

Practice of Nonpharmacological Pain Control Strategies Among Nurses Working in Public Hospitals of West Arsi Zone, Ethiopia

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Abstract

Background: Nonpharmacological pain control strategies combine numerous strategies that contain nondrug measures for pain remedies for sufferers.

Objective: To assess the practice of nonpharmacological pain control strategies among nurses working in public hospitals of West Arsi zone, Ethiopia, 2022.

Methods: An institutional-based cross-sectional study design was employed from April 15 to May 30, 2022. The total sample size was 422 and a simple random sampling technique was used. Data were entered using Epi-information 4.6 version and analyzed using SPSS version 25. Multicollinearity was checked by considering the variance inflation factor and tolerance. The goodness of fit test was done using the Hosmer-Lemeshow goodness of fit check. Binary logistic regression analysis was done and variables with a p-value of <0.25 within the bivariable analysis were taken into the multivariable analysis. Statistical significance was declared at a p-value of <0.05 with an adjusted odds ratio (AOR) and 95% confidence interval (CI).

Result: The practice of nonpharmacological pain control strategies was 53.8% (95% CI: 48.9–58.7). Age of 30–39 years old (AOR: 2.28, 95% CI: 1.34–3.86), educational status bachelor's degree (AOR: 2.25, 95% CI: 1.47–4.45), marital status married (AOR: 0.46, 95% CI: 0.28–0.73), and having training (AOR: 1.98, 95% CI: 1.23–3.17) were found to be significantly associated with practice of nonpharmacological pain control strategies.

Conclusion: About five in 10 nurses working in West Arsi zone public hospitals had good practice of nonpharmacological pain control strategies. Age, educational status, marital status, and training were found to be significantly associated with practice. Therefore, improving the educational status of nurses through various opportunities such as continued professional development and regular updating, and training nurses about methods may increase the nurses' practice toward nonpharmacological pain control strategies.

Keywords

practice, nonpharmacological pain control strategies, nurses, public hospitals, West Arsi zone

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Introduction

Pain is an unpleasant sensory emotional experience and it causes potential damage (Kahsay, 2019; Raja et al., 2020). The clinical manifestation of pain is a highly subjective and deeply personal experience (Osama, 2018; Kahsay, 2019). Pain management is an important aspect of patient care and nurses play a crucial role in providing pain assessment and treatment (Huang et al., 2013; Kahsay, 2019; Raja et al., 2020). Effect pain management improves

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outcomes and increases patient satisfaction (Zeb et al., 2018). On the other hand, ineffective pain management leads to a marked decrease in desirable clinical and psychological outcomes and patients' overall quality of life (Cornett et al., 2018; Kahsay, 2019).

Nonpharmacological pain control strategies (NPPCS) are a combination of different approaches that involve nondrug measures to relieve pain such as exercise, deep breathing, positioning, ambulating, and music therapy (Ali, 2015; Ung et al., 2016). It reduces potential risks like drug dependency, respiratory depression, vital organ damage, and high costs of drugs (Christian & Centre 2014; Karabulut, 2016). The good practice of nurses is to take corrective action in pain control and improve outcomes (Ou et al., 2020).

Globally, millions of people suffer from pain in hospitals, in their homes, or in assisted living facilities. About 20% of adults are estimated to suffer from pain worldwide and 10% are diagnosed with chronic pain each year (Goldberg & McGee, 2011). In Africa, the prevalence of pain is 87.5% in palliative care and it has a devastating effect on the socio-economic system (Huang et al., 2013).

Literature Review

Literature indicates that 90% of hospitals have no documented evidence of NPPCS use. The nonpharmacological control of pain and its documentation evidence in Ethiopian university hospitals are inadequate (Woldehaimanot et al., 2014) even though both academic and clinical nurses caring in these hospitals. Thus, the problem is related to the nurses' practice of NPPCS in the health facility setting. Therefore, this study assessed the practice of NPPCS among nurses working in public hospitals of the West Arsi zone.

