

Pain Management Practice and Associated Factors Among Nurses, Southern Ethiopia, 2025

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ABSTRACT

Introduction: Ineffective pain management leads to functional impairment, disability, psychological distress and sleep deprivation. Previous studies have primarily concentrated on evaluating nurse's post-operative, non-pharmacologic and pharmacologic pain management practice.

Objectives: To assess pain management practice and associated factors among nurses.

Method: Institutional based cross-sectional study design was conducted. A simple random sampling technique was used to select the study participants. Data was collected by using structured pre-tested self-administered questionnaires. Data was analyzed using SPSS version 25.0. Binary and multiple logistic regressions was performed. All variables with p-value <0.25 on bivariate analysis was taken to multivariate analysis.

Result: Of the total 468, 31.6% (95% CI, 27.4, 35.8) of the study participants have good pain management practices. Work experience of >10 years, having BSc and above educational level, 1:8 nurses to patient ratio, and nurses' knowledge towards pain management were statistically associated with nurses' pain management practice.

Conclusion and Recommendation: The study findings revealed that one-third of nurses have a good pain management practice. Therefore, hospitals have to work to address factors affecting pain management practice of nurses.

Implication of the Research: The findings of this study suggest that healthcare institutions should implement on-the-job training programs to enhance nurses' knowledge of pain management in clinical settings. Additionally, nurses with only a diploma-level education are encouraged to pursue further educational advancement, and hospitals should facilitate these opportunities. Experienced nurses with a BSc. or higher should provide guidance and mentorship to diploma-level nurses.

Abbreviations

AOR	: Adjusted Odds Ratio
BHUTH	: Bule hora university Teaching Hospital
DUGH	: Dilla university General Hospital
CI	: Confidence Interval
COR	: Crude Odds Ratio
JCAHO	: Joint, Commission on Accreditation of Healthcare Organizations
HMIS	: Health Management Information System
IASP	: International Association for the Study of Pain

ICU	: Intensive Care Unit
PI	: Principal Investigator
SPSS	: Statistical Package Software for Social Students

Keywords: Nurse, Pain Management Practice, Southern Ethiopia

Keypoint: Globally, one in five adult experiences pain and one in ten adult is diagnosed with chronic pain annually. Ineffective pain management leads to functional impairment, disability, psychological distress and sleep deprivation. Previous studies have primarily concentrated on evaluating nurses' post-operative,

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non-pharmacologic and pharmacologic pain management practice. However, there is lack of comprehensive information regarding nurses' overall pain management practice.

Introduction

Pain management is defined as a systematic nursing practices aimed at providing individualized and ethical relief from pain [1]. It is as a set of activities focusing on reducing pain to a level acceptable to the patient through various interventions [2]. The World Health Organization identified pain as a major global health issue and considers it the fifth vital sign, yet it remains underreported, poorly documented, and inadequately treated worldwide [3].

Pain management includes pharmacologic and non-pharmacologic nursing interventions such as medications, therapies, and behavioral approaches [2]. Nurses play a vital role in assessing and managing pain, which is essential for improving quality of life, reducing complications, and shortening hospital stays [4]. Effective pain management is also a key indicator and fundamental responsibility of nursing care [5].

Globally, one in five adult experiences pain and one in ten adult is diagnosed with chronic pain annually [6]. In Africa, pain prevalence is especially high among palliative care patients and in Ethiopia, it is a common postoperative complication. Ineffective pain management significantly leads to negative outcomes including reduced quality of life, increased hospital stays, higher readmission rates, and greater psychological distress [7-9].

To address these challenges, organizations such as the Joint Commission and the World Health Organization have established comprehensive pain management guideline [10]. In Ethiopia, initiatives like the Pain-Free Hospital Initiative and training programs have been introduced [11,12]. Despite these efforts, many nurses still demonstrate inadequate pain management practices [6,13,14].

