Utilization of Non-Pharmacological Methods and the Perceived Barriers for Adult Postoperative Pain Management by the Nurses at Selected National Hospitals in Asmara, Eritrea

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Abstract

Background: Pharmacological methods are widely used for postoperative pain management however, poorly controlled pain continues to pose a significant challenge. Non pharmacological methods could contribute to the unresolved postoperative pain management in assisting nurses’ routine care and minimizing the need for medication. The aim of the study was to assess nurses’ utilization of non-pharmacological methods in postoperative pain and the perceived barriers for their implementation at the National Hospitals.

Methods: A descriptive cross sectional study was conducted among 154 nurses working at the National Referral Hospitals and Sembel Private Hospital. A standardized five-point Likert-scale questionnaire which assesses nurses’ utilization of selected non-pharmacological methods and the perceived barriers for the implementation was used to collect data. Descriptive statistics for the demographic data, independent samples t-test, one way ANOVA and factorial ANOVA were used to analyze the data. Statistical significance level was set at \( P < 0.05 \).

Results: The study found out that emotional support (45.5%), helping with daily activities (67.5%) and creating a comfortable environment (61%) were the most frequently used methods, while cognitive-behavioral (5.9%) and physical methods (5.8%) had less frequency. The results also showed, such as the nurses' age \( (p=0.013) \), education \( (p=0.012) \), work experience \( (p=0.001) \) and place of work \( (p=0.001) \), were significantly related to the use of non-pharmacological methods at bivariate level. However, hospitals had a statistical significance of \( (p<0.001) \) and were the only determinants of the non-pharmacological methods at multivariable level. On the perceived barriers; heavy work load (87.7%), shortage of time (84.4%), limited resources (82.5%), deficit in the guidelines for pain management (77.3%), patient’s uncooperative behavior (57.1%), language difference (64.4%), nurse’s lack of knowledge (50%) and experience (40.3%) were identified.

Conclusion: Non-pharmacological methods on postoperative patients in the studied hospitals varied greatly due to experience and knowledge. The study recommends exposure and training for all health care providers at all level in order to appreciate the benefits of non-pharmacological methods applicable to postoperative pain management among patients. This could be achieved through on job training, seminars, scientific conferences and other brainstorming forums.

Background

Worldwide postoperative pain is the most common problem in developing and developed countries with reported incidence ranging between 47-100% (1). The longstanding recognition of postoperative pain with many advances in its management, poorly controlled pain continues to pose a significant challenge to the treatment of patients in postoperative care (2-5). Untreated postoperative pain can predispose patients to medical complications including pneumonia, deep vein thrombosis, delayed wound healing, development of chronic pain and may also result in patients dissatisfaction (6). Postoperative pain is associated with higher risk of morbidity and mortality which increases the length of hospital stay (7). The cornerstone of
effective postoperative pain management is based on the nurses’ ability to assess pain (8). To effectively administer prescribed pain relievers and usage of other effective non-pharmacological methods, surgical nurses should have sufficient knowledge in conducting post-operative pain assessment (5). The main goal of postoperative pain treatment is to comfort and facilitate healing to patients after surgical procedures by inhibiting nociceptive impulses induced by trauma (9).

To ensure adequate pain relief both pharmacological and non-pharmacological methods could be used for instance, opioids and NSAID are commonly used in alleviating post-operative pain (8). The pharmacological pain management has potential risks and high cost, in addition to this, patients may develop drug dependency, severe adverse effects and vital organ damage also respiratory depression could be a potential life-threatening side-effect of opioid analgesics. In addition to this, skillful administration and deficit in supply renders it to be less advisable in developing countries (10). In the Eritrean settings, frequent administration of pharmacological methods to postoperative patients expose them to the above mentioned risks.

