World Journal of Nursing Sciences 3S: 10-21, 2014
ISSN 2222-1352

DOI: 10.5829/idosi.wjns.2014.10.21

Nurses' Knowledge and Perceived Practices of Non-Pharmacological Pain Management Strategies

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Abstract: Nurses make a significant contribution to pain control management by offering variety combinations of both non-pharmacological and more traditional methods as analgesia or local anesthesia. This study aimed to evaluate nurses' knowledge and practices regarding non-pharmacological pain management at Alexandria university hospitals - Egypt. The study subjects included a convenient sample of 122 bachelor degree nurses in the previously mentioned settings. Two tools were used to collect the necessary data; Nurses' knowledge Assessment Questionnaire and Non-pharmacological Pain Management Questionnaire. Results revealed that most common barriers hindering nurses from using Non-Pharmacological Pain Management was lack of time, followed by lack of organizational support and the least barrier was patients'/families' attitude toward its use. The majority of nurses did not attend training courses related to Non-pharmacological Pain Management. High statistically significant correlations were detected between nurses' area of specialty and their level of practice as well as their overall knowledge, also between nurses' position and their level of practice. It was concluded that; the majority of the studied nurses' overall practice regarding using non-pharmacological pain management was unsatisfactory. No significant correlations were found between educational level work area and the use of non-pharmacological pain management. It was recommended to provide pre-service and in-service training programs to update nurses' knowledge, attitudes and practices regarding non-pharmacological pain management.

Key words: Pain · Non-Pharmacological Pain Management · Nurses' Knowledge and Practice

INTRODUCTION

Pain is a complex sensation that comprises socio-cultural, behavioral, physiological, emotional and developmental components [1, 2]. It is defined as unpleasant sensory and emotional experiences arise from actual or potential tissue damage, ranging from mild to severe [2].

Acute pain is short lasting and usually manifests in ways that can be easily observed, while chronic pain is that pain lasting more than three months. Estimates suggest that 20% of adults suffer from pain globally and 10% are newly diagnosed with chronic pain each year, in addition; more than 1.5 billion people worldwide suffer from chronic pain [3].

It is remarkable that chronic pain results in loss of the patient's social responsibility toward his family, in addition to functional health pattern disability, changes in nutritional status and poor sleep quantity and quality; which in turn loss of family income and accordingly increase burden on others; in addition to pain medication side effects which contribute to psychological and spiritual disturbances, this is as debilitating as pain itself [4, 5].

Melzack [6] suggested that pain experiences with three dimensions; motivational-affective, sensory discriminative and cognitive control processes. The selective cognitive processes are activated by a specialized large-diameter descending fibers system which modulates the spinal gating mechanism. Being the fifth vital signs, since 2004 many hospitals have integrated non-pharmacological pain management strategies (NPPMS) for chronic pain patients [7].

Pain vehicles gates are controlled by pain management that affects transmission or the release of natural opioids as endorphin [6].

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Managing pain is a complex science which uses a combination of both pharmacological and non-pharmacological methods of pain and anxiety control which may be improved by the involvement of patients and their family in their own pain management [8, 9]. People use NPPMS or alternative therapy not because they are dissatisfied with conventional medicine but because they are more congruent with their values and beliefs toward health and life [8, 10]. As well NPPMS are effective by providing physical, social and psychological benefits to improve patients' health care [11].

Recent researches support nurses use of Cognitive NPPMS as mediation, distraction, especially breathing exercises, reading, watching television, musical therapy or humor; reassurance and lengthening time of stay with the patient, explaining any procedure, as well as; imagination through patient's memory of peaceful events or place, progressive relaxation technique this improve oxygenation; and control rhythmic breathing which acts as distraction in turn, relieve pain [12, 13].

Physical NPPMS by ways of comforting touch use (massage, therapeutic touch) which relieves body and mind and improve pain threshold, that act as referral cutaneous stimulation. Cold- heat application causes vasodilation and nourishment to painful area. Exercise, position changing and resting are also used in order to reduce acute pain. Other methods include; engaging the patient's family in his NPPMS, provide familiar hospital environment which relieves pain and assists in gaining patient's cooperation in any performed procedure. All of these require specialized training for apparent positive pain relieve results [10, 14, 15].