Previous studies have primarily concentrated on evaluating nurses' post-operative pain management and non-pharmacologic and pharmacologic pain management practice which is specific. However, there is lack of comprehensive information regarding nurses' overall pain management practice. As far as the researcher's knowledge, there is no previous study done on pain management practice and associated factors among nurses working in selected Southern Ethiopia. This study aimed to assess pain management practice and its associated factors among nurses in selected public hospitals, in Southern Ethiopia.

Methods and Materials

Study Area and Period

The study was conducted in selected public hospitals Southern Ethiopia, from June 30 to July 30, 2025. Gedeo zone is one of the Third zones found in the Southern Ethiopia region and Peoples Regional State (Southern Ethiopia) of Ethiopia. Its major city administration is Dilla town located on the main road of Addis Ababa and 292km away from Addis Ababa, the capital city of Ethiopia, and 181 km from Wolayta sodd, the capital city of Southern regional state and one of selected regional town of south Ethiopia regional states. Gedeo zone is an exclave of the South

Ethiopia region and consists of a narrow strip of land along the Eastern escarpment of the Ethiopian Highlands. It is surrounded by the Oromia region which borders the zone in the East, South, and West. Gedeo zone shares its boundary with the Sidama region. The people of Gedeo Zone mostly generate income through agriculture. There are about 4 public hospitals in Gedeo Zone of which is a general hospital and the remaining are primary hospitals. These are Dilla General Hospital, Bule primary hospital, Yirga Chefe primary hospital, and Gedeb primary hospital which comprise 190, 28, 67, and 69 nurses respectively. Gedeo Zone public hospitals comprise 354 nurses and services for a 1,269,203 total population. The zone also has 38 Health centers and 159 Health posts (Source: Zonal Health Department).

West Guji is one of the 21 zones of the Oromia regional state situated in the southern of the region. The zone is bordered by South Ethiopia region in the West, Guji zone in the East, Gedeo Zone of the South Ethiopia Region and Sidama Region in the North and Borena in the South. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA) the projected total population of the zone 1300707 of whom 105,443 are urban residents. Of the total population, 638,648 were male while 662,060 were female. Bule Hora is the administrative center of the zone which is located 467 km away from Addis Ababa the capital city of Ethiopia. The zone has two town administrations and nine rural districts. West Guji zone has four public hospitals namely: Bule Hora University Teaching Hospital (BHUTH), Kercha Primary Hospital, Melkasodda Primary Hospital, and Galana Primary Hospital which comprise 157, 41, 40, and 25 nurses respectively. In addition, West Guji zone has 42 health centers, and 196 health posts serving the population of the zone. The total number of nurses in West Guji public hospitals is 263 (Source: Zonal Health Department)

Study Design

An institutional-based cross-sectional study design was conducted.

Populations

Source Population

All nurses working in public hospitals Southern Ethiopia.

Study Population

Sampled nurses working inpatient departments of the selected public hospitals.

Study Unit

Those nurses who provide care to patients in the selected wards of the selected hospitals from whom actual data were collected.

Eligibility Criteria

Nurses working at the participating wards of the selected hospitals that have a diploma and above and work a daytime shift during the study period were included. Nurses on annual leave and sick leave during the data collection period were excluded from the study.

Sample Size Determination and Sampling Procedure

Sample Size Determination

The number of participants for nurses' pain management practice is calculated using a single population proportion formula by

considering the assumptions of a 95% level of the confidence level, 5% margin of error, and 25.8% proportion of nurses with good nursing pain management practice which is taken from the previous study conducted in Bahir dar University. Finally, 10% was added for possible non-response rates. Where, n_i : initial sample size, $z_{\alpha/2}$ is the critical value for normal distribution at 95% confidence level which is =1.96, (z-value at $\alpha=0.05$) $P=0.258$ (established proportion of good nursing pain management practice from previous study Bahir dar University [15].

$$n_i = \frac{(Z_{\alpha/2})^2 \cdot p \cdot (1-p)}{d^2}$$

$$n_i = \frac{(1.96)^2 \cdot 0.2588 \cdot 0.742}{0.0025} = 294$$

Considering a 10% non-response rate. The final sample size was $294 + 29.4 = 323$. For the second objective, the sample size was estimated by considering 80% statistical power, and 10% non-response rates. Proportions in an exposed and unexposed group as well as the AOR of the reported variables in under mentioned studies were calculated. The sample size was then computed using Epi Info software. Then, the largest sample was taken to increase the number of required participants.