Non-pharmacological methods refers to diverse approaches that involve nondrug measures to relief pain(11), such as deep breathing, exercises, massage, positioning and music therapy. According to Pölkki et al., (2001) non-pharmacological methods are divided into five categories cognitive-behavioural methods, physical methods, emotional support, helping with activities of daily living and creating a comfortable environment. These interventions are recognized as valuable, simple, safe, inexpensive with less adverse effects and promote active role of patients in the treatment of pain (12). They can be used independently for the relief of mild pain or offer complementary treatment options in conjunction with pain medication for the relief of moderate to severe pain (13). Non pharmacological methods could assist on the nurses’ routine care and minimize the need for higher dosage of medications(14). Unlike in the use of pharmacological methods, nurses have full authority on the implementation of non-pharmacological methods for postoperative pain management. Medicinal drugs are widely used in the treatment of somatic pain, while non-pharmacological therapies aim to treat the affective, cognitive, behavioral and socio-cultural types of the pain(8, 15). Utilization of non-pharmacological methods by the nurses could contribute to the unresolved postoperative pain resulting from usage of pharmacological methods only (16). The overwhelming benefits in the use of non-pharmacological methods reflects safety even though, they are usually overlooked and less utilized (17). Several barriers has been identified, such as knowledge and experience of the nurses, inadequate time, heavy workload, shortage of nurses, lack of patients’ participation (uncooperativeness), lack of administrative support and resources (16, 18-20).

In the post-operative surgical wards of the selected hospitals in Asmara, the use of pharmacological methods is the primary approach of pain management however still, postoperative pain remains as a challenge with high level of patient's dissatisfaction (21, 22) Therefore, the aim of the study was to assess the utilization of the non-pharmacological methods and the perceived barriers which limit their utilization in the selected sites.

Methods
Study Design and study setting

This was a descriptive cross-sectional study design conducted in the period between February 2018 and March 2018. A quantitative approach was used to assess the utilization of the non-pharmacological methods and perceived barriers among the nurses. The study was carried out in Halibet National Referral Hospital (HNRH), Orotta National Referral Hospital (ONRH) and Sembel Private Hospital (SPH) in Asmara, Eritrea.

Study Participants

The overall number of nurses in the postoperative surgical wards and recovery units at the above mentioned hospitals was 159 of whom 154 nurses met the inclusion criteria. Nurses of all age group, gender, various level of education, currently working in post-operative and recovery units of the three selected hospitals were included in the study.

Data collection tools and method

The questionnaire was initially developed by Polkki et al., (2001), to assess the utilization of non-pharmacological methods (23). After obtaining permission from the original author, the questionnaire was modified to fit the setting of the study area and study population. The questionnaire had three sections, the first section comprised the key elements of socio-demographic and work experience data which included age, gender, educational status, place of work and prior hospitalization with a close relative. The Eritrean curriculum categorizes nurses education into three levels; ‘associate nurse’, ‘diploma nurse’ and ‘degree nurse’. The second section of the questionnaire assessed nurses’ utilization of non-pharmacological in pain treatment. The non-pharmacological methods were divided into; cognitive-behavioral methods (including preparatory information, imagery, distraction, relaxation, breathing technique and positive reinforcement), physical methods (including thermal regulation, massage and positioning), emotional support (including presence, comforting/reassurance and therapeutic touch), helping in daily activities and creating a comfortable environment. The third section assessed the perceived barriers that hinder nurse's implementation on the non-pharmacological methods. A researcher administered structured questionnaire was used for data collection. All researchers involved in this study undertook two days of training on how to administer the questionnaire during data collection.

Data collection procedure

Permission for conducting the research was initially obtained from the ethical committee of Asmara College of Health Sciences, Ministry of Health at the department of research and human resource development. Further permission was obtained from the study sites in this case, the hospitals after an organized meeting with the hospital heads prior to carrying out the study. Verbal and written informed consent was obtained from the participants before administering the questionnaire. Data was collected in the morning and evening shifts whereby convenient time for the participants (nurses) was during half an hour of break from their duty schedule. To avoid errors in the data collection, researchers at certain occasions translated the questions to the local language. Each of the questionnaire was promptly checked.
for a range of valid values and completion of all items without any skip, before leaving from each data collection site.