In spite acute and chronic pain physically and psychologically remarkably disable people; there are barriers which may prevent the use of NPPMS in hospitals, as physicians' orders and approval, patient compliance, nurses' knowledge and acceptance; in addition to nurses compliance in NPPMS administration [16].

A valid and comprehensive nursing pain management approach is essential for effective pain relieve [17, 18]. It is apparent that; nurses are accountable for performing targeted pain assessment, intervention goals, analgesics administration, as well as monitoring and reporting treatments outcomes [19]. Nurses also provide an undeniable role in using to NPPMS to achieve an effective pain alleviation management [9].

The growing body of evidences shows that; many health care professionals lack the proper knowledge and attitude for managing pain effectively, leaving many patients to endure a reduced quality of life. Pölkki *et al*. [20] postulated that, the NPPMS problem continues to be internationally; as well nurses neither have knowledge nor positive practices to pain management, which in turn contributes to ineffective pain management. Inherent in the previous statements, is the belief that NPPMS use among practicing nurses is inquired and has to be investigated to ensure the safety benefits that improve patient's care.

Significance of the Study: In spite of the growing interest and upsurge of knowledge in pain management, nurses' knowledge and practices are considered barriers for the use of NPPMS, since they are questioned and need to be investigated.

Aim of the Study: The present study aimed to evaluate nurses' knowledge and perceived practices regarding NPPMS at Alexandria university hospitals- Egypt.

Research Questions: To fulfill the aim of the study, two research questions were formulated:

- What are NPPMS nurses uses in practice?
- What are the reported barriers that prevent nurses from applying NPPMS?

MATERIALS AND METHODS

Research Design: This is a descriptive study.

Setting: It was conducted at medical, surgical, dialysis, orthopedics, burn and oncology units affiliated in University hospitals at Alexandria, Egypt.

Sample: A convenient sample of 122 nurses working at the above mentioned settings were invited to participate in the study.

Inclusive Criteria: Males, female's adult nurses, bachelor graduates, age ranging from 20 to less than 60 years old.

Sample Size Calculation: Epi info-7 Program was used to estimate the sample size using the following parameters:

- Population Size= 150
- Expected frequency= 50%
- Acceptable error=5%
- Confidence coefficient=99%
- Minimum Sample Size=122

Tools: The following tools were used for the purpose of study

Tool (I): Nurses Assessment Sheet: This sheet was developed by the investigators after reviewing the relevant literature [7, 8, 9, 21]. It aimed to assess nurses' knowledge regarding NPPMS. It consisted of two parts as follows:

Part One: Nurses' Socio-Demographic Data: This part included questions about the participant's age, gender, level of education, years of experience, availability of pain assessment tools at their working unit and whether these tools are used, previous attendance of pre and in services training related to NPPM and barriers hindering the use of NPPMS.

Part Two: Nurses' Knowledge Assessment Questionnaire: It included knowledge about pain concept, pain assessment, non-pharmacological pain management methods and benefits of using NPPMS.

Scoring System: Nurses knowledge regarding using NPPMS was plotted under three main categories:

- <60% Poor knowledge
- 60-75% Fair knowledge
- >75% Good knowledge.

Tool (II): Non-Pharmacological Pain Management Questionnaire: This questionnaire was adapted from Bicek [21]. It aimed to assess nurses' perceived practice regarding use of NPPMS. The nurse chooses alternatives that best represent her/his practices. It consisted of 6 domains; preparing the patient carefully for a procedure (10 questions), Imagery (4 questions), distraction (7 questions), relaxation techniques (10 questions), physical methods (4 questions) and emotional support (2 questions).

Scoring System: This consisted of five categories ranging from 1-5.

1= not at all, 2 = very seldom, 3= sometimes, 4 =nearly always and 5 = always.

- Analysing the nursing practices regarding NPPM strategies was plotted under two main categories (=60 %satisfactory and <60 % unsatisfactory), after dividing the total practices to six domains: patient preparation, Imagery, distraction, relaxation techniques, physical methods and emotional support.

Methods:

- Permission to carry out the study was obtained from the directors and the responsible authority of the selected setting after explaining the aim of the study.
- Tool (I) and Tool (II) were developed and adapted based on the review of relevant literature.
- The study tools were translated into Arabic language and revised by 5 experts in the above mentioned medical surgical nursing specialists for their content validity and the necessary modifications were introduced.
- A pilot study was conducted on 10% of the total sample fulfilling the inclusion criteria to evaluate the content and test the feasibility, objectivity, clarity, relevancy and applicability of the study tools. Also reliability was calculated using Cronbach's Alpha test (0.908) which indicated that the tools were highly reliable.

