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NURSES' KNOWLEDGE AND PRACTICES IN PAIN ASSESSMENT AMONG CRITICALLY ILL NON-VERBAL PATIENTS IN THE CRITICAL CARE UNIT, KENYATTA NATIONAL HOSPITAL, KENYA

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ABSTRACT

Background: Intensive Care Unit patients are often unable to report the degree of pain due to sedation and mechanical ventilation and rely on the nurses to diagnose their pain intensity. Therefore, nurses should have adequate knowledge and skills in identifying the patients' hidden pain.

Objective: To determine nurses' knowledge and practices in pain assessment among critically ill non-verbal patients admitted in the critical care unit.

Method: A cross-sectional study design was used. A self-administered questionnaire was used to collect data on 72 critical care nurses working in the main critical care unit. A data abstraction tool was used to extract data from patients' files at the end of each participants' twelve-hour shift. Data was analysed using the R software version 4.1.2. Descriptive statistics, odds ratios and 95% confidence intervals were used to report knowledge /practices and associated factors in pain assessment.

Results: Majority, 87.5%(n=63) of the nurses had inadequate knowledge. Pain assessment practice was poor with 94.4%(n=68) having overall poor practice. Majority of the nurses did not use a valid pain assessment tool attributed reasons being lack of pain assessment tools and lack of knowledge in use of the tools. Social demographic characteristics assessed had no significant relationship with pain assessment practices. Sociodemographic characteristics including female gender(OR=0.13, 95% CI:0.01-1.16, p=0.096), higher diploma(OR=0.25, 95% CI:0.009-6.69, p=0.342), older age(40-49yrs)(OR=0.12, 95% CI:0.005-1.48, p=0.107) and years of nursing work experience(OR=0.35, 95%

CI:0.02-3.01, $p=0.382$) were not significantly associated with nurses' pain assessment practices.

Conclusion: The study found inadequate knowledge in pain assessment and poor pain assessment practices among the critical care nurses. Critical care nurses require Continuous Professional Development programmes that target pain assessment in critically ill non-verbal patients.

Key words: Pain assessment, Critical Care, non-verbal patients, Knowledge, Practice.

INTRODUCTION

The International Association for the Study of Pain (IASP), 2020 describes pain as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage[1]." Pain has been described as the most common and distressing symptom for critically ill patients during their stay in the critical care [2]. According to studies, more than 79% of critically ill patients experience pain during clinical procedures, whilst 33% of patients experience pain at rest [3]. Therefore, accurate pain assessment is an essential part of pain management and is the first step in the Intensive Care Unit(ICU) care bundle that enhances quality improvement initiative to foster early recovery in ICU patients [4].

Patients have subjective perceptions of pain with different degrees of endurance, therefore self-report is considered the most reliable method to assess it and has conventionally been considered the gold standard in its measurement [5]. However, self-report in critically ill patients is frequently compromised by mechanical

ventilation, sedation or invasive procedures performed in the ICU setting [6]. The Society of Critical Care Medicine guidelines recommends regular conduct of a protocol-driven pain assessment that prioritizes pain control prior to the administration of sedatives and use of reliable and valid pain assessment tools in adult ICU patients who cannot self-report [4]. Despite these recommendations, studies have shown inadequate and incorrect pain assessment and treatment practices, with a significant gap in knowledge, practice and attitude among the nurses working in ICU which often result in either overuse or underuse of analgesics [7]. Therefore, this study sought to determine the critical care nurses' knowledge and practices of pain assessment among critically ill non-verbal patients admitted in the critical care unit at Kenyatta National Hospital.

METHODS

Study design:

A descriptive cross sectional study design was used to evaluate the nurses' current level

of knowledge and practices in pain assessment among critically ill non-verbal patients admitted in the critical care unit.

Study Area:

This study was carried out in main critical care unit at the Kenyatta National Hospital, Nairobi county, Kenya. This level 6 hospital is the main referral hospital in Kenya with the highest critical care capacity. The Main critical care unit has over 92.5% bed occupancy and over 72% mechanically ventilated adult patients.

Study population:

All critical care nurses directly involved in patient care and working in the hospital's critical care unit at the time of the study who met the study inclusion criteria.