**Variable measurement**

The five components on nurse’s utilization of non-pharmacological methods are ‘cognitive behavior’, ‘physical methods’, ‘emotional support’, ‘helping with daily activities’ and “creating a comfortable environment’ which also happened to be important variables in this study. Questions in this section were standardized in five point Likert scale: ‘not at all’, ‘very seldom’, ‘sometimes’, ‘nearly always’ and ‘always’. The section that measured the perceived barriers that hinder nurse’s implementation on the non-pharmacological methods was standardized to five point Likert response: ‘strongly agree’, ‘agree’, ‘neither agree nor disagree’, ‘disagree’ and ‘strongly disagree’.

**Validity and Reliability**

The validity and internal consistency in the previous findings suggest that the overall questionnaire had adequate validity and reliability(16, 18). An expert panel consisting of an anesthetists, a professor in critical care nursing and a senior surgical nurse was organized to evaluate the validity of the questionnaire. The reliability analysis in this study also indicated that the scales had good internal consistency. The cronbach’s alpha for preparatory information (24 items), non-pharmacological methods (13 items) were 0.89, 0.87 respectively.

Factor structure was observed using exploratory factor analysis for features that hinder nurses from performing non-pharmacological methods. Three factors were identified using principal component analysis with varimax rotation. The KMO statistic was 0.69 and significant (p<0.001) Bartlett’s sphericity was found. The cronbach’s alpha for perceived barriers was 0.75.

**Data analysis**

Data was cleaned, coded and entered into SPSS (version 22) for analysis. Internal consistency of the items were checked using Cronbach α before conducting the main analysis. Frequency, percentage and median (IQR) were used, as appropriate, for descriptive analysis. To simplify presentation, the items of non-pharmacological methods collected in five-point Likert scale were condensed to three, by merging the adjacent responses (Nearly always/always, sometimes, not at all/seldom). Comparison across the different categories of the nurses’ demographic characteristics and work experiences regarding their utilization of the non-pharmacological methods were performed using independent samples t-test and one way ANOVA (accompanied with LSD post hoc analysis for the significant variables). Variables that were significant at bivariate level were selected for further analyses at multivariable level using factorial ANOVA. P-values less than 0.05 were considered as significant in all the analyses.

**Results**

**Nurses Socio-demographic Characteristics**
The majority of the study participants were females whose number was 74%. The age of the participants ranged between 20 and 70 years with a median age of 27 years. A good proportion of the nurses (53.2%) were certificate holders with one year training. Among the nurses 38.3% had 3 to 5 years of experience of which 48.1% of them had 2 years of surgical care experience. About 57.1% of the participants were from Orotta hospital. The rest of the demographic and clinical details of the participants are shown in table 1.

### Table 1: Socio-demographic characteristics of Nurses (N=154)

| Characteristics                  | Frequency(n) | Percent (%) |
|----------------------------------|--------------|-------------|
| **Gender**                       |              |             |
| Male                             | 40           | 26.0        |
| Female                           | 114          | 74.0        |
| **Age, years** (Md=27, IQR=6, Min.=20 and Max.=70) | |             |
| 20 to 36                         | 126          | 81.8        |
| 37 to 53                         | 22           | 14.3        |
| 54 to 70                         | 6            | 3.9         |
| **Experience in Health care (years)** (Md=5, IQR=5, Min.=1 and Max.=45) | |             |
| 0 to 2                           | 30           | 19.5        |
| 3 to 5                           | 59           | 38.3        |
| 6 to 10                          | 37           | 24.0        |
| ≥11                              | 28           | 18.2        |
| **Experience in surgical (years)** (Md=3, IQR=4, Min=1 and Max=26) | |             |
| 0 to 2                           | 74           | 48.1        |
| 3 to 5                           | 51           | 33.1        |
| 6 to 10                          | 20           | 13.0        |
| ≥11                              | 9            | 5.8         |
| **Educational status**           |              |             |
| Associate Nurse                  | 82           | 53.2        |
| Diploma Nurse                    | 67           | 43.5        |
| Degree Nurse                     | 5            | 3.3         |
| **Hospital**                     |              |             |
| HNRH                             | 36           | 23.4        |
| ONRH                             | 88           | 57.1        |
| SPH                              | 30           | 19.5        |
| **Multi professional cooperation** |            |             |
| Good                             | 127          | 82.5        |
| Moderate                         | 25           | 16.2        |
| Poor                             | 2            | 1.3         |
| **Hospitalized Close relative**  |              |             |
| Yes                              | 34           | 22.1        |
| No                               | 120          | 77.9        |

Md: Median, IQR: Interquartile range, Min.: Minimum, Max.: Maximum, HNRH: Halibet National Referral Hospital, ONRH: Orotta National Referral Hospital, SPH: Sembel Private Hospital.