Ethical Considerations: The current study was approved by the research institutional review board of Faculty of Nursing, Alexandria University. Aim of the study was explained to all the participants and all of them signed the informed consent before participation and were assured about the confidentiality and freedom to participate in the study. Data collection was approved from the hospital and units administrative authorities.

Techniques for Data Collections: A structured interview was utilized. The nature and the purpose of the study were explained to all research participants. Questionnaires were distributed by the researchers. The average time needed for each tool completion was around 30 minutes.

Statistical Analysis: Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. Qualitative data were described using number and percent. Quantitative data were described using mean, standard deviation. Significance of the obtained results was judged at the 5% level.

The used tests were:

Chi-Square Test: For categorical variables, to compare between different groups

Fisher's Exact or Monte Carlo Correction: Correction for chi-square when more than 20% of the cells have expected count less than 5

Pearson Coefficient: To correlate between two normally quantitative variables.

RESULTS

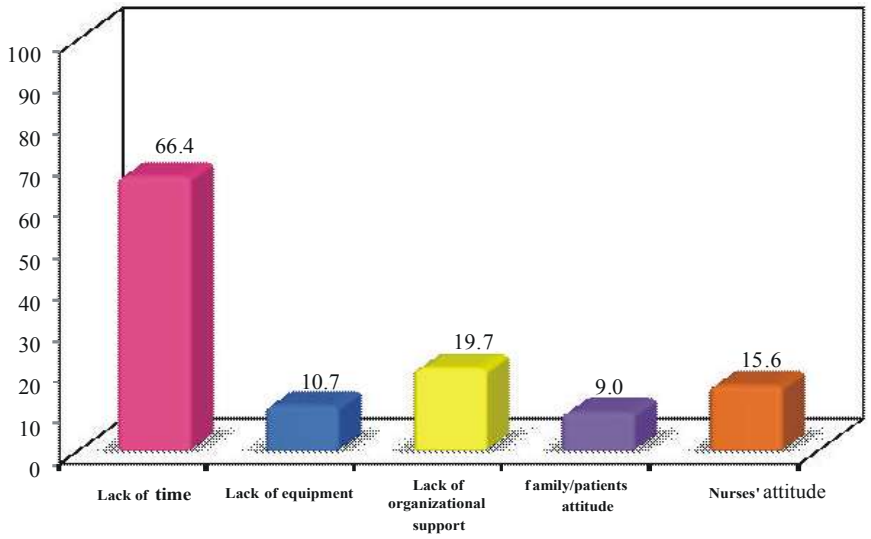
Table (1) shows that almost one third of the sample were from medical units, a quarter was from surgical unit and a minority was from oncology unit. Also, more than one third of the studied nurses had 10 to less than 20 years of experience. Less than half of the studied nurses (40.2%) were between 30 to less than 45 years, while one fifth of them (20.5%) were between 45 to less than 60 years. Most of the studied nurses were females (92.6%). Regarding nurses' position, almost two thirds were clinical nurse supervisors followed by internship nurse and head nurses (66.4, 20.5 and13.1%) respectively. Almost all nurses (99.2 %) were Bachelor graduates while only one nurse (0.8%) held Master degree, the majority of nurses (86.9%) had not attend training courses related to NPPMS. Also, (95.1%) of them reported availability of pain assessment tools and (90.5%) identified that they don't use it.

Fig. 1 demonstrates that the most common reported barriers preventing nurses from using NPPMS for their patients were; lack of time (66.4%), followed by lack of organizational support (19.7%). The least barrier identified was patients'/families' attitude toward them as reported by (9%) of the sample.

Fig. 2 displays that the majority of the studied nurses' overall perceived practice regarding using NPPMS was unsatisfactory. Emotional support achieved the highest practice among the majority of nurses, while more than one third of the studied nurses practiced relaxation techniques. Less than one-third of nurses practiced patient's preparations by explaining procedure, Physical measures as making the patients' environment comfortable and distraction, while guided imagery was the least nurses' practice.

