

**ADDIS ABABA UNIVERSITY**

**COLLEGE OF HEALTH SCIENCES**

**DEPARTMENT OF EMERGENCY MEDICINE**



**KNOWLEDGE, PRACTICE AND ASSOCIATED FACTORS ABOUT  
GLASGOW COMA SCALE ASSESSMENT AMONG NURSES  
WORKING IN ADULT INTENSIVE CARE UNITS OF FEDERALLY  
ADMINISTERED HOSPITALS, ADDIS ABABA, ETHIOPIA.**

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**A RESEARCH THESIS RESULT SUBMITTED TO THE  
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**ADDIS ABABA, ETHIOPIA**

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**Approval by the board of examination**

This thesis by Habtamu Andualem is accepted in its present form by the board of examiners as satisfying the thesis requirement for the degree of master in emergency medicine and critical care nursing.

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## **ACRONYMS & ABBREVIATION**

A&E:- Accident and emergency

AaBET:-Addis Ababa Burn, Emergency and Trauma Hospital

AAU: - Addis Ababa university

AICU: - Adult intensive care unit

BSc:-Bachelor of Science

CI: - Confidence interval

FMOH: - Federal ministry of health

GCS: - Glasgow coma scale

ICU: - Intensive care unit

MSc: - Master of science

RNS:- Registered nurses

SPSS:-Statistical package for social science

STD: - Standard deviation

UAE:-United Arab Emirates

## ABSTRACT

**Background:** Glasgow Coma Scale is an important tool in assessing patients' level of consciousness. An assessment of GCS is considered a primary action of nurses who care for patients with neurological or neurosurgical problems. However, still, now many kinds of literature review showed that most of the nurses did not consider Glasgow coma scale assessment as their scopes. Therefore this study had assessed the knowledge, practice, and factors affecting Glasgow coma scale assessment among nurses working in adult intensive care units of Addis Ababa federally administered hospitals, Ethiopia.

**Objectives:** To assess knowledge, practice and associated factors of nurses towards Glasgow coma scale assessment among nurses working in adult intensive care units of federally administered hospitals, Addis Ababa, Ethiopia, from April 4-24, 2020, G.C.

**Methods:** Institutional based cross-sectional study with a structured self-administered questionnaire was conducted from April 4-24 among 126 AICU nurses in Addis Ababa federally administered hospitals in Ethiopia. The collected data were entered into Epi-data version 4.6 and exported to SPSS version 21.0 software for analysis. Associations between independent variables and dependent variables will be analyzed by using bivariate and multivariate logistic regression.

**Result:** -This study revealed that while many nurses may have knowledge about the basic theoretical concepts of the GCS, they are not able to apply that basic knowledge in clinical scenarios. In addition, education level and sex were factors significantly associated with nurses' levels of knowledge and clinical practice.

**Conclusion:** -The findings from this study showed that nurses had low levels of knowledge and clinical practice about the Glasgow coma scale.

**Keywords:** - Glasgow coma scale, knowledge, practice, intensive care unit

# 1. INTRODUCTION

## 1.1. Background:

Glasgow Coma Scale (GCS) is defined as a neurological scale that used to quantifying and recording the conscious state of a person, for initial as well as subsequent patient assessment. It is the first standardized neurological tool used to assess patients' level of consciousness (1,2).

It was first- introduced by Teasdale and Jennet in 1974 targeting at standardizing the assessment of the level of consciousness in head-injured patients. It has been used primarily in evaluating prognosis, comparing different groups of patients and monitoring the neurological status. From the time when GCS was developed, it has been used worldwide because it enhances communication among health care practitioners through a common reporting language. Over the years, its use has been extended to the assessment of consciousness in other clinical specialties and research projects (3,4).

GCS composed of three components: - eye-opening, best verbal response, and best motor response. The scale uses the numeric system with a total score ranging from 3 to 15. Reporting each of these separately as well as by summing provides a clear, communicable picture of a patient's state. The total score is used in classifying head injuries into mild (13-15), moderate (9-12) and severe (3-8) (5,6).