Nurses utilization on Non-Pharmacological methods for Post-Operative pain relief

Cognitive-Behavioral Methods
The summary on the utilization of non-pharmacological methods is illustrated in Table 2. The cognitive behavioral methods, breathing (81.7%), and relaxation (72.1%) techniques were mostly reported to be utilized as ‘nearly always/always’ where as positive reinforcement (79.3%), distraction (77.5%), and imagery (70.1%) methods were utilized as ‘not at all/seldom’.

Among the physical methods, alleviating pain by positioning the patient was responded by most (84.4%) of the nurses utilized as ‘nearly always/always’ whereas thermal regulation was the least used. In emotional support, comfort and reassurance were used more often at (92.2%).

Table 2: Nurses’ utilization of non-pharmacological methods

| Non pharmacological Methods             | Not at all/ Seldom (%) | Sometimes (%) | Nearly always/ Always (%) |
|-----------------------------------------|------------------------|---------------|---------------------------|
| **Cognitive-behavioural methods**       |                        |               |                           |
| Positive re-inforcement                 | 79.3                   | 20.7          | 0                         |
| Breathing Technique                     | 3.9                    | 14.4          | 81.7                      |
| Relaxation                              | 3.2                    | 24.7          | 72.1                      |
| Distraction                             | 77.5                   | 18.6          | 3.9                       |
| Imagery                                 | 70.1                   | 20.2          | 9.7                       |
| Preparatory Information*                | 12.3                   | 65            | 22.7                      |
| **Physical methods**                    |                        |               |                           |
| Heat Thermal Regulation                 | 76                     | 12.3          | 11.7                      |
| Cold Thermal Regulation                 | 72.7                   | 17.5          | 9.7                       |
| Massage                                 | 50                     | 31.2          | 18.8                      |
| Positioning                             | 6.5                    | 9.1           | 84.4                      |
| **Emotional**                           |                        |               |                           |
| Presence                                | 17.5                   | 37            | 45.5                      |
| comforting and reassurance              | 0.6                    | 7.1           | 92.2                      |
| **Helping with daily activities**       | 7.8                    | 24.7          | 67.5                      |
| **Creating a comfortable environment**  | 15.5                   | 39            | 45.5                      |

*: Preparatory information inclusive of cognitive, sensory and ways of giving information.

Concerning cognitive information preparation for procedure and pain medication after the procedure were the most commonly addressed items as ‘nearly always/always’ by (95.2%) and (89.8%) of the nurses respectively. Informing patients on the length of the procedure was at 54.4% whereas, the type of anesthesia was at 78.9% as being utilized ‘not at all/ seldom’. On ways of giving information regarding sensation majority of the nurses (85.7%) responded as ‘nearly always/always’.

Table 3: Item wise response of nurses on preparatory information as a method of pain management (N=154)
Preparatory Information

| Preparatory Information | Not at all/ Seldom (%) | Sometimes (%) | Nearly always/ Always (%) |
|-------------------------|------------------------|---------------|---------------------------|

(1) Cognitive and Sensory Information

Cognitive Information

| Types of procedure | 12.2 | 10.2 | 77.6 |
| Place of procedure | 14.3 | 6.1  | 79.6 |
| Person who carries out procedure | 35.4 | 8.8  | 55.8 |
| Purpose of procedure | 23.8 | 20.4 | 55.8 |
| Duration of the procedure | 54.4 | 27.9 | 17.7 |
| Preparation of procedure | 3.4  | 1.4  | 95.2 |
| Type of anesthesia | 78.9 | 10.9 | 10.2 |
| Postoperative placement | 29.3 | 15.6 | 55.1 |
| Postoperative monitoring’s | 21.8 | 12.9 | 65.3 |
| Patients limitation | 7.1  | 5.2  | 83.1 |
| Pain medication after procedure | 6.5  | 3.2  | 85.7 |

