

Knowledge and Attitude Towards Non-Pharmacological Pain Management and Associated Factors Among Nurses Working in Benishangul Gumuz Regional State Hospitals in Western Ethiopia, 2018

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Background: Millions of people worldwide are suffering from pain. Non-pharmacological therapy has an important role in the treatment of pain and is recognized as a valuable, simple help to lower the dosage of analgesic drugs needed, decreasing the side effects, reducing drug dependency and reducing health care costs; however, knowledge and attitude of nurses greatly affect the use of non-pharmacological pain management methods.

Objective: The study aimed to assess knowledge and attitude towards non-pharmacological pain management and associated factors among nurses working in Benishangul Gumuz Regional State Hospitals, western Ethiopia, 2018.

Methods: Institution-based cross-sectional study was conducted from April 1st to May 1st, 2017. Two hundred sixteen nurses were selected by using simple random sampling. Data were collected by using a pretested self-administered structured questionnaire. Collected data were checked, coded and entered to Epi-Info version 7 and exported to SPSS version 20 for further analysis. Bivariable and multivariable logistic regression was used.

Results: A total of 209 professional nurses participated in the study, a 96.7% response rate. This study shows that 51.2% (95% CI: 51.1–51.3) of nurses had adequate knowledge and 47% (95% CI: 46.9–47.06) of nurses had a favorable attitude towards non-pharmacological pain management. The findings reveal that level of qualification (AOR=12.2 (3.05, 48.4)), taking educational courses (AOR=7.5 (2.7, 21.24)), nurse to patient ratio (AOR=4.9 (1.64, 14.55)) and work experience were factors significantly associated with knowledge. Findings also show that nurse to patient ratio (AOR=10.36 (2.8, 38.4)), training (AOR=4.6 (1.4, 15.4)) and knowledge of non-pharmacological pain management (AOR=4.3 (1.74, 10.56)) were significantly associated with nurses' attitude to non-pharmacological pain management.

Conclusion and Recommendations: Nurses in Benishangul Gumuz regional state hospitals have unfavorable attitude, but they have relatively adequate knowledge about non-pharmacological pain management. Work experience, level of education, nurse to patient ratio and taking educational courses were associated with nurses' knowledge, and nurse to patient ratio, training, and knowledge of non-pharmacological pain management were associated with nurses' attitude. Therefore, efforts should focus on innovative educational strategies for nurses, training and achieving a 1:6 nurse to patient ratio.

Keywords: attitude, associated factors, knowledge, nurses, non-pharmacological pain management

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Background

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Non-pharmacological pain management means utilizing alternative therapies such as comfort therapy, physical and occupational therapy, psychosocial therapy/counseling and neurostimulation to better manage and reduce pain without medication.^{1,2}

Millions of people worldwide are suffering from pain, whether they are in the hospital, their homes or assisted living facilities.³ The incidence of moderate to severe pain is 20–80% worldwide.⁴ Community-based surveys find that 15–25% of adults suffer from chronic pain at any given time, a figure that increases to 50% in those older than 65 years.⁵ Globally, it has been estimated that 1 in 5 adults suffers from pain and that another 1 in 10 adults is diagnosed with chronic pain each year, and 5 million were suffering in drug dependency.⁶ It affects all populations, regardless of age, sex, income, race/ethnicity or geography, but it is not distributed equally across the globe.⁷ In Africa, the prevalence of pain is 87.5% in palliative care, and it has a devastating effect on the socioeconomic systems.⁸

Traditionally, pain management tended to emphasize the use of pharmacological agents, but intensive usage of analgesics can have negative implications as it can greatly affect some physiological functions, with side effects, drug dependency and increasing health care costs, and it puts a burden on the country's economy.⁹

Therefore, it is important to have a range of options including non-pharmacological therapies in order to manage patients' pain more effectively.^{10,11} This method of pain management has great potential to relieve someone's pain in addition to pharmacological management, and it is simple and inexpensive compared with pharmacological methods.² It has many advantages such as having no adverse effects on the mother and fetus, reducing the dosage of analgesics, decreasing the side effects and reducing drug dependency and health care costs.^{1,2}

