28 to 37 category, the majority of the nurses were females, most of nurses had a general nurse diploma as their highest qualification, and Based on experience in years the highest number of nurses were in the below 5 years category.

Chapagain, 2018 reported that nurses should improve and maintain their knowledge and skills with ongoing education .So, It is crucial that nurse is aware of the pain-relieving methods, both pharmacological and non-pharmacological, which are available and how and when to use them safely. Also, **Basak (2010)** reported that pain management action is performed less by nurses using non-pharmacological methods to reduce pain. This indicated that nurses may not have adequate knowledge regarding nonpharmacological methods. In the light of this the results of the present study illustrated that the majority of both groups' nurses had poor knowledge regarding non-Pharmacological pain management. pre the in -service training

program and the majority of control group nurses had poor knowledge post the in-surface training while; the majority of study group nurses had good knowledge post the in -service training program. There was a highly statistically significant difference between the control and study groups regarding nurses' knowledge about non- Pharmacological Pain management post the in -service training program. This may be due to that face-to-face educational sessions provided in this study increased nurses' knowledge regarding non-Pharmacological pain management.

In this context**, (Germossa, et al., 2018)** mentioned that there was a significant improvement in nurses' scores of knowledge and attitudes regarding pain management following participation in the educational program. Moreover**, (Salim,   et al .,2019)** reported that mean score of nurses knowledge toward pain management increased after the in-Service education program from 61.36 ±11.60 (mean ± SD) to 69.94 ±7.74. Furthermore; **(Abdalrahim, et al., 2011 & Jarrett, et al., 2013)** reported that educational programs can improve nurses' knowledge and attitudes regarding pain and that improved knowledge may lead to better and effective pain management.

Nurses have a key role in pain management. The promotion of comfort and relief of pain are fundamental to nursing practice **(Williams et al., 2009).** In relation to nurses' utilization of non-pharmacological pain management methods. It is obvious that all nurses within the control group not utilized non-pharmacological pain management methods either pre or post the applied time of the in -service training program. The majority of nurses within the study group does not utilize all methods of non-pharmacological pain management pre the in -service training Program. While, post the in -service training program most of the nurses remain not utilize distraction and imagery, music, relaxation technique, and breathing exercise. On the other hand; the majority of nurses sometimes utilize position changing, heat/cold application, exercise, quit, and reflexology. In addition to; more than one third of the nurses became always utilize massage, comfort, and elevation of the extremities. This may be due to majority

of both control and study groups had poor knowledge and experience pre the in -service training program.

This study finding is supported by **(Ali .,2010)** who revealed that the majority of nurses didn't use non pharmacological pain management methods, non-pharmacological pain management methods that weren't used absolutely applying breathing techniques, distract the patient by listening to light music , applying guided imagery/visualization techniques**. (Yaban., 2019)** stated that; nurses have never used or have used little of non-pharmacological methods in pain management; they mostly try pharmacological pain management with analgesics. Moreover; **(Nwaneri, et al., 2018)** urged that massaging and change of patient position were most often used by orthopedic nurses to relive patient's pain.

Concerning nurses' level of performance toward Non- pharmacological pain management. The difference was highly statistically significant as regard the level of performance toward non- pharmacological pain management either within the study group nurses and between the control and study groups nurses post the in -service training program. This may be due to the demonstration, re-demonstration training used as a part of the in -service training. In this context, **(Ali et al., 2013)** revealed that there was a satisfactory level of nursing practice regarding non-pharmacological pain management practice after educational program. **(Abd El- Aziz, et al., 2018)** stated that the studied nurses got incompetent practice preprogram implementation, while, the majority and more than half of them respectively achieved competent practices immediately post program and at follow up. This result is supported by **(Mehrnoush, et al., 2016)**, who found that proper pain management was significantly correlated with adequate training. Also, **Archanah (2018)** reported that there was a significant reduction in pain in experimental group compared to control group P value (< 0.05) when using local heat, cold, pressure, massage, and electrical stimulation in his study on effect of a hydrotherapy based alternate compress on osteoarthritis of the knee joint.

Helmrich, et al., 2001 illustrated that there are many barriers preventing nonpharmacological pain therapies from being used in the hospital, some of which are physicians' orders, physicians' approval, patient compliance, nurses' knowledge, and nurses' acceptance. In this context the result of the present study illustrated that the majority of nurses perceived lack of knowledge regarding non-pharmacological pain management methods as the main barrier to utilize the non-pharmacological pain management methods, followed by lack of time, excess workload, Patient unwilling, being the pain is very severe and patients refuse non pharmacological methods perceived as the least barrier to utilize the non-pharmacological pain management.

These results were similar to **(Ali, et al., 2013)** who mentioned that more than half of the studied sample reported that the factors that may affect their abilities to use non pharmacological pain methods were lack of education, nursing workload, Patient instability e.g. unstable hemodynamic, Lack of availability of pain management equipment and Patient inability to communicate respectively. These results are nearly consistent with those obtained by **(Mohebbi et al., 2014 & Azimzadeh, 2014)** who found that (54.2%), excessive workload (51.2%), lack of equipment(48.3%) and lack of knowledge of some of the various alternative measures (38.9%) were some of the reasons for not practicing alternative methods of pain control . The present results differ from those obtained by **(Nwaneri, 2018)** and **(Morgan, 2012)** who found that the following important barriers for non-pharmacological pain management respectively: frequency of working hours, Lack of time and heavy work load, staff shortages.

Finally, the present study is bridging the gap between clinical practice and research in order to translate research findings and apply the best evidence into practice. Studies indicated that the use of non -pharmacological methods is the most effective way for relieving orthopedic procedural pain. Therefore, it is important to conduct this study.

Conclusion:

This study illustrated that there was no statistically difference between control and study group patients in relation to patients sociodemographic data, while there was significant difference between control and study group patients related to their knowledge &level of performance regarding non-pharmacological pain management after application of in-service training. Lack of nurse's knowledge regarding non-pharmacological pain management methods consider the main perceived barrier by orthopedic nurses.

Recommendation:

Based on the findings of the present study, the following recommendations had been derived and should be considered:

- Nurses and patients need to apply the different types of on pharmacological pain management methods.

- Barriers need to be explored and continuing education needs to be done to eliminate some of these perceived barriers.

- Incorporation of theoretical and practical non-pharmacological pain management methods in nursing Curricula.

- For further research, continuous training and educational program on non-pharmacological pain relieve measures techniques.

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