Sampling Procedure

A Simple random sampling technique was used to select hospitals after identifying all public hospitals in the Southern Ethiopia and the study unit was nurses in a selected hospitals and review of patient charts from inpatient for nurse's pain management practice. From 3 public hospitals in Gedeo zone; Dilla General Hospital, Yirga Chefe Primary Hospital, and Gedeb Primary Hospital, each comprising of 190, 67, and 69, nurses were selected respectively, whereas from 3 public hospitals in West Guji zone, BHUTH, Melka Soda Primary Hospital, and Kercha Primary Hospital each comprising of 157, 40, 41 nurses were selected respectively. After proportional allocation of a sample

size to each hospital, simple random sampling technique was used to select nurses from sampling frame (lists with serial number) received from nursing leaders or matrons. The list of all nurses working in the in-patient wards were obtained from the nursing leaders of respective hospitals and the number of samples in each hospital was selected according to proportional allocation formula as follows:

Seven inpatient departments (Medical, Surgical, and orthopedics, Emergency, ICU Pediatric and Maternity) were selected in each hospital, and nurses working in those inpatient departments again were allocated proportionally based on their number. Finally, simple random sampling by lottery method was employed to select the study samples.

The total number of nurses working in selected hospitals of Southern Ethiopia was 481.

Before selecting a nurse for the study, the bed numbers were determined.

Then, one of the patients that the nurses responsible for care.

$(n_f \times n) / N = (\text{Sample final} \times \text{no of nurses in each hospital}) / \text{Number of total nurses}$

Where N is equal to 564.

Dilla General Hospital = $(481 \times 190) / 564 = 162$

Yirga Chefe primary hospital = $(481 \times 67) / 564 = 57$

Gedeb Primary hospital = $(481 \times 69) / 564 = 58$

BHUTH hospital = $(481 \times 157) / 564 = 134$

Melka soda primary hospital = $(481 \times 40) / 564 = 34$

Kercha primary hospital = $(481 \times 41) / 564 = 34$

A simple random sampling technique is used to select the study participant. The total number of participants (564) was put into computer generated random sampling number from 1-564. Then, we were taking our participants until the desired sample size (481) is reached (Figure- 1).

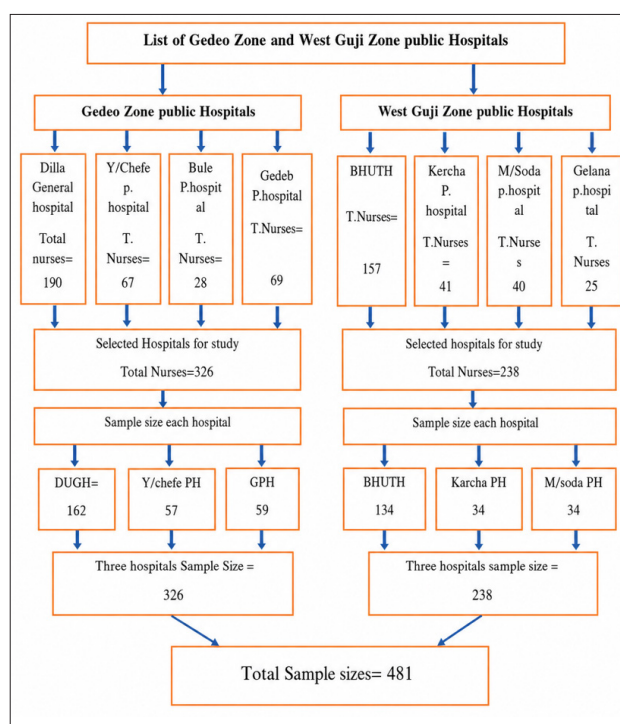


Figure 1: Schematic presentation of the sampling procedure among nurses working in public hospitals, Southern Ethiopia, 2025