As regard to the perceived benefits by nurses associated with the use of NPPMS, the majority of them believed that these strategies had physical benefits as decreased pain sensation. Nearly one quarter of the studied nurses didn't know the benefits of the use of NPPMS while only (22.1%) of them believed that they had psychosocial benefits as decreased anxiety/ increased patient's sense of control (Fig. 3).

Table (2) Demonstrates that the majority of nurses had good knowledge about pain assessment, NPPMS and benefits of their use, while the majority of them had poor general knowledge about pain concept. The overall nurses knowledge' percent score was (62.25%).



Percentage distribution of barriers to the application of NPPMS as reported by the studied nurses (n=122).

Fig. 1: Percentage distribution of barriers to the application of NPPMS as reported by the studied nurses (n=122)

Table 1: Distribution of the studied nurses according to socio-demographic and clinical characteristics (n=122)

Socio-demographic and clinical characteristics of the studied nurses	n=122	%
Age		
20 ≥ 30	48	39.3
30 ≥ 45	49	40.2
45> 60 years	25	20.5
Area of specialty		
Medical	30	24.6
Surgical	40	32.8
Dialysis	15	12.3
Orthopaedic	20	16.4
Burn	5	4.1
Oncology	12	9.8
Years of experience		
Less than 10 year	47	38.5
10>20 years	50	41.0
20>30	21	17.2
30 > 40	4	3.3
More than 40 years	0	0.0
Gender		
Male	9	7.4
Female	113	92.6
Position		
Internship	25	20.5
Clinical nurse supervisor	81	66.4
Head nurse	16	13.1
Level of Education		
Bachelor degree	121	99.2
Master	1	0.8
Attendance of training programs related to NPPM in the past 2 years		
Yes	16	13.1
No	106	86.9
Availability of pain assessment sheet in the Unit		
Yes	116	95.1
No	6	4.9
Nurses use of pain assessment sheet		
Yes	11	9.5
No	105	90.5

Table 2: Distribution the studied nurses' knowledge regarding pain concept, pain assessment and use of NPPMS (n=122)

	<60% poor		60% – 75% Fair		>75% Good			
Knowledge items	No.	%	No.	%	No.	%	Total score (mean± SD)	% score (mean± SD)
Pain concept	89	73.0	15	12.3	18	14.8	4.70 ± 1.31	52.28 ± 14.55
Pain assessment	44	36.1	1	0.8	77	63.1	6.29 ± 2.37	69.85 ± 26.28
NPPMS	36	29.5	0	0.0	86	70.5	0.70 ± 0.46	70.49 ± 45.79
The benefits of using NPPMS	30	24.6	0	0.0	92	75.4	0.75 ± 0.43	75.41 ± 43.24
Overall knowledge	41	33.6	62	50.8	19	15.6	12.45± 2.02	62.25±10.08

Table (3) reveals that there were highly statistical significant correlations between nurses' overall knowledge about NPPMS and their overall practice, meaning that nurses who had good level of knowledge scored a satisfactory level of perceived practice where ($p < 0.001^{*}$) & ($r = 0.262^{*}$ ($p = 0.004^{*}$).

Table (4) reveals that there were high significant relations between nurses' knowledge and their areas of specialty as nurses in medical units achieved the highest knowledge scores (Good) about NPPMS, while nurses in surgical units achieved the lowest knowledge scores. No significance relations were detected between nurses' knowledge and the rest of their socio-demographic data.