Inadequately managed pain negatively affects a patient's quality of life, leading to more frequent outpatient visits, higher readmission rates, causing longer stays in hospital, and also increased levels of stress and anxiety for the patient and families.^{4,12}

However, knowledge and attitude of nurses greatly affect the use of non-pharmacological pain management methods. A different study shows that nurses had

inadequate knowledge and negative attitude towards non-pharmacological pain management and a majority of nurses did not use non-pharmacological pain management methods.¹³

During a patient's stay in a ward, nurses have great responsibility in pain evaluation, promotion of patient comfort, maintenance and recovery patients in pain.^{14,15} Previous studies have confirmed that 90% had no documented evidence of the use of any non-pharmacological interventions to relieve pain.¹⁶ This gap affects many hospitalized patients, and its effects on the patient's physical, emotional and spiritual wellbeing alter the quality of life, increase the incidence and severity of postoperative complications and consequently increase health care cost.¹⁷

However, many studies document attempts to improve the situation through graduate and postgraduate training programs determined and guidelines prepared but not implemented. Also in recent years, many hospitals try to achieve important improvements in non-pharmacological pain management, but there are many factors preventing non-pharmacological pain management from being used in the hospitals, some of which are level of qualification, physicians' order, patient compliance, nurses' knowledge and nurses' attitude.¹⁸ Even if these problems are abundant, existing local and regional decision makers are unaware of the problem and have made limited efforts with regard to non-pharmacological pain management due to absence of evidence of non-pharmacological pain management in the area. To the best of our knowledge, no published research has been conducted in Benishangul Gumuz regional state regarding non-pharmacological pain management. Therefore, this study was instigated to assess knowledge and attitude of nurses towards non-pharmacological pain management, and it is intended to contribute to bridging the information gap; the findings of this study will serve as a baseline for a future study.

Methods

Study Area, Design and Period

An institutional based cross-sectional study was conducted from April 1 to 15, 2018. Benishangul Gumuz regional state has an estimated area of 50,699 square kilometers, which is located in the northwestern part of Ethiopia. The region has three government hospitals, which are Assosa, Kamashi and Pawie hospitals, and the study was conducted in each of the hospitals. Pawie hospital is located in the Benishangul

Gumuz regional state Metekel zone that has 110 nurses and serves a total population of around 361,449. Assosa hospital is found in the capital city of Benishangul Gumuz regional state Assosa, which has 130 nurses serving a total population of around 261,449, and Kamashi hospital is found in Kamashi Zone Kamashi Woreda, which has 50 nurses and serves a population of around 161,448.

Sample Size and Sampling Technique

Epi Info software was used to calculate the required sample size with given assumptions. Using 95% CI and a 4% margin of error, power of 80%, proportion of 51% of knowledge and 79% to attitude was taken from the northwest (similar design)¹⁹ and considering a 10% non-response rate. Study participants were proportionally allocated to each hospital, then the frames of nurses were received from the human resource management office and simple random sampling method was used to select study participants. The participants were selected from the medical, surgical, pediatric and emergency wards.

Data Collection Procedure

Data were collected using a structured and pre-tested self-administered questionnaire adopted from previously validated tools of NKASRP questionnaires^{20–23} and modified from similar studies. It is prepared in English, in five parts and consists of closed ended questions. Seven data collectors and three supervisors were selected from health centers, and one day's training was provided on the approach to data collection, the content, objective and relevance of the study, confidentiality of information, participant rights and approach to participants. The participants frame received from the human resource management office and a simple random sampling method were used to reach participants. Then the questionnaire was distributed to the study subjects and data collection facilitated by seven trained health professionals; continuous follow-up and supervision was carried out by supervisors throughout the data collection.

Data Processing and Analysis

Epi Info version 7 was used for data entry, and SPSS version 20 was used for cleaning, coding and analysis. Binary logistic regression was employed to see the association of each variable with dependent variables. Finally, independent variables with *p*-value less than 0.2 in the bivariable logistic regression was entered to multivariable logistic regressions to control the effect of confounding,

and in multivariable logistic regression variables having a *p*-value $\leq 5\%$ and 95% CI were used to declare an association between factors and a dependent variable.