Sample size and Sampling technique

Census of all the critical care nurses working in the unit who met the eligibility criteria was done with a target of 80% response rate. A total of 72 nurses were interviewed. Data was also extracted from the files of the patients each nurse had cared for throughout the shift. Each participants' documentation on pain assessment was abstracted at the end of the 12 hours shift.

Data collection tools

A self-administered questionnaire was used. The practice questions were adapted from a comparable questionnaire on Critical Care

Nurses' Pain Assessment and Management Practices, utilized in a survey conducted in Canada for both nonverbal and verbal adult patients in critical care settings [8]. These questions were modified to specifically evaluate practices concerning patients unable to self-report. The knowledge questions were taken from the Knowledge and Attitude Survey Regarding Pain, a tool developed by Betty Ferrel and revised in 2014 and customized to address the critically ill non-verbal patients [9]. The knowledge section had fifteen questions with one mark allocated to each correctly answered question and no mark for wrongly answered question. The maximum achievable score was fifteen marks translating to a 100% score. The practice section had questions on a 5 Likert scale.

A data abstraction tool was used to obtain data from the patients' records/files to determine the nurses' actual practice. Data was assessed through extraction of data entries by the nurses on the patients' records/files at the end of their twelve-hour shift. A mark was awarded for every correct entry on the patient's file and for correct use of the recommended pain assessment tool. The total correct score was 100%.

Data Analysis:

Data was analysed using the R software version 4.1.2 and descriptive and inferential statistics were reported. For the descriptive statistics, mean, mode and median were reported. For the inferential statistics, odds ratios and 95% Confidence Interval was used to determine socio-demographic factors

associated with practice and a p value of less than or equal to 0.05 was reported as significant. Nurses who correctly answered $\geq 70\%$ of the questions correctly were considered as having adequate knowledge. Nurses who answered below 70% of the knowledge questions correctly were regarded as having inadequate knowledge level in pain assessment [10]. To assess practices on pain assessment, a score of $\geq 70\%$ was considered as good practice while a score of less than 70% was considered as poor practice [10].

Ethical Consideration

Ethical clearance was sought from the Kenyatta National Hospital (KNH)/University of Nairobi (UoN) Ethics and Research Committee (ERC) KNH/UON ERC (P385/04/2024). Additionally, permission to conduct the study was sought from the management of Kenyatta National Hospital. Approval to undertake this study was also sought from the National Commission for Science Technology and Innovation (NACOSTI) (Ref No. 560013). Informed consent was sought from the participants of the study after a full explanation of the study. The participants were informed that the participation was voluntary with no physical or psychological harm expected. No penalty to those who wished to withdraw from the study. Confidentiality and anonymity of the information and data obtained was carefully maintained and the filled questionnaires were kept under lock and key. Participants

were assured of physical and auditory privacy. No material or monetary benefits were accrued from participation in the study.

RESULTS

Socio-demographic characteristics

A total of 72 nurses working in the ICU were recruited with the majority, (68.1%,n=49) being females. Majority of the nurses, (56.9%,n=41) had attained a Higher Diploma in Critical Care Nursing, 25%(n=18) had a Bachelor's degree, 15.3%(n=11) had a Basic Diploma and the rest had attained a Master's Degree in nursing. The median age of the nurses was 39 years with an interquartile range of 33 to 47 years. Majority of the nurses (41.4 %,n=29) were between the age of 30-39yrs. The median overall experience working as a nurse was 15 years with an interquartile range of 9 to 22 years. Majority of the nurses (36.1%,n=26) had worked as nurses for between 11-20yrs with the minority (2.8%,n=2) having worked as nurses for less than 5 years.