Methods and Materials

Study Area and Period

The study was done in public hospitals of the West Arsi zone, Oromia region, Ethiopia. There are seven public hospitals in the zone. These are Shashamene Specialized Hospital, Melka Oda General Hospital, Dodola General Hospital, Loke General Hospital, Gambo General Hospital, Arsi Negele primary Hospital, and Kokosa primary Hospital. The zone was located in the Eastern part of the Oromia region at 235 km from Addis Ababa, the capital of Ethiopia. The study was conducted from April 15 to May 30, 2022.

Study design: An institutional-based cross-sectional study design was employed.

Source population: All nurses working in public hospitals in the West Arsi zone.

Study population: All selected nurses working in public hospitals in the West Arsi zone.

Eligibility Criteria

Nurses working at public hospitals in the West Arsi zone during the study period were included. However, nurses on maternity and annual leave, nurses working for <6 months, and those critically ill during the data collection period were excluded.

Sample Size Determination

The sample size was determined using a single population formula. The assumptions of a 95% confidence interval, 5% margin of error, and a proportion of 51.2% are as follows:

$$\frac{(z_{\alpha/2})^2 p(1-p)}{d^2} = \frac{(1.96)^2 0.512(0.488)}{(0.05)^2} = 384$$

By considering a 10% nonresponse rate, the sample size was 422.

Sampling Procedure

All seven hospitals in the West Arsi zone were included in the study. Then, the total number of nurses in each hospital were determined, 103 nurses in Shashamene Specialized Hospital, 104 nurses in Melka Oda General Hospital, 68 nurses in Dodola General Hospital, 55 nurses in Gambo General Rural Hospital, 60 nurses in Loke general hospital, 43 nurses in Arsi Nagele primary hospital, and 38 nurses working in Kokosa Primary Hospital. The total number of nurses working in all hospitals was 471. Secondly, the proportional allocation was used to determine the required number of nurses from each hospital. Finally, a simple random sampling technique was used to select nurses by taking the registration from the human resource management of the respective hospitals as a sampling frame (Figure 1).

Study Variables

Dependent variable: Practice of NPPCS.

Independent Variables

Sociodemographic factors: Age, sex, marital status, educational status, work experience, and income.

Health system-related factors: Pain management policy of the organization, workload, equipment supply, lack of administrative support, and pain management policy.

Nurses-related factors: Knowledge, training, and lack of experience.

Patient-related factors: Willingness, the patient's need for the drug, and patient awareness.