Results

Socio-Demographic Characteristics of the Nurses

A total of 209 nurses participated in the study, a 96.7% response rate. Out of all the participants 107 (51.2%) were males, and the age of the participants was in the range of 20 to 45 with a mean age of 29 (SD=4.91) years. About half, 107 (51.2%), were orthodox, and 124 (54%) were married. Regarding educational status 95 (45.5%) were qualified BSc nurses, and 84 (40.2%) participants had above five years of work experience. Of the total participants only 85 (40.7%) of the respondents were attending courses on non-pharmacological pain management. Regarding education among this group, 49 (23.4%) and 36 (17.3%) were attending courses after employment and during study in nursing school, respectively; the remaining 124 (59.3%) had not attended non-pharmacological pain management education. However, 127 (60.8%) participants wished to have non-pharmacological pain management education. Monthly income was grouped into three categories: 54 (25.8%) of participants had reported to have a monthly income of <3170 Ethiopian Birr, 102 (48.8%) had 3171–3999 and 53 (25.4%) had >4000 Ethiopian Birr (Table 1).

Facility-Related Factors in Knowledge and Attitude Regarding Non-Pharmacological Pain Management

The biggest group of respondents, 44.5%, reported that the nurse to patient ratio was 1:6, and 35.9% was undetermined. From the total only 22% of the respondents reported that they had the non-pharmacological management guideline. Nearly half of the respondents were working in the inpatient unit, and only 13.4% of the respondents worked more than 12 hrs per 24 hrs. Regarding training, 67.9 % of the respondents did not take any training (Table 2).

Patient-Related Factors in Knowledge and Attitude Regarding Non-Pharmacological Pain Management

The majority of the patients and their family had strong beliefs and good intention on drugs. Similarly, a majority

Table 1 Socio-demographic Characteristics of Nurses in Benishangul Gumuz Regional State Hospitals, Western Ethiopia, April 2018 (N=209)

Variable	Frequency (N=209)	Percent (%)
Sex		
Male	107	51.2
Female	102	48.8
Age		
20–29	145	69.4
30–39	61	29.2
>40	3	1.4
Religion		
Orthodox	107	51.2
Muslim	53	25.4
Protestant	47	22.5
Catholic	2	1
Marital status		
Married	124	59.3
Single	83	39.7
Divorced	1	0.5
Widowed	1	0.5
Level of qualification		
Certificate	1	0.5
Diploma	113	54.1
Bachelor degree	95	45.5
Non-pharmacological education		
Yes	85	40.7
No	124	59.3
Monthly income		
<3170 ETB	54	25.8
3171–3999 ETB	102	48.8
>4000 ETB	53	25.4

Abbreviation: ETB, Ethiopian Birr.

of the patients had strong beliefs in drug but only one-fourth of the patients were willing to take drugs (Table 3).

Nurses' Attitude Towards Non-Pharmacological Pain Management

All attitude-related questions were summarized and computed, then using the median as the cutoff point the responses were dichotomized as favorable and unfavorable attitude. Those nurses who scored above the median were considered as having a favorable attitude, while those who scored below the median were considered as having an unfavorable attitude. From a total of 209 participants this

Table 2 System or Facility-Related Factors to Knowledge and Attitude Regarding Non-Pharmacological Pain Management Among Nurses in Benishangul Gumuz Regional State Hospital, 2018 (N=209)

Variable		Frequency	Percent
Nurse to patient ratio	1:4	30	14.4
	1:6	93	44.5
	1:8	11	5.3
	Undetermined	75	35.9
Working unit	Inpatient	100	47.8
	Outpatient	49	23.4
	Emergency	36	17.2
	Other	24	11.5
Working hours	8 hours	105	50.2
	12 hours	76	36.4
	>12 hours	28	13.4
Presence of guideline	Yes	46	22
	No	163	78
Training	Yes	67	32.1
	No	142	67.9
Pain management equipment	Yes	121	57.9
	No	88	42.1

Table 3 Patient-Related Factors in Knowledge and Attitude of Non-Pharmacological Pain Management Among Nurses Working in Benishangul Gumuz Regional State Hospital, 2018 (N=209)