Consistent assessment and communication of the GCS at different times and between different observers are essential in patient care. However different studies showed that nurses are inconsistent and inaccurate when they perform the GCS in a mentoring system, which is a important component of assessment and care of patients experiencing trauma, surgery, and neurological effects (7-9).

The proper use of measurement scale in the assessment of patients' consciousness status is not only necessary to assess the patient's prognosis but also as a basis for decision-making especially by doctors and nurses. Since a proper neurological assessment is a crucial part of nursing care; nurses working in critical care should use assessment of consciousness level as easily as other routine observations of vital signs. Nurses should have the knowledge, skills, and qualification to competently carry out a neurological assessment using the GCS technique (10,11).

## 1.2. Statement of the Problem

Nurses providing care for seriously sick patients face situations with any type of neurologic disorder that may require GCS assessment; which is considered as a primary function of nurses (4,12). Failure to assess GCS is the common cause of avoidable mortality and morbidity after a head injury because of delays in the detection and timely treatment of complications. Nurses are frontline health care professionals working with patients. Therefore, they should be knowledgeable and confident in the GCS assessment (13,14). However many studies that have been done to assess knowledge of nurses and other clinicians about the GCS have reported poor knowledge and incorrect practice about this important tool (9,15).

Nowadays nurses' knowledge and clinical practice about the Glasgow Coma Scale is a global problem. For example, a study conducted in America on 217 various emergency care providers to determine the degree of accuracy of GCS scoring shown that; overall GCS scoring accuracy for all levels of providers was 33.1%. Resident physicians were the most accurate in using the GCS 51.0%; while nurses were least accurate 29.0%. A total of 9.2% of subjects assigned GCS scores that do not exist in the GCS scoring system(for example zero) (2,16).

A study conducted on the assessment of nurses' knowledge in Malaysia, United Arab Emirates, and Ghana showed that 55.56%, 33.3%, 49.4% of participate nurses had poor knowledge respectively (6,17,18).

This insufficient knowledge and practice in these areas possibly will limit their capacity for clinical judgment and decision making in managing unconscious patients. So re-learning and updating of this priceless clinical device will help for the right assessment of the neurological status of patients(19,20).

This pattern of poor knowledge and practice of nurses about such a life-saving and fairly simple device in many countries calls for an evaluation of the situation in Ethiopia. To the researchers' knowledge, this is the first study to assess nurses' knowledge, practice and associated factor about GCS specifically in Addis Ababa federally administered hospitals. Therefore, this study is intended to assess and describe the existing knowledge and practice gap.

### 1.3. Significance of the Study

Lack of knowledge and practice in this device would invariably impact negatively on the care of patients with altered level of consciousness, because worsening in clinical status may not be readily detected until the condition becomes worse or irreversible.

This study was revealed the degree of knowledge and practice nurses have on GCS, which will, in turn, inform policymakers about the problem and associated factors which will help designing an intervention that remedies any deficiencies in knowledge and improves practice towards Glasgow coma scale assessment. The study finding will encourage nurses' to perform the Glasgow coma scale assessment at bedside routinely. And also it helps as baseline information for further studies

The investigation findings will help Addis Ababa federal hospitals to implement a guideline for nurses, to ensure they will utilize the GCS regularly and appropriately to assess their patients. This study also provides baseline information to other researchers to work on further research-related issues.

## 2. LITERATURE REVIEW

### 2.1 Nurses level of knowledge on using GCS

A descriptive cross-sectional study was conducted to assess knowledge of 135 nurses in Malaysia showed that, more than half (55.56%) of the nurses had poor knowledge, 41.48% had moderate knowledge, and only 2.96% study participant had good knowledge about Glasgow coma scale(17). A similar study done in UAE showed that 50.6% of respondents had good knowledge and 49.4% had poor knowledge of the GCS (6)

A descriptive study was carried out at the University of Baghdad, starting from 1<sup>st</sup> Jan to the end of April 2011 G.C on purposive samples of 100 nurses and the result of the study outcome showed that nurses' knowledge about Glasgow coma scale assessment was inadequate (1).