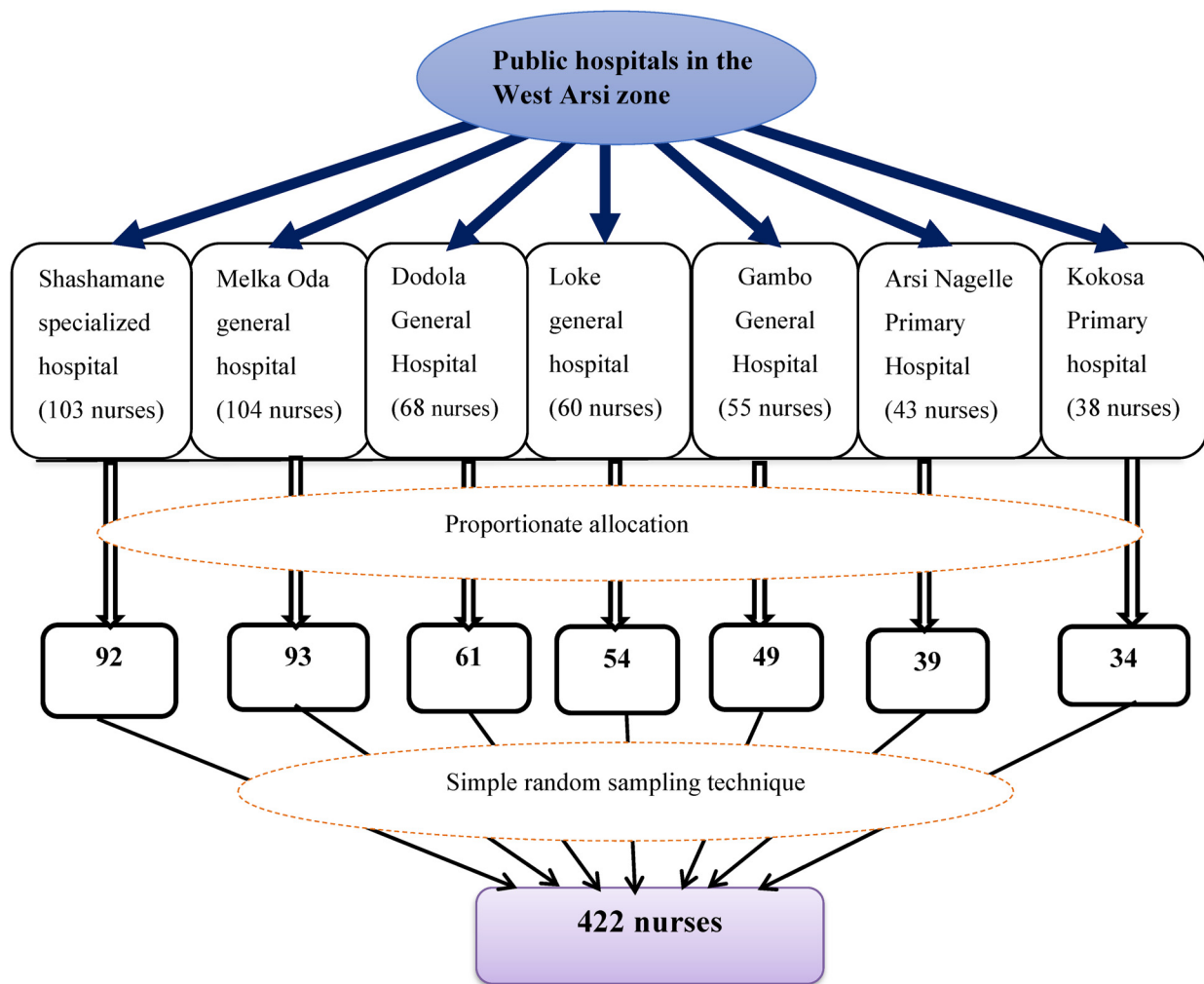


Figure 1. Ischemic presentation of sampling procedure of selecting nurses working in public hospitals of West Arsi zone, Ethiopia, 2022.

Operational Definition

NPPCS: A pain control strategy that helps to decrease pain without the use of medication (Ali et al., 2013).

Knowledge: A nurse's understanding of NPPCS methods gained through experience or study. It was measured by using 12 items that asked about the knowledge of nurses about NPPCS. Each item was rated as 0 (zero) for "no" and 1 for "yes." Then, categorized as *good knowledge* (if scored mean and above) or *poor knowledge* (if scored below the mean) (Ali et al., 2013; Kheshti et al., 2016).

Practice: Nurses' activities or behavioral experience concerning nonpharmacological pain control. It was measured by using 10 items that asked the practice of nurses about NPPCS. Each item was rated as "1 for not at all, 2 for very seldom, 3 for sometimes, 4 for nearly always, and 5 for always." Then, categorized as *good practice* (if scored mean and above) or *poor practice* (if scored below the mean) (Ali et al., 2013; Kheshti et al., 2016).

Data Collection Tool and Procedure

The data was collected using structured, pretested, and self-administered questions. The tool was adapted by reviewing related kinds of literature (Ali et al., 2013; Kheshti et al., 2016; Kidanemariam et al., 2020). Seven bachelor's degree pharmacy technicians and four master's degree holder public health officers were recruited for data collection and supervision, respectively. The data collection was carried out by self-administering the questionnaire for the selected nurses in their work settings.