Variable		Frequency	Percent
Patient/family intention to use drug	Yes	179	85.6
	No	30	14.4
Strong beliefs in drug	Yes	175	83.7
	No	34	16.3
Patient unwillingness	Yes	155	74.2
	No	54	25.8
Other	Yes	69	33.0
	No	140	67.0

report shows that 47% (95% CI: 46.9–47.06) of the nurses had a favorable attitude, with a total median attitude score of 76%. Among the participants 109 (52.2%) agreed with the idea that distraction reduces pain intensity, and 112 (53.6%) agreed with the idea that non-pharmacological interventions are very effective for mild to moderate pain but not for severe pain. Among participants 88 (42.1%) strongly agreed with the idea of willingness to provide information on issues related to non-pharmacological pain management methods to sick people.

About 82 (39.2%) strongly agreed with the idea that preparing a patient carefully for a procedure by telling him/her about what will be done can decrease pain. From the total, 21 (10%) of participants strongly disagreed with the idea that pain can be seen in the patient's behavior, and 12 (5.7%) participants neither agree nor disagree with the idea that nurses are the best judges of the patient's pain intensity because they spend 24 hours with the patient.

Knowledge of Non-Pharmacological Pain Management

From twenty knowledge test questions distributed regarding non-pharmacological pain management this study shows that 51.2% (95% CI: 51.1–51.3) of nurses had adequate knowledge, with a total mean knowledge score of 61.3%. Among the participants 113 (54.1%) were aware of the benefits of non-pharmacological pain management, but about 80 (38.3%) of respondents did not know any methods of non-pharmacological pain management (Table 4).

Factors Associated with Knowledge of Non-Pharmacological Pain Management

In bivariable logistic regression analysis, sex, level of qualification, years of experience, nurse to patient ratio, non-pharmacological pain management education, working unit, pain management guideline, lack of non-pharmacological pain management equipment, monthly income and training were significantly associated with nurses' knowledge of non-pharmacological pain management.

However, only level of qualification, years of experience, nurse to patient ratio and non-pharmacological education were found to be significantly associated in the multivariable logistic regression analysis. This study shows that level of qualification was one of the factors that were significantly associated with nurses' knowledge of non-pharmacological pain management in the study area. Degree-educated nurses were 12.2 (AOR=12.2 (3.05, 48.4)) times more likely to have adequate knowledge as compared to those who have certificates and diplomas.

Those nurses who reported work experience of less than 1 year were 80% less likely (AOR: 0.2 (0.026, 0.66)), 1–3 years were 89% less likely (AOR: 0.11 (0.026, 0.44)) and 3–5 years were 50% less likely (AOR: 0.5 (0.146, 0.56)) to have adequate knowledge as compared to those who had reported

Table 4 Frequency Distribution of Nurses' Knowledge Score on Non-Pharmacological Pain Management in Benishangul Gumuz Regional State Hospitals, 2018 (N=209)

Variable	True		False	
	n	%	n	%
1. The most accurate judge of the intensity of the patient's pain is the patient.	161	77	48	23
2. Providing a suitable room temperature and good air condition can alleviate pain.	156	76	53	25
3. Providing the patient with a possibility to rest by minimizing noise can alleviate pain.	152	73	57	27
4. Including family members in the pain management regimen can increase the patient's ability to manage pain.	161	77	48	23
5. Use of non-pharmacological pain management therapies has no value to the patient.	42	20	167	80
6. Encouraging the patient to relax different parts of the body can alleviate the sensation of pain.	144	69	65	31
7. Trying to focus a patient's thoughts/attention away from pain can decrease pain.	152	73	57	27
8. Vital signs are always reliable indicators of the intensity of a patient's pain.	82	39	127	61
9. Asking the patient to suggest ways to relieve his/her pain can increase the patient's ability to manage pain.	159	76	50	24
10. Patients who can be distracted from pain usually do not have severe pain.	54	26	155	74
11. Non-drug interventions such as heat, music, imagery etc. are effective only for mild pain control.	80	38	129	62
12. The patient's pain can be alleviated by position changes.	154	74	55	26
13. The benefit of non-pharmacological pain management is only fewer side effects than medication.	96	46	113	54
14. Patients who can be distracted from pain usually do not have pain.	88	42	121	58
15. Distraction by the use of music or relaxation can decrease the perception of pain.	148	71	61	29
16. Patients with chronic pain should receive pain medications along with non-pharmacological pain treatment at regular intervals with or without the presence of discomfort.	137	66	72	34
17. The patient should be advised to use non-pharmacological means alone.	69	33	140	67
18. methods of pain relief have no applications for neonates.	97	46	112	54
19. Non-pharmacological pain management only includes distraction, heat/cold and relaxation.	69	33	140	67
20. It may often be useful to give a placebo to a patient in pain to assess whether he/she is genuinely in pain.	101	48	108	51