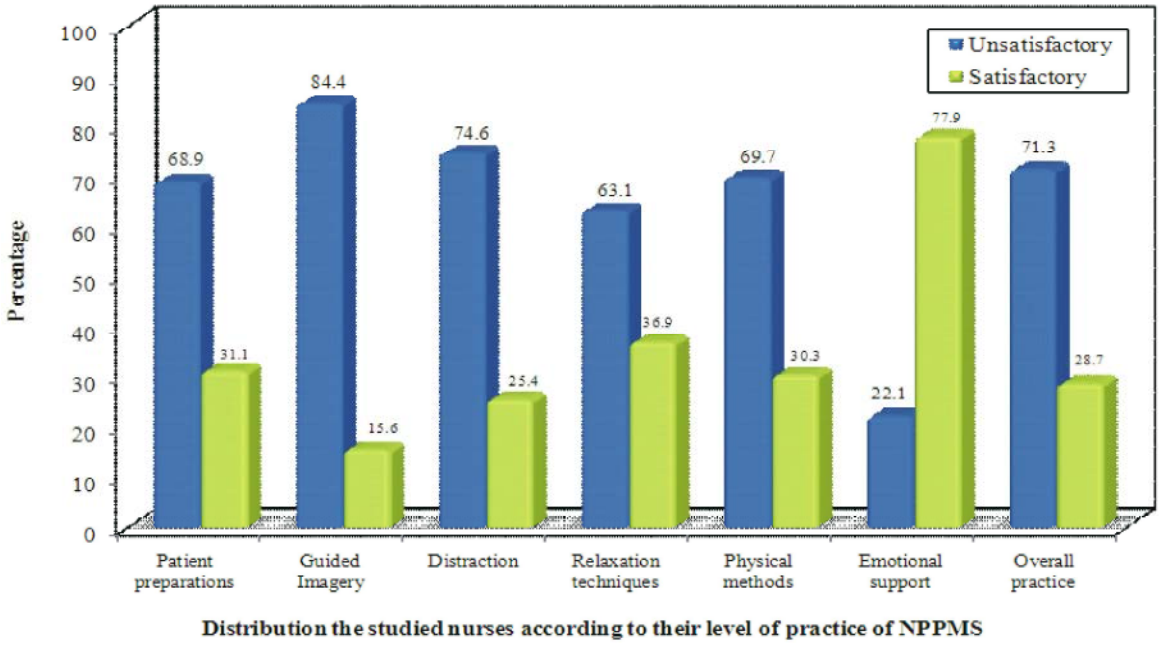


Fig. 2: Distribution of the studied nurses according to their level of perceived practice of NPPMS (n=122)

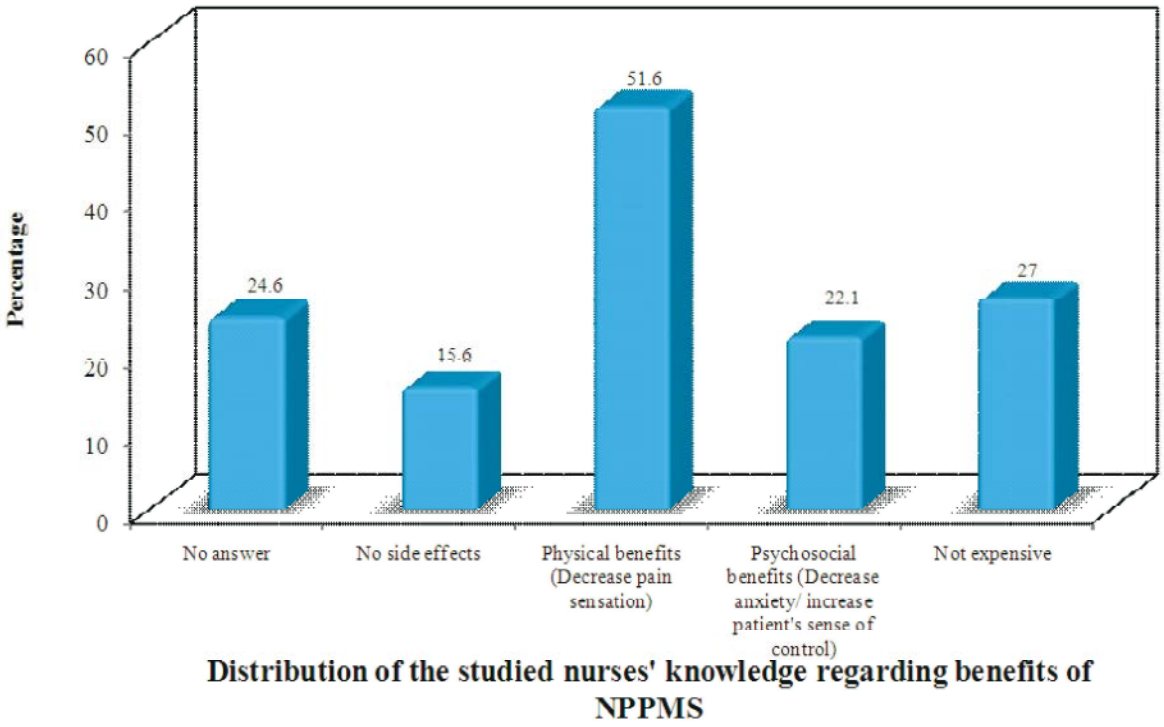


Fig. 3: Distribution of the studied nurses' knowledge regarding benefits of NPPMS

Table (5) illustrates that there are high statistical significant relations between nurses' area of specialty and their level of perceived practice, as oncology nurses achieved a satisfactory level of perceived practice (P <0.001*). In addition, there were high statistical significant relations between nurses' position and their level of perceived practice, as clinical supervisors achieved more satisfactory level of practice (P <0.001*).