Data Quality Assurance

The tool was prepared in English version. A 2-day training was given for data collectors and supervisors. A pretest was conducted on 5% (21 nurses) of sample size at Bokoji General Hospital a week before the start of the study. Based on the pretest result, the necessary modification was

made. The Cronbach's Alpha reliability test was done and it was 0.782. Continued follow up and supervision were done by supervisors and researchers throughout the data collection period. All filled questionnaires were reviewed for completeness and cleared before data entry.

Statistical Analysis

Data were entered using the Epi-data version 4.6 and analyzed using SPSS version 25. Multicollinearity was checked by considering the variance inflation factor (VIF > 10) and tolerance < 0.05. The goodness of health take a look at was done using of the Hosmer-Lemeshow goodness of fit test. Binary logistic regression analysis was done, and variables with a p-value < 0.25 in the bivariable analysis were taken into the multivariable analysis. Statistical significance was declared at a p-value < 0.05 with an adjusted odds ratio (AOR) and 95% confidence interval (CI).

Result

Sociodemographic Characteristics of Nurses

Four hundred eighteen nurses gave responses that made the overall response rate 99%. More than half, 245 (58.6%) have been male and 247 (59.1%) have been inside the age group of 20–29 years. Of the nurses, 230 (55.0%) had been married and 325 (77.8%) were bachelor diploma holders.

Table 1. Sociodemographic Characteristics of Nurses Working in Public Hospitals of West Arsi Zone, Ethiopia, 2022.

Variables (n = 418)	Category	Frequency	Percent
Sex of nurses	Male	230	55.0
	Female	184	44
Age of nurses	20–29 years old	247	59.1
	30–39 years old	161	38.5
	≥ 40 years old	10	2.4
Marital status of nurses	Married	230	55.0
	Single	184	44
	Divorced	4	1
Educational status of nurses	Diploma	82	19.6
	Bachelor degree	325	77.8
	Master's degree	11	2.6
Work experience of nurses	≤ 1 year	99	23.7
	3–5 year	162	38.8
	6–10 year	143	34.2
	≥ 11 year	14	3.3
Monthly income of nurses	≤ 3170 Ethiopian birr	6	1.4
	3171–3999 Ethiopian birr	115	27.5
	≥ 4000 Ethiopian birr	297	71.1

The work revealed that 162 (38.8%) nurses were 35 years and the month-to-month income of 297 (71.1%) nurses was ≥ 4000 Ethiopian birr (Table 1).

Healthcare System-Related Factors

Out of 418 respondents, 244 (58.4%) mentioned that a heavy workload is a barrier to NPPCS. However, 40 (9.6%) stated loss of administrative support was a barrier to NPPCS. Less than half, 98 (23.4%) suggested a lack of resources, and 135 (32.3%) suggested a loss of pain control coverage as a barrier to NPPCS (Table 2).

Nurses-Related Factors

Of 418 nurses, 136 (32.5%) suggested a loss of experience in using NPPCS, and 81 (17.4%) pronounced that the belief of nurses' number one venture is to administer pain medicinal drugs. Less than half, 29 (30.9%) nurses said a history of training is a barrier for NPPCS (Table 3).

Patient-Related Factors

Much less than half, 156 (37.3%) suggested that loss of affected person cognizance. But, 262 (62.7%) reported affected person focus. Similarly, 185 (44.3%) stated patient unwillingness. On the other hand, 233 (55.7%) mentioned willingness. Regarding patients' robust ideals in capsules, 204 (48.8%) suggested patients' sturdy beliefs in drugs as limitations to NPPCS. However, 214 (51.2%) patients do not believe as a barrier.