work experience of five years and above. Moreover, those nurses having a 1:6 nurse to patient ratio were about 4.9 times more likely to have adequate knowledge as compared to those nurses who have an undetermined nurse to patient ratio (AOR= 4.9 (1.64, 14.55)). Those nurses who have ever taken non-pharmacological pain management education were about 7.5 times more likely to have adequate knowledge than those who had not (AOR= 7.5 (2.7, 21.24)) (Table 5).

Factors Associated with Nurses' Attitude Towards Non-Pharmacological Pain Management

In the bivariate analysis age, sex, years of experience, non-pharmacological pain management education, availability of guideline, monthly income, training and nurses'

knowledge were significantly associated with nurses' attitude towards non-pharmacological pain management. However, nurse to patient ratio, any training on non-pharmacological pain management and nurses' knowledge were found to be significantly associated in the multivariable analysis.

Those nurses having a 1:4 nurse to patient ratio were about 10.36 times more likely (AOR= 10.36 (2.80, 38.38)) to have a favorable attitude as compared to those nurses who have an undetermined nurse to patient ratio. Those nurses who have a 1:6 nurse to patient ratio were about 4.3 times more likely to have a favorable attitude than those who had an undetermined nurse to patient ratio (AOR=4.34 (1.55, 12.2)). Those nurses who have ever taken training on non-pharmacological pain management were about 4.6 times more likely to have a favorable

Table 5 Factors Associated with Nurses' Knowledge of Non-Pharmacological Pain Management in Benishangul Gumuz Regional State Hospitals, Western Ethiopia, 2018 (N=209)

Variable	Category	Knowledge		COR (95% CI)	AOR (95% CI)
		Inadequate	Adequate		
Sex	Male	35 (16.7%)	72 (34.4%)	3.93 (2.217, 6.996)*	2.17 (0.80, 5.85)
	Female	67 (32.1%)	35 (16.7%)	1.00	1.00
Level of qualification	Certificate and Diploma	83 (39.7%)	31 (14.8%)	1.00	1.00
	Degree	19 (9.1%)	76 (36.4%)	10.7 (5.59, 20.52)*	12.2 (3.05, 48.4)*
Years of experience	<1	9 (4.3%)	4 (1.9%)	0.168 (0.047, 0.598)*	0.2 (0.026, 0.66)*
	1-3	44 (21.1%)	16 (7.7%)	0.137 (0.065, 0.289)*	0.11 (0.026, 0.44)*
	3-5	26 (12.4%)	26 (12.4%)	0.377 (0.183, 0.778)*	0.5 (0.146, 0.56)*
	>5	23 (11.0%)	61 (29.2%)	1.00	1.00
Nurse to patient ratio	1:4	26 (12.4%)	74 (35.4%)	4.421 (1.803, 10.84)*	1.2 (0.320, 4.495)
	1:6	39 (18.7%)	10 (4.8%)	6.505 (3.29, 12.847)*	4.9 (1.638, 14.55)*
	1:8	13 (6.2%)	23 (11%)	3.537 (0.968, 12.92)*	1.9 (0.293, 12.25)
	Undetermined	24 (11.5%)	0	1.00	1.00
Non-Pharma Education	Yes	15 (7.2%)	70 (33.5%)	10.97 (5.57, 21.60)*	7.5 (2.7, 21.24)*
	No	87 (41.6%)	37 (17.7%)	1.00	1.00
Working hours per day	8 hrs	37 (17.7%)	68 (32.5%)	4.595 (1.845, 11.44)*	2.6 (0.704, 10.19)
	12 hrs	45 (21.5%)	31 (14.8%)	1.722 (0.673, 4.404)	1.39 (0.36, 5.34)
	>12 hrs	20 (9.6%)	8 (3.8%)	1.00	1.00
Guideline	Yes	15 (7.2%)	31 (14.8%)	1.00	1.00
	No	87 (41.6%)	76 (36.4%)	0.423 (0.212, 0.84)*	1.29 (0.396, 4.25)
Pain management equipment	Yes	78 (37.3%)	43 (20.6%)	0.207 (0.11, 0.376)*	0.641 (0.257, 1.59)
	No	24 (11.5%)	64 (30.6%)	1.00	1.00
Monthly ncome	<3170 ETB	49 (23.4%)	5 (2.4%)	0.016 (0.005, 0.052)*	0.405 (0.06, 2.61)
	3701-3999 ETB	46 (22.0%)	56 (26.8%)	0.185 (0.076, 0.449)*	2.3 (0.595, 8.87)
	>4000 ETB	7 (3.3%)	46 (22.0%)	1.00	1.00