Current Knowledge in Pain Assessment

Majority of the participants (77.2%,n=56) thought that vital signs were always a reliable indicator of pain. Most of the participants incorrectly answered the questions related to the Critical Care Pain Observation Tool (CPOT) with only 8.3%(n=6) correctly identifying parameters assessed when using the CPOT and only 50%(n=36) correctly identifying the maximum score in the tool. This is shown in the statements illustrated in table 1 below:

Table 1: General Knowledge in Pain Assessment

Question Statement	n (%)
Vital signs are always reliable indicators of a patient's pain	56 (77.2%)
Physician is the most accurate judge of the patient's pain	68 (94.4%)
Comparable stimuli in different people produce the same pain intensity	62 (86.1%)
Sedated patient cannot be assessed for pain	53 (73.6%)
Analgesics can be given without first assessing the patient	47 (65.3%)
Important to assess pain among patients with Glasgow coma Scale>8	65 (90.3%)
Patients who can be distracted from pain usually do not have severe pain	41 (56.9%)
Self-report is the single most preferred method of pain assessment	27 (37.5%)
A reliable and valid behavioral pain scale should be used	70 (97.2%)
intubated and sedated patients do not require routine monitoring of pain	71 (98.6%)
CPOT Score of ≥ 5 indicates that the patient is in pain	10 (13.9%)
Parameters assessed when using the CPOT: Facial expression, restlessness, muscle tone, vocalization, and consolability	6 (8.3%)
When assessing a patient's facial expression using the CPOT, the highest score is 1	27 (37.5%)
When using the CPOT, the patient should be attributed the highest score observed	16 (22.2%)
Maximum score while using a CPOT is 12	36 (50%)

Only 12.5%(n=9) of the nurses had adequate knowledge on pain assessment

i.e had a mean score of 70% or more as shown in figure 1 below

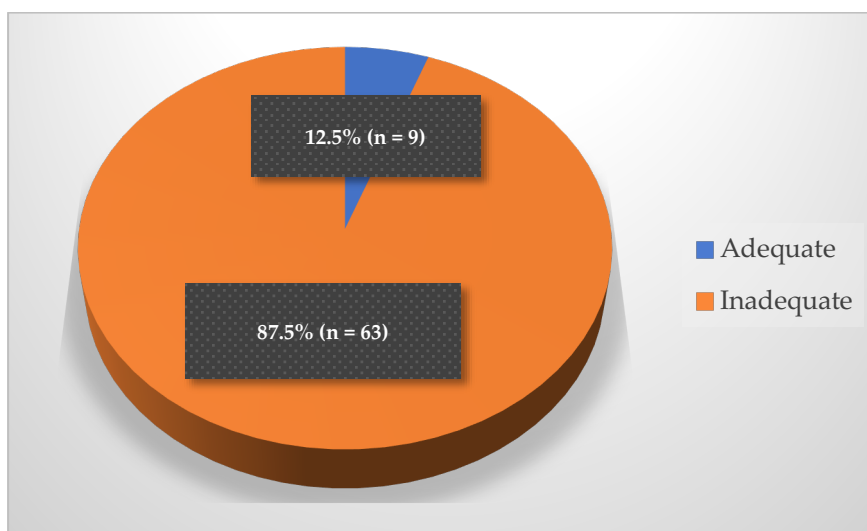


Figure 1: Overall knowledge of pain assessment

Nurses' practices in pain assessment

Nurses' Self-reported Practices:

Majority(38.9,n=28) of the participants reported often using behavioral pain

assessment tools in pain assessment with only 13.9%(n=10) using it routinely. 31.9%(n=23) also reported often documenting pain scores and discussing the results during nurses' change-over shift with 38.9% (n=28) reporting sometimes discussing the scores during ward rounds. This is shown in table 2.

Table 2: Nurses Self-reported practice (n = 72)

Nurses Practice	Never (1)	Seldom (2)	Sometimes (3)	Often (4)	Routinely (5)
How often do you use behavioral pain assessment tools?	3 (4.2%)	4 (5.6%)	27 (37.4%)	28 (38.9%)	10 (13.9%)
I consider assessment of pain as important as assessment of the vital signs.	3 (4.2%)	2 (2.8%)	4 (5.6%)	33 (45.8%)	30 (41.7%)
How often do you use behavioral pain assessment tools to guide the treatment plan?	2 (2.8%)	12 (16.7%)	19 (26.4%)	30 (41.7%)	9 (12.5%)
How often do you document and report pain?	1 (1.4%)	7 (9.7%)	22 (30.6%)	23 (31.9%)	19 (26.4%)
How often is pain assessment discussed during handover?	1 (1.4%)	7 (9.7%)	22 (30.6%)	23 (31.9%)	17 (23.6%)
How often are pain scores discussed during ward-round?	3 (4.2%)	7 (9.7%)	28 (38.9%)	21 (29.2%)	12 (16.7%)
How often do you receive CMEs on pain assessment tools?	10 (13.9%)	24 (33.3%)	27 (37.5%)	10 (13.9%)	1 (1.4%)
How often do you read published guidelines regarding pain?	7 (9.7%)	17 (23.6%)	30 (41.7%)	14 (19.4%)	3 (4.2%)