Study Variables

Dependent Variables:

Pain management practice of nurses

Independent Variables

Independent variables are categorized into two groups, which include:

Nurse-Related Variables: Socio-demographic characteristics (age, sex, educational status, work experience, and working unit), and knowledge were nurses-related variables

Institutional-Related Variables: In-service training, nurse-to-patient ratio, written policy for pain as the “5th vital sign”, pain assessment tools, pain management guidelines, number of working shifts, and pain-free hospital initiative implementation focal person were institutional-related variables.

Operational Definitions

Nurses Pain Management Practices: Pain management practices are the activities that are provided by nurses and other health care professionals to ensure that the pain is managed effectively [16].

Adequate Nurse to Patient Ratio: When a nurse serves ≤ 6 patients in all units other than the Intensive Care Unit (ICU) which is based on Ethiopian Standard Agency (ESA) for hospitals [1].

Good Pain Management Practice: Refers to those study participants, who have scored mean and/or above the value of the total 21 practice questions [17].

Poor Pain Management Practice: Refers to those study participants who have scored below the mean value of the total 21 practice questions [17].

Good Knowledge: is the Knowledge Status of nurses when they scored more than the mean value of 12 questions [16].

Data Collection Tools and Procedures

Data was collected using a structured and pre-tested self-administered English version questionnaire for independent variables and review of records with similar number of chart review (481) simultaneously using structured check list for nurses' pain management practice then each check list was attached and coded for data entry. The questionnaire was adapted from reviewed literature [1,7,21].

Content validity was done for the instrument by other senior nurses. Six experienced data collectors (BSc nurses), one for each hospital and two MSc nurses for supervision activities who were not employees of the study hospitals was selected.

The training was given for data collectors and supervisor for one day on method of extracting the needed information and the ethical aspect in approaching the participants as well as the aim of the study and contents of the instruments. Therefore, the data collectors informed participants that participating and not participating is their full right and can stop from participation in the study at any time. Any information forwarded is kept private and his/her name is specified to keep confidentiality.

Content validity was done for the instrument by other senior nurses. Six experienced data collectors (BSc nurses), one for each hospital and two MSc nurses for supervision activities who were not employees of the study hospitals was selected.

Data Quality Control

To assure the data quality, pre-tested questionnaires was used. Before 10 days of actual data collection, pretest was done on 5% of study participants at Yirgalem General Hospital. Data was collected by BSc nurses was not employees of the study hospitals. Completeness of data was checked by principal investigator and those trained supervisors.

Data Processing and Analysis

The collected data was checked visually for completeness and the responses was coded and entered into the computer using Epi data version 4.2 statistical package and exported to windows of Statistical Package for Social Science (SPSS) version 25 for data analysis. Results were summarized using frequencies, percentage, measure of central tendency/dispersion, and presented using figures, tables and text.

Binary logistic regression was performed for each independent variable with the outcome variable. A variable whose test have a p value < 0.2 was selected as a candidate for the multivariable logistic regression. Hosmer and Lemeshow's goodness-of-fit test was checked. Then, the association between the outcome and predictors was determined using multivariable logistic regression analysis. The level of statistical significance was determined at a p-value of less than 0.05. Odds ratio with 95% CI was performed on variables to determine the strength of association of variables.

Dissemination of Results

The finding of this study was presented in open defense and submitted to Bule Hora University, West Guji Zone, Southern Oromia, Ethiopia, 2025. It was also be disseminated to each Zonal Health Office and other concerned governmental and non-governmental organizations. The finding of this study was also presented for Gedeo and West Guji Zone Health Office, the zonal administration and other stakeholders who was participating in improving quality of nursing care. Effort was also be made to publish in peer reviewed open access journals.