Notes: Statistical significance: *p-value < 0.05.

Abbreviations: ETB, Ethiopian Birr; COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

attitude than those who have not (AOR = 4.6 (1.4, 15.4)). Moreover, nurses who have adequate knowledge were 4.3 times more likely (AOR=4.3 (1.74, 10.56)) to have a favorable attitude as compared to nurses who have inadequate knowledge (Table 6).

Discussion

In Ethiopia, few studies have assessed the knowledge and attitude regarding non-pharmacological pain management among nurses; hence, the goal of this study was to assess knowledge and attitude towards non-pharmacological pain management and associated factors among nurses working in Benishangul Gumuz regional state hospitals.

This study shows that 51.2% (95% CI: 51.1–51.3) of nurses had adequate knowledge, with a total mean knowledge score of 61.3%, of non-pharmacological pain

management. This finding was lower when compared with the studies done in United States 76%, Saudi Arabia 69.5%, Zimbabwe 64.5% and southern part of Ethiopia 78.1%.^{17,21,24,25} The possible reasons could be variations in sources of information, lack of updated training and lack of non-pharmacological pain management courses in their basic nursing curriculum.

It was nearly the same in the study conducted in Iran 48.2% and South West Amhara region, Ethiopia 51.3%.^{26,27} But it was higher compared with a study conducted in China 38.9%, and Turkey 39.65%.^{28,29} This may be due to differences in scoring and variations in sources of information.

Concerning attitude this study revealed that 47% (95% CI: 46.9–47.06) of nurses had a favorable attitude with a median attitude score of 76%. This study finding was lower when compared with the study done in Makah,

Table 6 Factors Associated with Nurses' Attitude Towards Non-Pharmacological Pain Management in Benishangul Gumuz Regional State Hospitals, Western Ethiopia, 2018 (N=209)