Sensory Information

| Preoperational sensations (eg. Fear, anxiety) | 48.7 | 22.1 | 29.2 |
| Sensation during the procedure | 77.3 | 13.6 | 9.1  |
| Post operational sensation | 26   | 11.7 | 62.3 |

(2) Ways of giving information

| Encouraging the patient to ask about misconception | 10.4 | 27.3 | 62.3 |
| Talking openly about sensation | 4.5  | 9.7  | 85.7 |
| Giving information honestly and openly | 5.2  | 4.5  | 90.3 |
| Making sure that the information has been understood | 11.7 | 35.1 | 53.2 |

Significant differences (Table 4) in utilization of non-pharmacological methods were found across the categories of age groups ($p=0.013$), educational level ($p=0.012$), hospital ($p=0.009$), experience in health care ($p=0.001$), and prior experience of hospitalization of a close relative ($p=0.008$).

Table 4: Comparison on utilization of non-pharmacological methods across categories of background characteristics of nurses (N=154)
LSD post hoc analysis (Additional File 1) revealed that nurses older than 40 years had significantly higher utilization compared to 20-24 years ($p=0.005$), and 25-29 years ($p=0.002$). On the other hand, nurses at associate level had significantly less utilization compared to those at diploma ($p=0.010$) and degree ($p=0.020$) level.

On multivariable analysis (Table 5), ‘hospital’ was the only determinant in utilization of non-pharmacological methods ($p<0.001$).

### Table 5: Factorial analysis of overall non-pharmacological methods (N=154)

| Variables                        | p-value | Partial Eta Squared | Observed Power |
|----------------------------------|---------|---------------------|----------------|
| Educational level                | 0.414   | 0.012               | 0.201          |
| Hospital                         | <0.001  | 0.246               | 1.000          |
| Age                              | 0.618   | 0.012               | 0.172          |
| Experience in Health care, years | 0.236   | 0.029               | 0.373          |

![Table 5](https://via.placeholder.com/150)
Perceived Barriers for the utilization of non-pharmacological methods for postoperative pain management

Besides among the wide range of related perceived barriers in the utilization of non-pharmacological methods, lack of pain management policy stood out least (77.3%) among the nurses as health care system-related barrier, while lack of knowledge (50.0%) was highly rated as important nurse related barriers. A considerable number of the nurses (64.9%) indicated that the language difference was relevant as patient related barrier.

Table 6: Perceived barriers for the utilization on non-pharmacological methods (N=154)

| Barriers                                      | Agree n | Neutral n | Disagree n |
|-----------------------------------------------|---------|-----------|------------|
| **Healthcare System-Related Barriers**        |         |           |            |
| Heavy work load                              | 135 (87.7) | 6 (3.9)  | 13 (8.4)   |
| Lack of time                                 | 130 (84.4) | 5 (3.2)  | 19 (12.3)  |
| Lack of administrative support               | 118 (76.6) | 3 (1.9)  | 33 (21.4)  |
| Lack of resources (e.g. equipment’s, materials) | 127 (82.5) | 5 (3.2)  | 22 (14.3)  |
| Lack of pain management policy               | 119 (77.3) | 1 (0.6)  | 34 (22.1)  |
| **Nurses-Related Barriers**                  |         |           |            |
| Personal interest                            | 26 (16.9) | 8 (5.2)  | 119 (77.3) |
| Lack of knowledge regarding non-pharmacological pain relief methods | 77 (50) | 4 (2.6)  | 73 (47.4)  |
| Lack of experience in using non-pharmacological methods | 62 (40.3) | 5 (3.2)  | 87 (56.5)  |
| Personal, traditional and cultural values on pain and pain relief methods | 45 (29.4) | 9 (5.9)  | 99 (64.7)  |
| Belief that other health team members should take main role | 20 (13) | 7 (4.5)  | 127 (82.5) |
| Belief nurses primary task is to administer pain medication for pain relief | 43 (27.9) | 3 (1.9)  | 108 (70.1) |
| Belief ineffectivity of non-pharmacological methods in pain relief | 49 (31.8) | 11 (7.1) | 94 (61) |
| **Patient-Related Barriers**                 |         |           |            |
| Patients inability to cooperate              | 88 (57.1) | 20 (13)  | 46 (29.9)  |
| Language difference                          | 100 (64.9) | 18 (11.7) | 36 (23.4)  |