Knowledge of Nurses Toward NPPCS

Of the 418 nurses, 66.7% had good knowledge and 33.3% had poor knowledge of NPPCS (Figure 2).

Practice of NPPCS Among Nurses

Of the full 418 nurses, 53.8% had good practice, but 46.2% had poor practices of NPPCS (Figure 3).

Table 2. Healthcare System-Related Factors of NPPCS of Nurses Working in Public Hospitals of West Arsi Zone, Ethiopia, 2022.

Variables (n = 418)	Category	Frequency	Percent
Heavy workload	Yes	244	58.4
	No	174	41.6
Lack of administrative support	Yes	40	9.6
	No	378	90.4
Lack of resources (e.g., equipment, materials)	Yes	98	23.4
	No	320	76.6
Pain management policy	Yes	135	32.3
	No	283	67.7

NPPCS=nonpharmacological pain control strategies.

Factors Associated With the Practice of NPPCS

In bivariable logistic regression, age, educational popularity, work revel, lack of pain control coverage, and training were related to the exercise of NPPCS strategies. While, in multi-variable analysis, age of 30–39 years (AOR: 2.28, 95% CI:

Table 3. Nurses-Related Factors for the Practice of NPPCS Among Nurses Running in Public Hospitals of West Arsi Zone, Ethiopia, 2022.

Variables (n = 418)	Category	Frequency	Percent
Lack of experience in using	Yes	136	32.5
	No	282	67.5
A belief that nurses` primary task is to administer pain medication	Yes	81	19.4
	No	337	80.6
History of train on NPPCS methods	Yes	129	30.9
	No	289	69.1

NPPCS=nonpharmacological pain control strategies.



Figure 2. Nurses' knowledge of NPPCS among nurses working in public hospitals of West Arsi zone, Ethiopia, 2022. NPPCS=nonpharmacological pain control strategies.

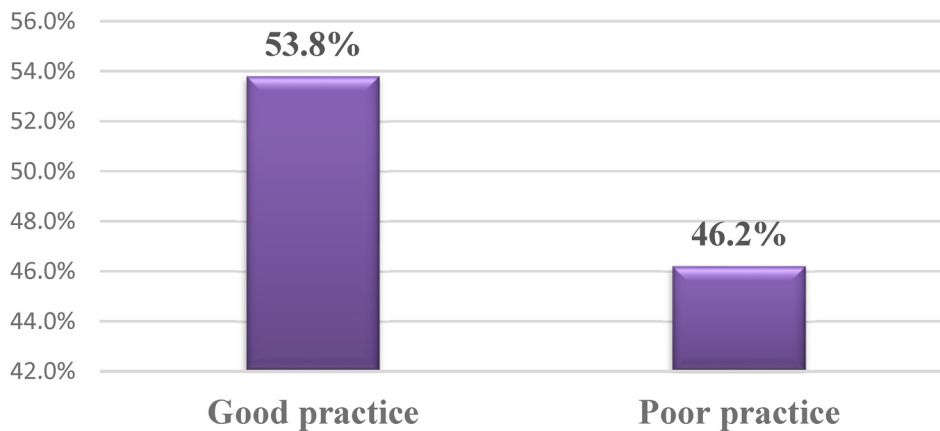


Figure 3. Practice of NPPCS among nurses working in public hospitals of West Arsi zone, Ethiopia, 2022. NPPCS=nonpharmacological pain control strategies.

1.34–3.86), educational status bachelor's degree (AOR: 2.25, 95% CI: 1.47–4.45), marital status married (AOR: 0.46, 95% CI: 0.28–0.73), and having training (AOR: 1.98, 95% CI: 1.23–3.17) have been discovered to be drastically related to practice of NPPCS (Table 4).