Variable	Category	Attitude		COR (95% CI)	AOR (95% CI)
		Unfavorable	Favorable		
Sex	Male	45	62	2.53 (1.44, 54.42)* 1.00	1.096 (0.485, 2.48) 1.00
	Female	66	36		
Age	20–29	92	53	1.152 (0.102, 13.01)	22.02 (0.71, 67.53)
	30–39	17	44	5.17 (0.44, 60.88)*	17.07 (0.61, 47.4)
	>40	2	1	1.00	1.00
Years of experience	<1	10	3	0.167 (0.04, 0.65)*	1.54 (0.176, 13.53)
	1–3	43	17	0.22 (0.12, 0.45)*	1.75 (0.48, 6.4)
	3–5	28	24	0.48 (0.24, 0.96)*	1.46 (0.43, 4.98)
	>5	30	54	1.00	1.00
Nurse to patient ratio	1:4	9	21	11.13 (4.2, 29.75)*	10.36 (2.8, 38.4)*
	1:6	33	60	8.67 (4.165, 18.05)*	4.34 (1.55, 12.2)*
	1:8	7	4	2.72 (0.69, 10.7)*	1.27 (0.22, 7.3)
	Undetermined	62	13	1.00	1.00
Non-pharmacological education	Yes	19	66	9.9 (5.21, 19.12)*	2.16 (0.79, 5.88)
	No	92	32	1.00	1.00
Pain guideline	Yes	14	32	3.36 (1.66, 6.77)*	1.7 (0.59, 4.99)
	No	97	66	1.00	1.00
Income	<3170 ETB	46	8	0.05 (0.017, 0.124)*	0.25 (0.06, 1.1)
	3171–3999 ETB	54	48	0.23 (0.11, 0.50)*	0.63 (0.205, 1.92)
	>4000 ETB	11	42	1.00	1.00
Any training	Yes	9	58	16.4 (7.45, 36.3)*	4.6 (1.4, 15.4)*
	No	102	40	1.00	1.00
Knowledge	Adequate	25	82	17.6 (8.79, 35.4)	4.3 (1.74, 10.56)*
	Inadequate	86	16	1.00	1.00

Notes: Statistical significance: *p-value < 0.05.

Abbreviations: ETB, Ethiopian Birr; COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

Saudi Arabia 85%, Bandar Abbas, Iran 54.22%, Sweden 84% and Zimbabwe 56%.^{23,26,30,31} The possible reason could be variations in sources of information, variation in individual judgments based on their beliefs and methodological difference.

The results of the current study revealed that level of qualification was one of the factors significantly associated with nurses' knowledge of non-pharmacological pain management.

Degree-educated nurses were 12.2 times more likely to have adequate knowledge as compared to those who have certificates and diplomas (AOR=12.2 (3.05, 48.4)). It is similar to the studies done in Saudi Arabia, western region, India, Jordan, Uganda and Cairo.^{1,22,23,29,30,32}

The results revealed that it is clearly healthcare providers with higher education levels that are more likely to have more knowledge on pain and more likely to apply practices toward treating pain. This might be because nurses with higher educational levels have a higher opportunity to get up-to-date information, accessing and reviewing different literatures.

This is supported by the study in Poland on Polish nurses' perceived barriers in using evidence-based practice in pain management study: lack of available professional publications and education, shortage of time and lack of support from chief physicians were factors for poor knowledge of non-pharmacological pain management.

Years of experience was another socio-demographic factor that was significantly associated with nurses' knowledge of non-pharmacological pain management. Those nurses who reported work experience of less than 1 year were 80% less likely (AOR: 0.2 (0.026, 0.66)), 1–3 years were 89% less likely (AOR: 0.11 (0.026, 0.44)) and 3–5 years were 50% less likely (AOR: 0.5 (0.146, 0.56)) to have adequate knowledge as compared to those who had reported work experience of five years and above. Similar research demonstrates results that four years of experience was an important factor in pain management knowledge; for example, participants in China received an average score of 47%, which was positively correlated with years of experience.³¹

Also consistent were studies conducted in Jordan revealing that academic study and clinical experience should reinforce each other, with the academic experience offering the opportunity to increase a nurse's knowledge base and the clinical environment, allowing them to consolidate academic learning and establish the links between theory and practice.²³ Our results are also supported by study findings from Sweden, Mica, Norway

and Zimbabwe that years of experience was positively associated with knowledge regarding non-pharmacological pain management.^{1,26,31–33} The positive association from this study could be because as the number of years of practice increases, nurses are more likely to be exposed to pain management repeatedly; more experienced nurses might have more opportunity to gain access to up-to-date information about non-pharmacological pain management and gradually from their daily observations, practices and staffs.

Nurses' knowledge of non-pharmacological pain management was positively associated with ever having education on non-pharmacological pain management. Those nurses who had ever had education on non-pharmacological pain management were about 7.5 times more likely to have adequate knowledge than those who had not (AOR= 7.5 (2.7, 21.24)).

According to the literature, nurses who take non-pharmacological and pharmacological pain management courses score higher than those who do not take such a course.