Result

Sociodemographic Characteristics

The total 468 participated in this study, 97.3% response rate. Of the total, 390 (83.3%) of them were between the ages of 18 and 35 years. Of the total nurses, 250 (53.4%) were male. Of the total, 297 (63.5%) nurses have a bachelor's degree and above educational level. The mean of the respondents' years of experience was 7.0 ± 4.9 SD, and 44.4% of nurses have experience less than or equal to 5 years. Of the total, 22.9% nurses work in a surgical ward followed by emergency ward (21.6%) (Table-1).

Table 1: Sociodemographic Characteristics of Nurses Working in Public Hospitals, 2025.

Characteristics	Category	Frequency	Percent (%)
Age	18-35	390	83.3
	36-55	78	16.7

Gender	Male	250	53.4
	Female	218	46.6
Educational status	Diploma	171	36.5
	Bachelor degree and above	297	63.5
Work experience	>=5 years	208	44.4
	6-10 years	185	39.5
	>10 years	75	16.0
Current working unit	Surgical	107	22.9
	Emergency	101	21.6
	Maternity	97	20.7
	Medical	90	19.2
	ICU	37	7.9
	Pediatrics	19	4.1
	Orthopedics	17	3.6

Institution-Related Factors

Of the total nurses, 342 (73.1%) receive training. Of those, 53 (42.0%) took place within the past year. Additionally, only 124 (26.5%) of nurses take training regarding pain management, and 38 (30.6%) of them take it within the last six months. More than half of nurses' work in areas where nurse to patient ratio is one to six. Two-thirds of study participants work two working shifts and 61.5% of them are assigned pain-free hospital implementation focal persons. Off the total 198 (42.3%) availability of written policy of pain as fifth vital sign (Figure-2).

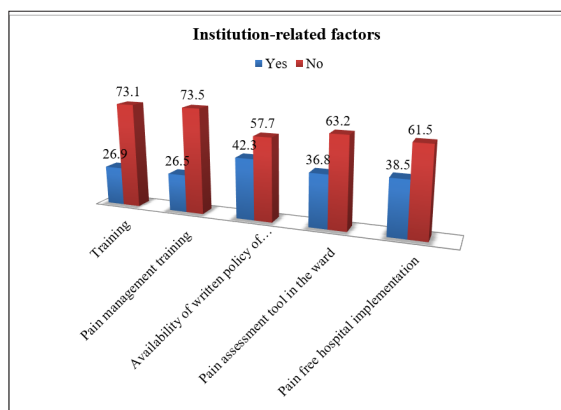


Figure 2: Institutional Related Factors Toward Pain Management Practice in Public Hospitals, 2025.

Knowledge of Nurses Toward Pain Management Practice

The study shows that 240 (51%) of study participant have inadequate knowledge towards pain management practice (Figure - 3).

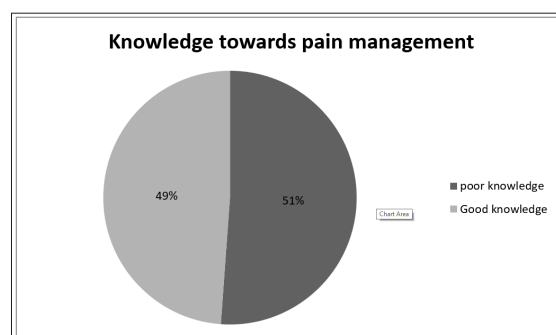


Figure 3: Knowledge of nurses toward pain management practice in public hospitals, 2025.

Nurses' Pain Management Practice

This study revealed that 31.6% (95% CI, 27.4, 35.8) of the study participants have good pain management practices. Among the various methods of pain management, 54.1% of the study participants reported using anti-pain medications. Also, 45.1% managed pain after and before every procedure, and 41.7% monitored the side effects of anti-pain medications as part of their protocol. However, only 33.8% of study participants utilized non-pharmacologic methods to manage pain (Figure - 4).