Discussion

This study discusses the utilization of the non-pharmacological methods for alleviating postoperative pain and existing barriers. The study was conducted using a standard questionnaire which was applied in different settings, making it useful for comparisons. Since the study was conducted in the major hospitals, it gave an informative picture of the degree of utilization of these methods.
Utilization of Non-pharmacological methods for postoperative pain management

This study found out that non-pharmacological pain relieving methods are less utilized by the nurses. A recent study conducted among Eritrean nurses indicated a gap in the knowledge and attitude in pain management. Further to that, knowledge gap resulted from lack of adequate training in the nursing curriculums (21). A study conducted in the same setting reported the negligence in pain management (22). Moreover, the common complains in the National hospitals has been less number of nurses which could hinder the utilization of the methods.

Among the cognitive behavioral methods, breathing and relaxation were often used frequently, while the rest of the methods were less utilized. In support of this, a study done by Faigeles et al, (2013), stated that the most frequently used non-pharmacological interventions during acute pain were calming voice, providing information, and deep breathing. It had been rationalized that those methods are easy to implement and do not require equipment or specific training, which makes them to be utilized more frequently (24). A study done in Westminster, England on non-pharmacologic pain management for postoperative coronary artery bypass in graft surgical patients, reported that deep breathing followed by distraction were commonly used as pain relieving methods. The majority of the patients stated it helped them to minimize both the perception and sensation of pain in contrast to pharmacological methods alone (25).

The preparatory information involved items done at the preoperative period and in this current study, the items were found to be less utilized. This was similar to a study previously conducted in Singapore (18), in which items; sensory information, paying enough attention to the ways of giving information, and the use of materials to help with informing were found to be less frequently utilized. In both studies those findings could be attributed to the fact that preparatory information is provided mainly by surgeons and/or anesthetists.

Alleviating pain by positioning of patients was the most frequently used physical method due to its routine application, acceptability, less time-consuming and easy to administer compared to the other methods. Massage application and thermal regulation with heat and cold application were rarely used. An explanation to this was due to lack of heating and cooling devices, lack of training and cultural influences.

Similar studies done in Finland, China and Singapore reported that positioning was the most commonly used physical method during postoperative pain, whereas, thermal regulation and massage were the least used (16, 18, 23). Furthermore, Kooten (1999) stated that positioning was frequently used, whereas cold packs were rarely used. Another study conducted in Finland on postoperative pain management after hip surgery, stated that positioning was the most commonly used non-pharmacological method (26). A study done by Gelinas and his colleagues, nurses were found to practice simple massaging as a pain relieve method on critically ill patients (27).

In this study on emotional support, nurses presence was at (45.5%) which was less frequently utilized compared to the Finland (77%) and Singapore (49%) nurses on relieving postoperative pain (18, 23). This discrepancy could be explained by the less time surgical nurses spend with patients or nurses lack of
understanding on the actual meaning of presence. The results of Bonnie Faigeles (2013), was incongruent with this study, stating that nurses provided pain relief by frequently holding hands and gentle touch during acute pain. This study found out that the nurses always helped patients during their daily activities and created a comfortable environment. This findings concurred with a study done by He et al., (2010) which reported similar findings.

Overall, nurses’ age, educational status and experience in healthcare had a significant difference in the utilization of non-pharmacological methods. In which the utilization of non-pharmacological methods is proportionate to the increase in age, experience and educational level of the nurses. These findings were similar to a study carried out in Finland, China and Singapore which found out nurses age, educational status, work of experience had effects on the use of some non-pharmacological methods(16, 18, 23).

Statistical differences prevailed across the provision of preparatory information, the nurses’ educational level, place of work, experience in health care, availability of pain assessment tools, and prior experience of hospitalization. This study findings was congruent to the research study done by Pölkki in 2001 where by ‘the nurses’ age, education and nursing experience showed statistically significant associations with the preparatory information. There was statistical significance among the study sites in which variation on the use of the non-pharmacological methods was disproportionately distributed. The uneven distribution resulted from the type of services, their specialties, affordability of the services, the catchment population served, accessibility and previous experience.