For example, a study done in Canada demonstrated a 7% improvement in scores for pediatric nurses who completed pain management workshops.³⁴ This is similar to studies done in the United States, Turkey and Uganda.^{25,35,36}

The possible reason could be that nurses who had taken educational courses had higher opportunity to review different books, literatures and get up-to-date information in non-pharmacological pain management, therefore they could have achieved good scores on knowledge questions. On the other hand, nurse to patient ratio was one significant factor in nurses' knowledge of non-pharmacological pain management. Those nurses having a 1:6 nurse to patient ratio were about 4.9 times more likely to have adequate knowledge as compared to those nurses who had an undetermined nurse to patient ratio (AOR= 4.9 (1.64, 14.55)). Similarly, a study done in Uganda showed that 84.1% of the factor associated with nurses' knowledge of non-pharmacological pain management was nurse to patient ratio. This might be because of work load and lack of time to read more about non-pharmacological pain management.

Regarding factors associated with attitude, this current study found that nurse to patient ratio, any training on non-pharmacological pain management and nurses' knowledge are significantly associated in the multivariable analysis. Those nurses having a 1:4 nurse to patient ratio were about

10.36 times more likely to have a favorable attitude as compared to those nurses who have an undetermined nurse to patient ratio (AOR= 10.36 (2.8, 38.4)).

Those nurses who have a 1:6 nurse to patient ratio were about 4.3 times more likely to have a favorable attitude than those who have an undetermined nurse to patient ratio (AOR=4.34 (1.55, 12.2)). Similarly, a study done in Australia, Makah showed a moderate positive relationship between nurse to patient ratio and pain management attitude.^{20,37} A possible reason could be workload or shortage of time to read more about non-pharmacological pain management.

Those nurses who have ever taken training on non-pharmacological pain management were about 4.6 times more likely to have a favorable attitude toward non-pharmacological pain management than those who have not (AOR = 4.6 (1.4, 15.4)). This is in line with study done in Saudi Arabia and Uganda, revealing a positive relationship between attitude and training.^{23,36}

This could be because updating the knowledge of the health care professionals about non-pharmacological pain management could have changed the older understanding of pain management and could result in a favorable attitude.

This study also revealed a positive relationship between nurses' knowledge and attitude of nursing staff regarding non-pharmacological pain management. Nurses who have adequate knowledge were about 4.3 times more likely to have a favorable attitude as compared to who have inadequate knowledge (AOR=4.3 (1.74, 10.56)). This finding was similar to the studies done in Brazil, Makah and Turkey.^{23,38,39} The reason could be that nurses who have adequate knowledge have detailed information and know more about the benefit of non-pharmacological pain management, so this could be leading to a favorable attitude.

Limitations of the Study

The findings of this study might have been influenced by subjects' response bias, leading to responses that may not accurately reflect the attitudes of participants because of the self-reporting nature of the questionnaire.

Conclusion

Generally, our investigation of knowledge and attitude towards non-pharmacological pain management among nurses working in Benishangul Gumuz regional state hospitals found nurses to have unfavorable attitude but relatively

adequate knowledge. Years of experience, level of qualification, nurse to patient ratio and taking educational courses were factors associated with nurses' knowledge of non-pharmacological pain management. Findings also show that nurse to patient ratio, any training on non-pharmacological pain management and nurses' knowledge were factors associated with nurses' attitude towards non-pharmacological pain management.

Abbreviations

CNSIP, clinical nurse specialist in pain; ENA, Ethiopia Nursing Association; IASOP, International Association Study of Pain; LTCF, long term care facilities; NKASRP, Nurses Knowledge Attitude Survey Relieving Pain; RN, registered nurses; US, United States; WHO, World Health Organization.

Data Sharing Statement

All the required data will be available upon request to the primary investigator.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the ethical review committee of the school of nursing University of Gondar. After the ethical clearance was sought from the University of Gondar, we submitted to the regional health office, and an official permission letter for the next steps was obtained from the office. Then the office wrote the letter to each hospital, in which the actual data collection was carried out. All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki Declaration of ethical standards. All participants provided verbal informed consent, which was approved by the University of Gondar ethics committee, and participant data were maintained with confidentiality.

Consent for Publication

Not applicable.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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