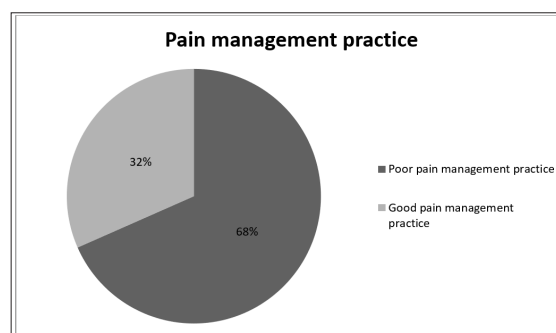


Figure 4: Pain Management Practice of Nurses Working in Public Hospitals, 2025

Factors Associated with Nurses' Pain Management Practice

Based on the bivariate analysis, six variables, namely educational level, work experience, having training, pain management training, nurse to patient ratio and the knowledge of nurses toward pain management, were identified as candidate variables for multivariable logistic regression.

In multivariable logistic regression, four variables were found to be statistically significant with nurses' pain management practice. Those variables educational level, work experience, nurse to patient ratio and knowledge of pain management were significantly associated with nurses' pain management practice.

Nurses with more than 10 years of experience were 2.78 times more likely to have a good pain management practice than those with five or fewer years of experience. [AOR=2.78, CI=95% (1.3, 5.7), P=0.005].

Concerning nurses' educational level, nurses who had a BSc and above were 3.5 times more likely to have a good pain management practice than with those nurses who had a diploma educational level. [AOR=3.5, CI=95% (1.9, 6.1), P= <0.001].

Regarding nurses to patient ratio, a nurse who works in one to eight nurses to patient ratio were 84% less likely to have a good pain management practice as compared to those nurses who works in one to six nurses to patient ratio. [AOR=0.16, CI=95% (0.08, 0.33), $P = <0.001$]. Additionally, a nurse who works in one-to-one nurse to patient ratio were 2.0 times more likely to have a good pain management practice as compared to those nurses who works in one to six nurses to patient ratio. AOR=2.0, CI=95% (1.0, 4.2), $P = 0.04$].

Regarding nurses' knowledge towards pain management, nurse who had good knowledge towards pain management were 8.8 times more likely to have a good pain management practice than those who had poor knowledge towards pain management. [AOR=8.8, CI=95% (5.1, 15.0), $P = <0.001$] (Table-2).

Table 2: Multivariable Logistic Regression Showing Factors Affecting Nurses' Pain Management Practice Among Nurses Working in Public Hospitals, 2025.

Variable	Category	Nurses pain management practice		COR (95%CI)	AOR (95%CI)	P value
		Good (%)	Poor (%)			
Educational status	Diploma	22(12.8%)	149(87.2%)	1		
	BSc and above	126(42.42%)	171(57.58%)	4.9 (3.0,8.2)	3.5(1.9,6.1)*	<0.001
Work experience	≤5 years	56(27%)	152(73%)	1		
	6-10 years	60(32.4%)	125(67.6%)	1.3 (0.8, 2.0)	1.5(0.9, 2.6)	0.125
	>10 years	32(42.6%)	43(57.4%)	2.0 (1.2, 3.5)	2.78 (1.3,5.7)*	0.005
Nurse to patient ratio	1 to 6	98(35.5%)	178(64.5%)	1		
	1 to 8	14(10.7%)	116(89.3%)	0.21 (0.12, 0.4)	0.16(0.08,0.33)*	<0.001
	1 to 1	36(58%)	26(42%)	2.5 (1.4, 4.4)	2.0(1.0, 4.2)*	0.042
Knowledge toward pain management practice	Poor knowledge	26(10.8%)	214(89.2%)			
	Good knowledge	122(53.5%)	106(46.5%)	9.4 (5.8, 15.3)	8.8(5.1,15.0)*	<0.001
Having training	Yes	53(42%)	73(58%)	1		
	No	95(27.7%)	247(72.3%)	0.53(0.34, 0.81)	0.74 (0.24, 2.3)	0.621
Pain management training	Yes	54 (43.5%)	70(56.5%)	1		
	No	94(27.3)	250(72.7%)	0.48(0.31, 0.74)	0.92 (0.29, 2.8)	0.879