Discussion

The level of exercise toward NPPCS becomes 53.8% (95% CI: 48.9–58.7). It was higher than a study executed in Egypt at 32.7% (Mohamed et al., 2021), and Debre Tabor Comprehensives specialized health facility at 26% (Zelege et al., 2021). This difference is probably due to differences in sample size, the sociocultural history of nurses, the international locations' coverage and motivation to enforce NPPCS, and the nurses' openness to practice NPPCS.

This study revealed that age was significantly related to the exercise of NPPCS. Nurses aged 30–39 years have been 2.28 times more likely to have suitable practice as compared to nurses aged 20–29 years old. It was just like another research achieved in Singapore and the United States (Becker et al., 2017), and Eritrea (Kidanemariam et al., 2020) that said the nurses' age had results on the practice of NPPCS. This is probably because as age increases they may be greater eager to exercise those strategies, professionally boost their capacity, interpret threat-gain evaluation, and exercise holistically in their lifetime.

In this look, educational status changed substantially related to the exercise of NPPCS. Bachelor's degree nurses are 2.55 instances more likely to have exact practice as compared to diploma nurses. This was supported using research completed within the United States (Becker et al., 2017), Singapore, Cairo (Badr et al., 2015), and Eretria (Kidanemariam et al., 2020). The possible rationalization might be nurses with higher academic stages had an opportunity to refer to distinct books and get up-to-date data and they modified these to exercise their paintings.

Table 4. Factors associated with nurses practice of nonpharmacological pain control strategies among nurses working in public hospitals of West Arsi zone, Ethiopia, 2022.

Variables (n = 418)	category	Practice of NPPCS		COR (95%CI)	AOR (95%CI)	p-Value
		Good practice	Poor practice			
Age of nurses	20–29 years old	106 (25.4%)	141 (33.7%)			
	30–39 years old	112 (26.8%)	49 (11.7%)	3.04 (1.99–4.63)	2.28 (1.34–3.86)	0.002*
	≥ 40 years old	7 (1.7%)	3 (0.7%)	3.10 (0.78–12.29)	0.96 (0.17–5.37)	0.965
Educational status	Diploma	34 (8.1%)	48 (11.5%)			
	Bachelor degree	183 (43.8%)	142 (34.0%)	1.8 (1.11–2.97)	2.55 (1.47–4.45)	0.001*
	Master's degree	8 (1.9%)	3 (0.7%)	3.7 (0.93–15.23)	2.89 (0.65–12.84)	0.163
Work experience	≤ 2 years	39 (9.3%)	60 (14.4%)			
	3–5 years	85 (20.3%)	77 (18.4%)	1.69 (1.02–2.82)	1.23 (0.69–2.17)	0.480
	6–10 years	90 (21.5%)	53 (12.8%)	2.61 (1.54–4.43)	1.13 (0.57–2.25)	0.725
	≥ 11 years	11 (2.6%)	3 (0.7%)	5.64 (1.48–21.52)	3.83 (0.69–21.04)	0.122
Marital status	Married	148 (35.4%)	82 (19.6%)	0.38 (0.26–0.57)	0.46 (0.28–0.73)	0.001*
	Single	75 (17.9%)	109 (26.1%)	0.55 (0.08–4.01)	0.33 (0.04–2.93)	0.320
	Divorced	2 (0.5%)	2 (0.5%)			
Pain management policy	Yes	66 (15.8%)	69 (16.5%)	0.75 (0.49–1.13)	0.84 (0.54–1.32)	0.453
	No	159 (38.0%)	124 (29.7%)			
History of training	Yes	85 (20.4%)	44 (10.5%)	2.06 (1.34–3.16)*	1.98 (1.23–3.17)	0.005*
	No	140 (33.5%)	149 (35.6%)			

*Significant at a p-value <0.05, “|”: reference group.

AOR=adjusted odds ratio; CI=confidence interval; COR=crude odds ratio; NPPCS=nonpharmacological pain control strategies.