Self-reported pain assessment tools/method used

Majority (62.5%,n=45) of the nurses reported to have used the Critical Care Pain Observation Tool while 50%(n=36) reported to have used the Behavioral Pain Scale (BPS). Other tools/methods reported to have been in use include Pain Affect Faces Scale(26.4%,n=19), Simple Descriptive Pain Intensity Scale(22.2%,n=16), The Visual Analogue Scale(19.4%,n=14), Numerical Pain Assessment Scale(8.3%,n=6), Universal Pain assessment Tool(1.4%,n=1), Nonverbal cues(1.4%,n=1) and changes in vital signs(5.6%, n=4).

Reasons for non-use of pain assessment tools

Participants who did not use pain assessment tools reported various reasons

for not using any tool. These included the lack of guidelines on pain assessment tools (22.2%,n=16), lack of pain assessment tools (12.5%,n=9) and lack of knowledge on pain assessment tools (13.9%,n=9). Other reasons included staff shortage(1.4%,n=1), time consuming(2.8%,n=2) and some considered that pain assessment should be the doctors' role(2.8%,n=2).

Actual practice in pain assessment

From the data that was abstracted from the patients' records/files documented by the nurses at the end of the shift, only 21%(n=15) of the participants had conducted pain assessment using a pain assessment tool as shown in Figure 2. This contradicts the findings from the self-reported practice where a higher number of nurses reported using various tools in pain assessment.