Table 3: Relationship between overall knowledge with overall perceived practice (n=122)

	Overall knowledge					
	<60 (unsatisfactory) (n=87)		=60 (Satisfactory) (n=35)			
Overall practice	No.	%	No.	%	χ^2	P
• <60poor	36	41.4	5	14.3	16.490*	<0.001*
• 60 – 75 Fair	44	50.6	18	51.4		
• >75Good	7	8.0	12	34.3		
r (p)	0.262* (p=0.004*)					

χ^2: Chi square test

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Tables 4: Relationship between nurses' overall knowledge with Socio-demographic data (n=122)

	Overall knowledge							
	<60 poor (n=44)		60 – 75 Fair (n=68)		>75 Good (n=10)			
Socio-demographic data	No.	%	No.	%	No.	%	χ^2	P
Age							8.802	χ^2p = 0.066
20 > 30	12	29.3	23	37.1	13	68.4		
30 > 45	20	48.8	25	40.3	4	21.1		
45 > 60 years	9	22.0	14	22.6	2	10.5		
Area of specialty								
Medical	4	9.8	17	27.4	9	47.4	23.959*	MCp=0.003*
Surgical	19	46.3	14	22.6	7	36.8		
Dialysis	3	7.3	9	14.5	3	15.8		
Orthopaedic	11	26.8	9	14.5	0	0.0		
Burn	1	2.4	4	6.5	0	0.0		
Oncology	3	7.3	9	14.5	0	0.0		
Years of experience								
Less than 10 year	12	29.3	22	35.5	13	68.4	8.696	MCp= 0.162
10>20 years	19	46.3	27	43.5	4	21.1		
20>30	9	22.0	10	16.1	2	10.5		
30 > 40	1	2.4	3	4.8	0	0.0		
More than 40 years	0	0.0	0	0.0	0	0.0		
Gender								
Male	1	2.4	6	9.7	2	10.5	2.396	MCp= 0.324
Female	40	97.6	56	90.3	17	89.5		
Position								
Internship	6	14.6	16	25.8	3	15.8	3.456	MCp= 0.487
Clinical nurse supervisor	28	68.3	38	61.3	15	78.9		
Head nurse	7	17.1	8	12.9	1	5.3		
Level of Education								
Bachelor degree	41	100.0	62	100.0	18	94.7	3.687	MCp= 0.147
Master	0	0.0	0	0.0	1	5.3		
Attendance of training programs related to NPPMS in the past 2 years								
Yes	7	17.1	9	14.5	0	0.0	3.539	χ^2p=0.170
No	34	82.9	53	85.5	19	100.0		

χ^2: Chi square test

MC: Monte Carlo for Chi square test

*: Statistically significant at $p \leq 0.05$

Tables 5: Relationship between overall perceived practice with demographic data (n=122)

	<60 (unsatisfactory) (n=87)		≥60 (Satisfactory) (n=35)			
Demographic data of the studied patients	No.	%	No.	%	χ^2	P
Age						
20 > 30	33	37.9	15	42.9	0.710	$^{\chi 2}$p=0.701
30 > 45	37	42.5	12	34.3		
45 > 60 years	17	19.5	8	22.9		
Unit						
Medical	24	27.6	6	17.1	47.898*	^{MC}p=<0.001*
Surgical	32	36.8	8	22.9		
Dialysis	6	6.9	9	25.7		
Orthopaedic	20	23.0	0	0.0		
Burn	5	5.7	0	0.0		
Oncology	0	0.0	12	34.3		
Years of experience						
Less than 10 year	32	36.8	15	42.9	2.854	^{MC}p=0.382
10>20 years	38	43.7	12	34.3		
20>30	13	14.9	8	22.9		
30 > 40	4	4.6	0	0.0		
More than 40 years	0	0.0	0	0.0		
Gender						
Male	7	8.0	2	5.7	0.199	^{FE}p=1.000
Female	80	92.0	33	94.3		
Position						
Internship	25	28.7	0	0.0	13.800*	$^{\chi 2}$p=0.001*
Clinical nurse supervisor	50	57.5	31	88.6		
Head nurse	12	13.8	4	11.4		
Level of Education						
Bachelor degree	87	100.0	34	97.1	2.506	^{FE}p=0.287
Master	0	0.0	1	2.9		
Attendance of training programs related to NPPMS in the past 2 years						
Yes	12	13.8	4	11.4		
No	75	86.2	31	88.6	0.122	χ^2p=0.726