**Perceived barriers that hinder the utilization of non-pharmacological methods**

A number of barriers on the utilization of the non-pharmacological methods has been perceived by the nurses and the barriers were related to health care system, care provision and patients indicating a statistical significance of (p<0.001).

In this study health related barriers heavy workload, less time and limited equipment’s were the most commonly perceived barriers. This study was consistent with the study done by Elcigil in 2011, reported that heavy work load and less time were perceived barriers (28). A study done by Batiha in 2014 identified policies of the hospital, lack of proper pain assessment tool, less number of nurses, interruptions of activities relating to pain and lack of alternative non-pharmacologic therapy were healthcare related barriers(29). A similar study done in Poland, found out that limitations such as lack of standard operating procedures and guidelines by the administration interfered with pain management (17). Moreover, a study done in China found out that the most common limiting factors were less nurse to patient ratios and heavy workload leading to less attention on post-surgical pain which was consistent with the findings of this study(16).

On nurse related barriers, lack of knowledge and experience on non-pharmacological methods were stated as existing barriers. This was associated with less experience and specialization on non-pharmacological methods and poor positive opinion on the efficiency of non-pharmacological methods. This study finding agreed with the results of Batiha in 2014 in which time limitations, less communication and inadequate staff knowledge were pointed out.
In addition to this, a study done in South Korea indicated that time constraints and insufficient knowledge were the most encountered barriers(30). Furthermore, a study done in Iran identified limited nurse-patient interaction, lack of pain management interventions and inadequate time to deliver non-pharmacological pain relief measures as barriers(31). In this study it is postulated that positive attribute to the pharmacological methods hinders the effective use of the non-pharmacological methods. On patient related barriers lack of cooperation and the limitation in language were found out to affect negatively the use of non-pharmacological methods in pain management.

**Study limitations**

The use of questionnaires in data collection for this study might have created limitation on the side of respondents since only selected non-pharmacological methods were captured. This study took into account non-pharmacological methods as practiced at major referral facilities hence, the picture could be different if the study was all inclusive of other lower level facilities. The study did not focus on the benefits attributed to the combination of non-pharmacological methods and pharmacological methods.

**Conclusion**

This study concludes that the nurse's use of the non-pharmacological methods on postoperative patients in the studied hospitals varied greatly due to experience and knowledge. The study recommends exposure and training for all health care providers at all level in order to appreciate the benefits of non-pharmacological methods applicable to postoperative pain management among patients. This could be achieved through on job training, seminars, scientific conferences and other brainstorming forums.

**List Of Abbreviations**

ANOVA: Analysis of Variance; ENT: Ear Nose and Throat; IQR: Interquartile Range; KMO: Kaiser-Meyer-Olkin; LSD: Least Significant Difference; NSAID: Non-steroidal Anti-inflammatory Drugs

**Declarations**

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**Authors’ contributions**

BYK: Study conception and design of study, acquisition of data, analysis and interpretation of data, drafting and submission of manuscript; TE: participated in designing and coordination of the study; LLB: participated in designing and coordination of the study; EHT: design of study, analysis and interpretation of the data, drafting and critical commenting of manuscript; YMA: participated in designing and coordination of the study, drafting and revising the manuscript critically for important intellectual content. All authors have read and approved the manuscript.
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Availability of data and materials

The complete dataset supporting the conclusions of this article is available from the corresponding author and can be accessed upon a reasonable request.

Ethics approval and consent to participate

Ethical clearance and approval were obtained from the ethical review committee of the Asmara College of Health Sciences as well as from the Health Research Proposal Review and an Ethical Committee of the Ministry of Health. Permission to conduct the research was also secured from the hospital administrations of all the hospitals. After explaining the purpose of the study and assurance of confidentiality and anonymity, informed written consent was obtained from each participant and the interview was then conducted. Any specific participant’s identifier was not included in the data collection tool and this was assured by using code numbers in order to promote confidentiality and anonymity.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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