Marital status became considerably related to the exercise of NPPCS. Married nurses were 54% less likely to have practice compared to divorced nurses. This might be related with that married nurse have diverse familial and social obligations that would make them busy and decrease their time for working toward NPPCS.

In this study, the training change into determined to be tremendous in the practice of NPPCS. The nurses who have a history of education in NPPCS have been 1.98 times more likely to have desirable practice in comparison to nurses who did not train. This turned into just like studies carried out in Saudi Arabia (Ali et al., 2013), Turkey (Tercan, 2017), and Debre Tabor complete clinic (Zelege et al., 2021). This may be due to trained nurses with updated records approximately NPPCS that ought to help them exercise the NPPCS of their work.

Limitations of the Study

The observer is probably liable to subjectivity and recall bias.

Implications for Practice

As it's far recognized, pain is an unpleasant sensory enjoyment and its medical manifestation is subjective, the use of a mixture of individualized NPPCS technique procedures relieves it. Almost, the NPPCS minimize capacity dangers like drug dependency, respiratory depression, essential organ harm, and high charges for tablets. On this, the practice

of nurses are crucial and a clue to expand techniques and enforce them in exercise.

Conclusion

About five in 10 nurses working in West Arsi zone public hospitals had good practice of NPPCS. Age, academic reputation, marital reputation, and training were considerably associated with practice. Therefore, enhancing the educational reputation of nurses through various opportunities which include persistent professional improvement and regular updating, and schooling nurses about techniques may boost the nurses' practice of NPPCS.

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Authors' Contribution

All authors have made substantial contributions to the work. Participated in the conception, design, and acquisition, conducted the data analysis and interpretation; took part in drafting, revising, and critically reviewing the article. All authors gave final approval of the version to be published and all authors have agreed on the journal to which the article has been submitted; agreed to be personally accountable for all aspects of the work.

Availability of Data

The data used for this study are available from corresponding authors on secured and reasonable request.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Consideration

Ethical clearance was obtained from Hawassa University College of medicine and health science, institutional review board and a formal letter of cooperation to conduct this research was written to West Arsi zone public hospitals.

Informed consent

Written informed consent was obtained from each participant nurses, and the information obtained from them would not have been disclosed. Coding was used to eliminate names and other personal identification of respondents to ensure anonymity, privacy, and confidentiality. Thoroughly, our research passed required the principles of the declaration of the Helsinki General Assembly, Seoul, Korea, and October 2008.