x^2: Chi square test

FE: Fisher Exact for Chi square test

MC: Monte Carlo for Chi square test

*: Statistically significant at $p \leq 0.05$

DISCUSSION

The main issues that emerged from the current study were the perceived benefits associated with using NPPMS, the barriers hindering its use by nurses as the lack of time and the unsatisfactory nurses' overall perceived practice level.

The results of the current study revealed that the most common age range of the studied nurses, was between 30 ≥ 45 years, this finding is contradicting with Ali *et al.* [22] who found that the most common age group among subjects of this study sample was 20-30 years. Also the findings revealed that most of nurses were female. These findings are in line with Elcigil *et al.*[23] who reported that 99% of the studied nurses were females.

Regarding the educational level, almost all of the studied nurses had Bachelor degrees and only one held Master degree. These results are congruent with Fourie [24] who found that a few of the studied nurses had Bachelor Degree and only 7% had completed a master degree in nursing.

The study findings also presented that a small percentage of the studied nurses received workshops concerning NPPMS while the reminders' sources of information were obtained from a 3 hours faculty lecture.

On the contrary, Bicek [21] reported that the majority of the studied nurses (60.4%) had received in-services training classes in the past 2 years of their work about NPPMS. In this context kopfer and McGovern [25] reported that receiving in-services training classes inspire nurses for implementing preventive strategies that alter their perception, increase knowledge and change their attitudes and practice.

The study also indicated that the majority of the studied nurses didn't use pain assessment tools at their units in spite of the availability of these tools in their units. This finding is congruent with a recent study by Vickers [26] who reported that the incorporated pain assessment tool was used by only a few of nurses.

Also, the results of the current study revealed that the most significant obstacle to the use of NPPMS was; the lack of time followed by lack of organizational support. This result is in accordance with Helmrich *et al.* [27] who found that some negative factors as nurses' lack of time may lead to poor use of NPPMS. In this context, Morgan [28] added that the most significant obstacle to the use of NPPMS was the lack of time, since nurses need more time to implement them which discourage its use.

In addition, the studied nurses mentioned that NPPMS are considered informal practice' and their implementation is not supported by the hospital environment. This finding is supported by Elcigil *et al.* [23] and Helmrich *et al.* [27] who found that lack of hospital policy and nurses' lack of authority to administer NPPMS are factors hindering its use.

Nurses' attitude, lack of equipment and patients/family attitude were among the less reported barriers by the studied nurses. Helmtich *et al.* [27] illustrated that some nurses had lack of confidence to independently use NPPMS in their nursing practice; therefore, they didn't appreciate using such therapies. Also, the negative patient/family attitude toward its use may be related to patients' beliefs in their inefficacy, since some patients prefers medications only.

As regards the perceived benefits by nurses associated with the use of NPPMS, the majority of nurses believed that they had physical benefits as decreased pain sensation, while only some of them believed that they had psychosocial benefits as decreased anxiety/ increased patient's sense of control since they were more able to participate in the activities of daily living as mobilization and sleeping. Similarly, Helmrich *et al*. [27] stated that nurses' comments related to benefits of using such therapies included: improvement in patient's pain, decreased anxiety and providing patients with some control over their pain management. Also, Menefee and Monti [29] reported that using NPPMS increased patients' sense of control over their pain and their lives.

In addition, the findings of this study revealed that the overall percent knowledge score was fair in about half of nurses. Similarly, Ali *et al.* [22] found a satisfactory level of nurses' knowledge regarding use of NPPMS, while Lui *et al*. [30] found that nurses' knowledge about its use was poor.