A study conducted to assess the knowledge of 226 nurses on the Glasgow coma scale at one tertiary hospital in EDO state, in 2016 in Nigeria revealed that 41.7% of the respondents had adequate knowledge, 25% fair knowledge and 33.3% had inadequate knowledge about Glasgow coma scale (4). Another similar study conducted in Ghana revealed that from the 115 participants; (18%) had good knowledge, (31.3%) had moderate knowledge, (50.4%) had inadequate knowledge of the GCS as a whole (21).

### 2.2 Nurses practice towards GCS Assessment

British national institute for health and care excellence (2014) suggests for patient head injuries, GCS assessments should be undertaken every 30 minutes for two hours, hourly for four hours and every two hours thereafter (22). The study conducted in Vietnamese, among 98 neurology wards, neurosurgical department, and neurosurgery intensive care unit nurses about the accuracy of Glasgow Coma Scale Knowledge and Performance showed that 90% of responded correctly to questions regarding their GCS basic theoretical knowledge whereas, only 47.9% of the nurses answered correctly questions related to clinical scenarios requiring the application of the basic knowledge (23).

The study conducted on nurses' consciousness assessment practices in Europe revealed that the majority of respondents use a standard instrument to assess consciousness. The majority of them used the tool mainly for clinical decision making and communication. Evaluation of the Glasgow coma scale was part of the daily routine for a majority (95%) of bedside nurses, that they assess nearly six times over their shift(24). A related study was conducted in Great Britain

on nursing students' understanding of GCS; showed that the majority(62%) of study respondents were not certain in the practical use of the GCS **(25)**.

A study carried out in Egypt on 36 nurses' to assess the impact of educational programs on nurses' knowledge and practice towards GCS indicated that nurses with the educational intervention were more likely to have good skills towards GCS **(26)**. Another related study conducted at Cairo, Egypt on 37 participant nurses' to evaluate their competent level of practice in pre, post and two months later after implementing the educational training program. It appeared that there were highly statistically significant differences between pre/post-tests ( $p=0.05$ ). The most obvious increase in the mean practice scores was observed between pre/posttest regarding the assessment of eye-opening response, Assessment of verbal response and recording as the mean scores were  $(91.06\pm 12.2, 90.32\pm 3.1 \& 89.07\pm 10.9)$  respectively **(10)**.

A study conducted on knowledge of nurses on the Glasgow coma scale in the neurological assessment of patients in Nigeria on 226 nurses shown that 76.4% do not use GCS and only 23.4 % of the respondents were self-confident in assessing GCS **(4)**.

### **2.3. Factors which affect Nurses correctly assessing the GCS of patients**

#### **2.3.1. Health Care Provider's Factors**

Experience and education significantly enhance the reliability of the assessment of the patient using the GC **(27,28)**. Prospective observational study on variability in an agreement between physicians and nurses when measuring GCS in ED in Australia shown that agreement between doctors and nurses for eye scores was lower for nurses with <2 years of experience compared with more experienced nurses, but the level of experience of doctors or nurses did not otherwise affect the level of agreement **(29)**.

A study conducted on 114 registered nurses (RNS) in acute care hospitals in Singapore showed that nurses with lesser work experience have lower self-confidence in using the GCS **(30)**. Another study was done in Singapore shown that Knowledge and experience were found to be the most significant factors in determining nurses' performance of patient conscious level assessment. Formal training was found to be effective in improving assessment skills and experience greatly affected the accuracy of assessment **(31)**. On the other hand results of a similar study conducted at Jordan contradict the study done in Singapore; that there was no statistically significant relationship between knowledge level and years of experience. Moreover, there were no statistically significant relationships found between those who had

training and those who did not have but the working place was the main factor that significantly associated with nurses' knowledge (2).

On the other hand, an Evaluative study conducted in India using purposive sampling of 55 staff nurses and the findings of this study revealed that Self Instructional Module was an effective way to enhance the knowledge and clinical practice among nurses working in critical care units (32). Another related study was conducted on the assessment of nurses' knowledge of GCS in Malaysia shown that there was a statistically significant association between knowledge and education level. On the other hand, the result on the relationship between knowledge and age group showed that age was the main factor that significantly associated with knowledge ( $p < 0.05$ ) and nurses with experience are more likely to have a skill as shown in this study (17).