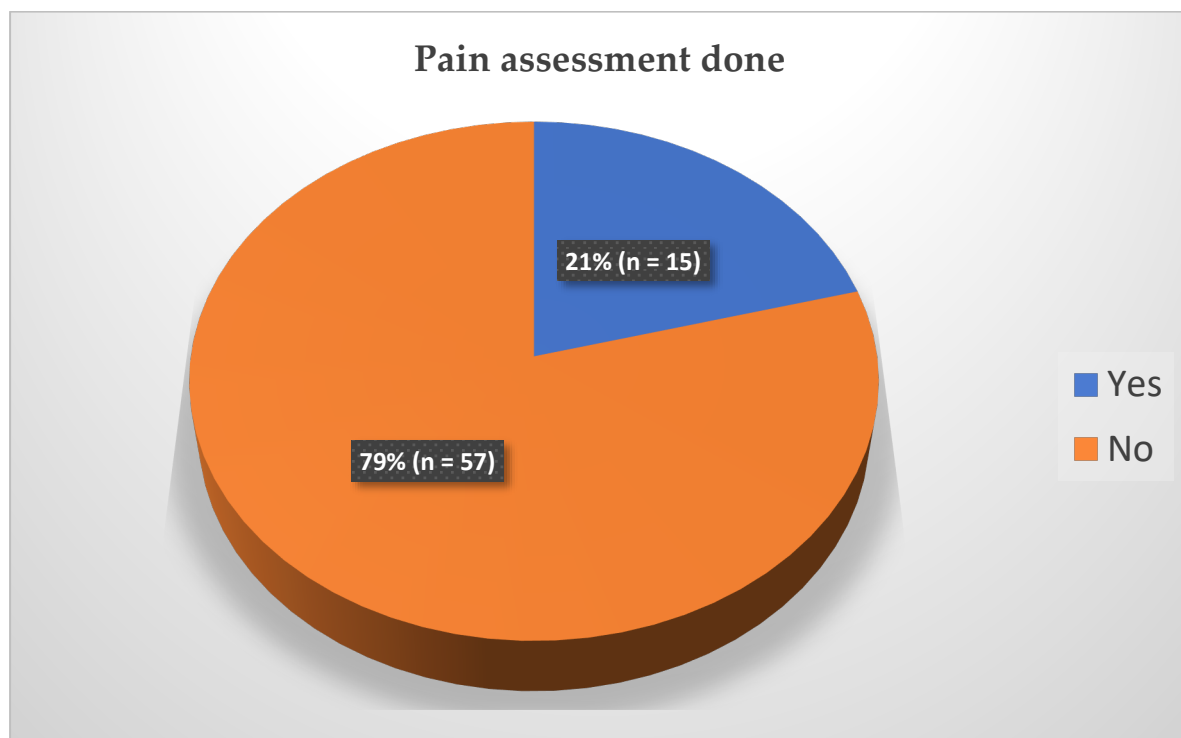


Figure 2: Proportion of nurses who assessed pain

In actual practice, 93.3% (n=14) of the 15 nurses who assessed patients for pain used a pain assessment tool. Out of the 14 nurses who used a pain assessment tool, majority, (42.3%, n=9) used the numerical pain assessment tool while only 14.3% (n=2) used the recommended behavioral pain assessment tools. Majority (57.1%, n=8) of the nurses who assessed for pain did so Eight hourly while 7.1% (n=1) assessed after noxious procedure. Only 28.6% (n=4) of those participants who assessed for pain correctly used the pain assessment tool to make pain diagnosis.

Out of 14 nurses who carried out pain assessment, 92.9% (n=13) could detect pain indicators from patient's facial expression correctly, 71.4% (n=10) could correctly identify pain indicators from the patient's body movements and a similar number from muscle tension while 64.3% (n=9) could correctly diagnose pain from non-compliance with the ventilator. After pain assessment, 57.1% (n=8) nurses notified the physician about the patient's pain with a similar number discussing the pain during ward rounds, 50% (n=7) provided pain intervention after pain diagnosis while only 7.1% (n=1) reassessed pain after intervention.

Overall pain assessment practice

Majority of the participants 68 (94.4%) had poor pain assessment practice i.e got a mean

score of 70% or less as shown in figure 3 below.