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References

- Ali, H. S., Ibrahim, Y., & Mohamed, E. (2013). Non-pharmacological pain management: nurses' knowledge, attitudes and practices in selected hospitals at Makkah El-Mukarramah. *Life Science Journal*, 2(10).
- Ali, N. S. (2015). Critical care nurses' application of non-pharmacological pain management approaches at Cairo University Hospitals. *Egyptian Journal of Nursing*, 10(1).
- Badr, M. N., Morsy, W. Y., & Ali, N. S. (2015). Critical care nurses' knowledge and practices regarding pain assessment and management at Cairo University Hospitals. *Egyptian Journal of Nursing*, 10(1).
- Becker, W. C., Dorflinger, L., Edmond, S. N., Islam, L., Heapy, A. A., & Fraenkel, L. (2017). Barriers and facilitators to use of non-pharmacological treatments in chronic pain. *BMC Family Practice*, 18(1), 1–8. <https://doi.org/10.1186/s12875-017-0608-2>
- Christian, K., & Centre, M. (2014). Postoperative pain management outcomes among adults treated at a tertiary hospital in Moshi, Tanzania. 2014; 16(1).
- Cornett, E. M., Budish, R., Latimer, D., Hart, B., Urman, R. D., & Kaye, A. D. (2018). Management of Challenging Pharmacologic Issues in Chronic Pain and Substance Abuse Disorders. 2018.
- Goldberg, D. S., & McGee, S. J. (2011). Pain as a global public health priority. *BMC Public Health*, 11(1), 1–5. <https://doi.org/10.1186/1471-2458-11-770>
- Huang, K. T. L., Owino, C., Gramelspacher, G. P., Monahan, P. O., Tabbey, R., Hagembe, M., et al. (2013). Prevalence and correlates of pain and pain treatment in a western Kenya referral hospital. *Journal of Palliative Medicine*, 16(10), 1260–1267. <https://doi.org/10.1089/jpm.2013.0080>
- Kahsay, D. T. (2019). Emergency nurses' knowledge, attitude and perceived barriers regarding pain Management in Resource-Limited Settings: cross-sectional study. 2019; 1–14.
- Karabulut, N. (2016). Non-pharmacological interventions for pain management used by nursing students in Turkey. *KONTACT*, 1, 23–31.
- Kheshti, R., Namazi, S., Mehrabi, M., & Firouzabadi, D. (2016). Health care workers' knowledge, attitude, and practice about chronic pain management, Shiraz, Iran. *Anesthesiology and Pain Medicine*, 6(4). <https://doi.org/10.5812/aapm.37270>
- Kidanemariam, B. Y., Elsholz, T., Simel, L. L., Tesfamariam, E. H., & Andemeskel, Y. M. (2020). Utilization of non-pharmacological methods and the perceived barriers for adult postoperative pain management by the nurses at selected national hospitals in Asmara, Eritrea. *BMC Nursing*, 19(1), 1–10. <https://doi.org/10.1186/s12912-020-00492-0>
- Mohamed, R. M., Taha, N. M., El, N. A., & Moghazy, K. (2021). Nursing performance regarding non-pharmacological pain management for patients with the cardiothoracic surgery at Zagazig University Hospitals. 2021; 25(4):16952–70.
- Osama, A. (2018). Knowledge and attitudes of nurses toward pain management. *Saudi Journal Anesthesia*, 12(2), 220–226. https://doi.org/10.4103/sja.SJA_587_17
- Ou, M., Xu, X., Chen, Y., Yan, Y., Wang, K., & Zhou, L. (2020). Pain management nursing factors related to nurses' knowledge and attitudes toward pain in hospitals in low-income areas. *Pain Management Nursing*, Available from: <https://doi.org/10.1016/j.pmn.2020.06.009>
- Raja, S. N., Carr, D. B., Cohen, M., Finnerup, N. B., Flor, H., Gibson, S., et al. (2020). The revised International Association for the study of pain definition of pain: concepts, challenges, and compromises. *Pain*, 161(9), 1976–1982. <https://doi.org/10.1097/j.pain.0000000000001939>
- Terzan, B. (2017). Knowledge and practice situations of nurses on nonpharmacological methods and in pain management. *New Trends Issues Proceedings of Advances in Pure and Applied Science*, (8), 98–105.
- Ung, A., Salamonson, Y., Hu, W., & Gallego, G. (2016). Assessing knowledge, perceptions, and attitudes to pain management among medical and nursing students: A review of the literature. *British Journal of Pain*, 10(1), 8–21. <https://doi.org/10.1177/2049463715583142>
- Woldehaimanot, T. E., Eshetie, T. C., & Kerie, M. W. (2014). Postoperative pain management among surgically treated patients in an Ethiopian Hospital. 2014; 9(7):1–9.
- Zeb, A., Arsh, A., Bahadur, S., & Ilyas, S. M. (2018). Effectiveness of transcutaneous electrical nerve stimulation in the management of neuropathic pain in patients with post-traumatic incomplete spinal cord injuries. *Pakistan Journal of Medical Sciences*, 34(5), 1177.
- Zelege, S., Kassaw, A., & Eshetie, Y. (2021). Non-pharmacological pain management practice and barriers among nurses working in Debre Tabor comprehensive specialized hospital, Ethiopia. *PLoS ONE*, 16(6), e0253086. <https://doi.org/10.1371/journal.pone.0253086>