A study conducted on knowledge of nurses on the Glasgow coma scale in the United Arab Emirates in 2018, revealed that there was a significant relationship between gender, years of experience and GCS training with a level of GCS knowledge (6). A similar study was done in Saudi Arabia on 149 ICU and ER nurses showed that those with a postgraduate degree and nurses reporting no previous training in the GCS were found to have more knowledge of the GCS (9).

A study conducted on knowledge of nurses on Glasgow coma scale in the neurological assessment of patients at a tertiary hospital in EDO state, in 2016 in Nigeria on 226 nurses indicates that lack of ongoing training or updates on GCS, and lack of enforcement from the nursing coordinators in the use GCS assessment were the major factors contributing to non-use of GCS by nurses (19). The study was done in Ghana, of the 115 participants showed that there was a significant relationship found between participants' sex and their knowledge of the GCS, with female nurses was better levels of knowledge than male nurses (18).

### 2.3.2. Patient-Related Factors

The study showed that GCS assessment is influenced by intubation, sedation and Peri-orbital edema: since they cannot be tested. This does not, still, bring about a GCS aggregate score that is illustrative of their actual neurological state (33,34).

Narrative review methodology study on Practical use of the Glasgow Coma Scale; done in Australia shows that overestimation GCS assessment of brain damage produced by temporary factors such as alcohol, hypoxia, hypotension any underlying disease (35).

International surveys study done on lack of standardization of GCS in Belgium showed that; if the patient is intubated, 67% would record the designation 'T,' 17% assign a score of 1 (V1), whereas 15% excluded the item altogether and there was a similar degree of discordance in the application of the GCS to patients who were sedated: 42% of responders felt that this rendered the application of the GCS impossible, but 29% assigned the best score under the sedation (7).

A study conducted on the assessment of nurses' knowledge of 135 nurses' in Malaysia showed that 63.7% participants were said GCS assessment can be used on an intubated patient's; on the other hand for swollen eyes 84.4%, of them answered correctly by saying "closed (C)" will be used to label it (17).

### **2.3.3. Organization Related factors**

A study done in British about the analysis and limitation of GCS recommend that there should be a standard or protocol of GCS assessment (36). Experienced nurses, including nurse managers, knowledgeable in the use of the GCS should mentor those less experienced in its use and assist in verifying their GCS assessments when these nurses are doubtful of their assessment findings. The frequency of monitoring also depends on the number of personnel and the number of patients being monitored. Educational interventions and guidelines for performing GCS assessment are also suggested to maintain clinical skills in performing the GCS (5,31,37).

A study done on nurses' knowledge about GCS in Jordan showed that there was a significant relationship found between participants' working hospitals and their knowledge of the GCS (2)

Another study conducted on knowledge and skill of nurses on Glasgow coma scale in the neurological assessment of patients at an intensive care unit, in 2015 in Egypt on 50 nurses shown that a short training course would be needed to make sure that nurses can use the GCS effectively while minimizing errors for improving the care of the patients in the critical care units. Lack of ongoing clinical training and lack of enforcement by nursing directors' were the major factors contributing to the non-use of GCS by nurses. On the other hand, two major factors identified as barriers to use the GCS as assessment tool among the respondents were a shortage of staff and a lack of continuous training on the use of the GCS (4,38).

Another study done in Tanzania showed that factors that make it difficult for nurses to assess patients by using the GCS include work overload, shortage of resources, lack of GCS documentation sheet for scoring and agitate patients (39).

## 2.4. Conceptual Framework

This conceptual framework adapted from (4,12,30,39). It has three main factors: health care provider factors, organizational factors and patient-related factors which may affect Nurses' knowledge and practice of GCS assessment.