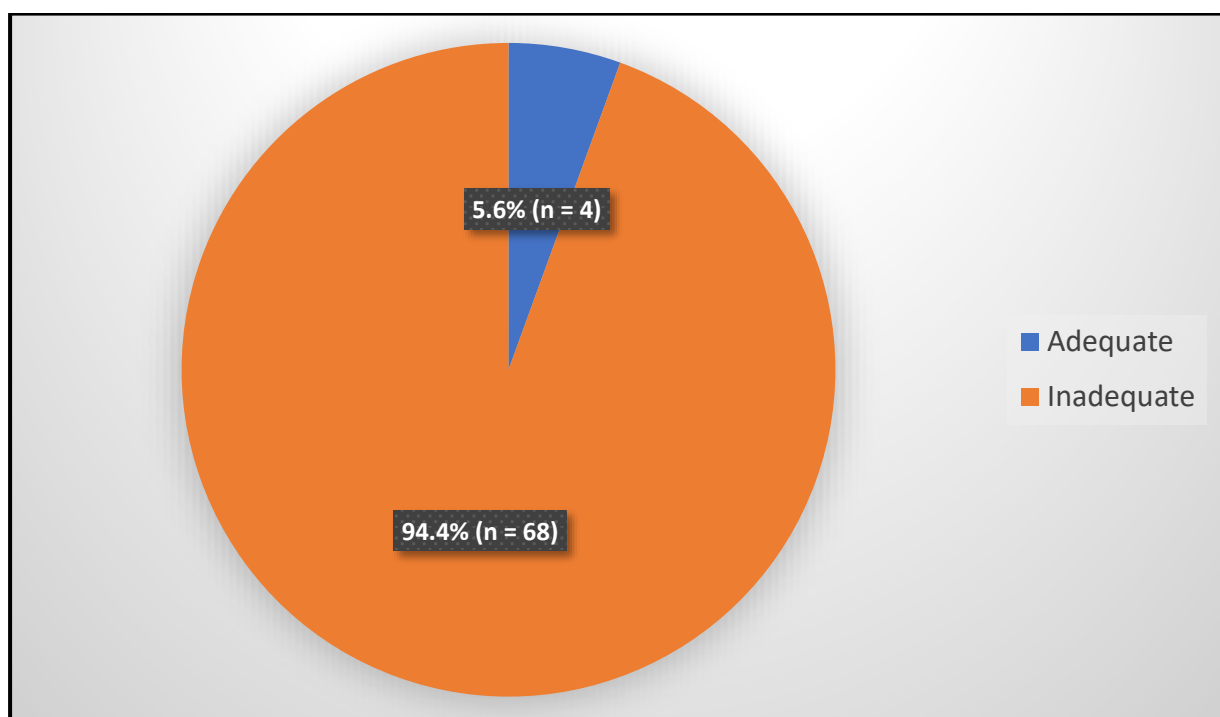


Figure 3: Nurses overall pain assessment practice

Relationship between Social Demographic Characteristics and nurses' practice

Sociodemographic characteristics including female gender(0.13, $p=0.096$), higher diploma(0.25, $p=0.342$), older age(40-

49yrs)(0.12, $p=0.107$) and years of nursing work experience(0.35, $p=0.382$) were not significantly associated with pain assessment practices among nurses as shown in the table 3 below:

Table 3: Relationship between Social demographic characteristics and nurses' practice

Characteristics	Practice		Crude OR (95% CI)	P value
Gender	Good = 4	Poor = 68		
Female	1	48	0.13 (0.01, 1.16)	0.096
Male	3	20	<i>Reference</i>	
Level of education				
Diploma	1	10	<i>Reference</i>	
Higher Diploma	1	40	0.25 (0.009, 6.69)	0.342
Bachelor's	2	16	1.25 (0.11, 28.98)	0.863
Masters	0	2	N/A	0.996
Age in years				
20-29 years	2	5	<i>Reference</i>	
30-39 years	1	28	0.09 (0.004, 1.10)	0.067
40-49 years	1	21	0.12 (0.005, 1.48)	0.107
≥50 years	0	12	N/A	
Years of experience as a nurse				
5-10 years	3	20	<i>Reference</i>	
<5 years	0	2	N/A	0.999
11-20 years	0	26	N/A	0.996
>20 years	1	19	0.35 (0.02, 3.01)	0.382
Duration working in the ICU				
<5 years	4	19	<i>Reference</i>	
5-10 years	0	25	N/A	0.996
11-20 years	0	20	N/A	0.996

>20 years	0	4	N/A	0.998
Trained as a critical care nurse				
Yes	4	44	N/A	0.994
No	0	24	<i>Reference</i>	

Abbreviations: OR- Odds ratio; CI- Confidence interval; N/A - Not applicable.

DISCUSSION

The results of this study indicated that, majority of the nurses had inadequate knowledge in pain assessment. These findings are similar to a study done in Rwanda that showed that the majority of the nurses (67.2%) did not have adequate current knowledge on pain assessment [11]. The findings of this study were however different from a study done in a private Hospital in Bangladesh which indicated that the majority of the participants (98.4%) had adequate knowledge in pain assessment [12]. This discrepancy could be related to the fact that the study in Bangladesh was done in a private hospital and the participants were purposively sampled which could have been biased to those that were knowledgeable. This study and that done in Rwanda were done in public hospitals where little focus is made on Continuous Professional Development sessions that focus on pain assessment in critically ill non-verbal patients.

This study demonstrated that the majority (77.2%,n=56) of the nurses always considered changes in vital signs as a reliable indicator of a patient's pain. The Society of Critical Care Medicine 2018 Clinical Practice Guidelines for pain in ICU recommends against use of changes in vital signs as valid

indicators of pain in critically ill patients and should only be used as cues to initiate further assessment using appropriate and validated pain assessment tools [13].

The findings of this study are similar to those of a study done in two Australian metropolitan departments which indicated that nurses relied on changes in the vital signs to detect the presence of pain [14]. A recent systematic review examining 30 studies across six continents demonstrated poor reliability and validity of changes in vital signs as an indicator of pain. Fluctuations in the values of the vital signs during nociceptive procedures is not often clinically significant [15].