Also, there were highly significant correlations between nurses overall knowledge about NPPMS and their overall perceived practice. Ali *et al.* [22] found a positive relationship between nurses' knowledge and practice of non-pharmacological pain management. In this regard, Thomas [31] reported that lack of knowledge regarding NPPMS resulted in poor nursing practice.

Moreover, there were insignificance relations between nurses' knowledge and the rest of their socio-demographic characteristics. This finding contradicts with Ali *et al.* [22] who found positive relationships between age, educational level, years of experience and attendance of training courses with the knowledge and practice of nursing staff.

The current study revealed that the majority of the studied nurses' overall practice regarding using NPPMS was unsatisfactory. Ali [32] also found that the majority of nurses didn't use NPPMS, while Polkki *et al*. [33] found that the majority of nurses used NPPMS routinely.

More than three quarters of the studied nurses practice emotional support while more than one third of them practice relaxation technique. These findings are in line with Ali [32] who found that the only and most frequently used NPPMS by few nurses was relaxation (breathing) technique. On the other hand, Elshamy and Ramzy [34] reported that few nurses used non-pharmacological interventions such as relaxation methods for managing post-operative pain.

The current study finding illustrated that less than one third of nurses practice patient's preparations, physical measures and distraction, while guided imagery was the least frequently used by nurses. This finding is in line with Ali [32] who reported that nurses weren't absolutely applying massage techniques; distracting the patient by listening to light music, applying guided imagery/visualization techniques. Interestingly, Hg he *et al.* [35] indicated that the most commonly used non-pharmacological methods by nurses were giving preparatory information, comforting and reassurance distraction.

There are many factors that affect nurses' practice of NPPMS such as years of experience and educational level, since the higher educational level and increasing years of experience, are reflected on better knowledge and practice. On the contrary, the findings of the current study revealed that nurses' education, experience and age, attendance of courses showed no statistically significant relations with nurses' level of knowledge or practice. This could be due to the fact that nurses with longer years of experience were not involved in direct patient care and were more involved in administrative affairs. Similarly, Mokhter [36] found no significant correlation between nurses' education, years of experience and their level of knowledge and practice. Also, Lui *et al*. [37] revealed that there were no relationships between level of education and practice score of nurses as regards NPPMS. On the other hand, Wilson [38] reported that nurses who had higher education and more years of clinical experience achieved higher level of competency using non-pharmacological pain management. As well, Hadded [39] reported that in-service educational and training program had significant effect in improving the nurses' knowledge and skills regarding nursing care to patient with medical surgical disorders.

Also, the study indicated a high significant correlation between nurses' area of specialty and their level of practice, since oncology nurses applied the widest range of NPPMS. Those nurses believe that NPPMS are more safe and effective for cancer patients. In this regard, Hokka *et al*. [40] emphasized the safety benefits of non-pharmacological therapies on treating cancer pain among cancer.

Being an applied science, nursing education does not stop at the recall level, but extends to application and interpretation of knowledge. Education, no doubt makes a difference in nurses' perception and use of these modalities.

CONCLUSIONS

It was concluded that the majority of the studied nurses' perceived overall practice regarding using NPPMS was unsatisfactory. Emotional support was the most frequently used method among the majority of nurses. No significant correlations were found between educational level of the studied nurses, work area and the used NPPMS. Finally, the most frequently reported barriers by nurses were lack of time, as well as organizational support.

Recommendations: In the light of these study findings, the following are recommended:

Recommendations to enhance nursing practices:

- Nurses must follow comprehensive, holistic approach of interventions when caring for pain suffering patients.
- Nurses play a vital role in teaching patients active self-management strategies of chronic pain, as self-acupressure and home-based exercise program.
- Utilization of the strengths and weakness revealed in the present study findings, as evidence base in constructing training programs to update nurses knowledge and practice about NPPMS to relieve pain.
- Provision of educational units in undergraduate nursing programs related to the application of NPPMS to relieve pain which might incorporate the findings of the present study as evidence base.
- Nurses should keep in mind that nurse-patient relationship plays an important role in the effectiveness of the pain management technique.

Recommendations for further researchers:

- Developing manuals of NPPMS might be of help nursing practice.
- Comparing the effect of different NPPMS as acupressure, acupressure with trans-cutaneous electrical nerve stimulation (TENS) on chronic pain, is advocated.
- Implementing further studies on the levels of knowledge and practice of nurses regarding NPPMS in other settings of nursing specialties.

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