1= Reference group, * significant association at p-value less than 0.05

Discussion

The study finding indicates that 31.6% of nurses working in Southern Ethiopia public hospitals have a good pain management practice. The pain management practice among nurses varied depending on their educational level, working experience, nurse to patient ratio and their knowledge of pain management practice.

The finding of this study is in line with the finding of a study done in Egypt (32.7%) [18]. But lower than the findings of studies done in Bahir Dar, (53.6%) West Arsi Zone (53.8%) and West Shoa Zone in Oromia (66%) Amhara Regional State (47.65%) [5,19-21]. The discrepancy might be due to the difference in knowledge towards pain management practice, institutional related factors such as pain management training, availability of pain management guidelines. But the finding of this study is higher than study conducted in Jimma Medical Centre (23.5%) in Debre Tabor Comprehensive Specialized Hospital (26%) and Amhara region (25.8%) [16,17,23]. The discrepancy might be due to the difference in educational status, study population, and work experience of the study participants. In study conducted at Debre Tabor Comprehensive Specialized Hospital, only nurses who had diploma and BSc degree participated. In study conducted in Jimma Medical Centre, more than half of study participants had less than five years of experience.

Nurses with more than 10 years of experience have a good pain management practice than those with five or fewer years of experience. This is consistent with the findings of studies conducted in Bahir Dar and Hawassa University Referral Hospital [5,23]. The possible explanation might be that their years of experience give them a deep understanding of patient needs, technical skills, and knowledge regarding pain management practice. Experiences make them more skillful at interpreting pain scores and their management [5].

Nurses who had a BSc and above educational level have a good pain management practice than those with those nurses who had a diploma educational level. This is consistent with the findings of studies conducted in Bahir Dar, Amhara region and West Arsi Zone [5,9,21]. The possible reason might be due to higher educational levels equip nurses with advanced knowledge and skills towards pain management. Higher academic stages had an opportunity to refer to distinct books and get up-to-date data [19].

Nurses who work in one-to-one nurse to patient ratio have a good pain management practice as compared to those nurses who works in one to six nurses to patient ratio. The possible reason might be high nurse to patient interfering with the time

required for pain assessment, as well as the subjective nature of pain and sedated patients were unable to report their feelings of pain, making it difficult to obtain information about their pain. Also, Nurses gave individualized care, as they could get enough time to manage all [21].

Nurse who had good knowledge towards pain management practice have a good pain management practice than those who have poor knowledge towards pain management practice. This is consistent with the findings of studies conducted in Bahir Dar [21]. The possible explanation might be due to that practice is positively related to knowledge and it can affect health care providers' practicing level directly. Additionally, knowledge about pain and its management practice can avoid confusion regarding pain and the disease condition [20]. The nurses' level of understanding increases as their level of practice improves [24].

Strength and Implication of the Study

The strength of this study arises from the fact that this study employed in multicenter. The data was collected at a single point, reducing cost and time compared to longitudinal designs. Overall, the finding of this study shows that nurses' pain management practices should be improved. This finding provides valuable information to hospital managers, indicating that nurses employ varying pain management practices based on their educational level, work experience, and workload. Therefore, this finding promotes teamwork and collaboration among nurses to share their experience and knowledge regarding pain management.

Limitation of the Study

The nature of the study design did not allow for the establishment of cause-and-effect relationships.

Conclusion

The study findings revealed that one-third of nurses have a good pain management practice. Nurses' work experience, educational level, nurse to patient ratio, and knowledge about pain management practice were the identified independent variables that had a significant effect nurses pain management practice.

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