In this study, the majority of the nurses lacked knowledge on the Critical Care Pain Observation Tool (CPOT) and did not know the parameters in the tool used for assessing pain(91.7%,n=66). This indicates that the participants knowledge on the CPOT was inadequate and underscores the importance of training the nurses on the CPOT.

This study also demonstrated a significant discrepancy between nurses' self- reported pain assessment practices and their actual implementation in practice. From self-report, nurses reported to have used at least one of the validated pain assessment tools in pain assessment while in actual practice only

19.4%(n=14) of the participants used a pain assessment tool. This shows that nurses are aware of the pain assessment tools used in critically ill patients but there are no guidelines on use of the tools in the critical care unit, no pain assessment tools are in place and the nurses do not know how to use the pain assessment tools for critically ill nonverbal patients. This is similar to a study done in Australia that showed that the most valid and reliable pain assessment tools were rarely used which indicates that the use of validated pain assessment tools to assess pain in critically ill patients is poor despite respondents recognizing the importance of pain management [16].

The low percentage in use of the CPOT in this study also adds to the findings of a previous research study done in a University affiliated Hospital in Quebec that showed that less than one quarter of documented pain assessments used CPOT despite the majority of the patients having altered levels of unconsciousness [17]. This shows that behavioural pain assessment tools are underutilized despite recommendations outlined by the clinical practice guidelines on pain assessment.

This was however different from a study done in Jordan which showed that the majority of the nurses used pain assessment tools for critically ill patients. This was expected because most of the hospitals in Jordan follow accreditation requirement measures that indicate the importance of using pain assessment tools to measure patients' pain in different clinical settings [18]. However, the study also showed that nurses perceived the use of pain assessment

tools for patients able to communicate as being more important than use of pain assessment tools in patients unable to communicate [18].

This study found out that 79%(n=57) of the nurses did not conduct and did not document pain assessment despite most of the patients being critically ill with various invasive and non-invasive procedures being performed on them. Overall scores showed that the majority (94.4%, n=68) of the nurses had poor pain assessment practices. This is inconsistent with a study that was done in several hospitals in Addis Ababa, Ethiopia that showed that more than half of the participants had good pain assessment practices [10]. The disparity could be attributed to a higher sample size used in the study in Ethiopia, availability of pain assessment tools, an ongoing professional development program and pain assessment initiatives, staffing and presence of pain assessment guidelines in Ethiopia.

In this study, none of the demographic factors that were assessed were significantly associated with the knowledge or practice of pain assessment in critically ill patients ($p < 0.05$). This was similar to a study done in Mexico which showed that variables including qualification, years of experience, shift rotation, were not significantly associated with the use of a pain assessment tool by the nurses [19]. Knowledge and practice could be influenced by institutional factors rather than individual demographic characteristics.

STUDY LIMITATIONS

In this study, nurses' practice depended on secondary data collected from the patients' files or records and not on physical observation of the nurses while performing their clinical duties. However, each nurse was observed for CPOT entries in the patient's file at the end of their shift with assumption that what is not documented is not done.

This is single centre study and thus cannot be generalized to the entire nurses population. Multicenter studies are needed for more comparable data.

CONCLUSION

This study revealed that the overall level of knowledge on pain assessment of critically ill non-verbal patients among the nurses was inadequate. Most of the nurses consider vital signs as reliable indicators of a patient's pain intensity which is contrary to pain management guidelines.

The overall pain assessment practices among the critical care nurses was poor. The nurses did not use pain assessment tools recommended for non-verbal patients. Reasons cited for poor pain assessment practices include lack of pain assessment guidelines, lack of pain assessment tools and lack of knowledge on the pain assessment tools. Critical Care Nurses require continuous Professional Development Programmes targeting pain assessment among the critically ill non-verbal patients. The unit should adopt a standardized pain assessment guideline/policy for seamless patient care.

DECLARATIONS

Conflict of interest: The authors declare no conflict of interest

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Authors Contribution: HK: Conceptualization, methodology, data collection, formal analysis, original draft, review & editing writing. JM: supervision, methodology, review & editing of writing. EG: supervision, methodology, review & editing of writing. GM: supervision, methodology, review & editing of writing.

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