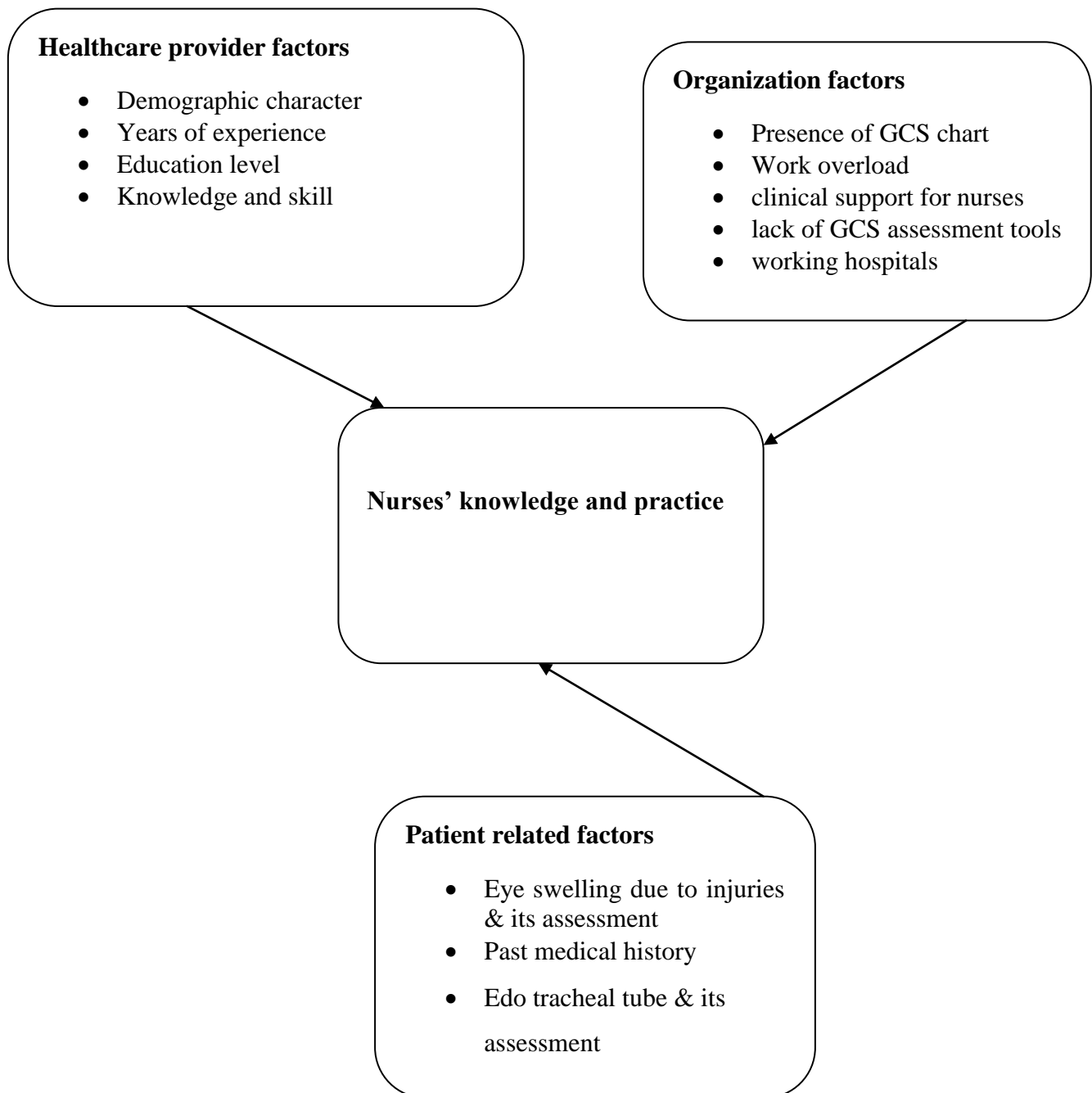


Figure 1: A conceptual framework of nurses' knowledge and practice about the Glasgow coma scale which summarizes the relationship among dependent and independent variables.

### **3. OBJECTIVES**

#### **3.1 General Objective**

To assess knowledge, practice and factors affecting GCS assessment among nurses working in adult intensive care units federally administered public hospital, Addis Ababa, Ethiopia, 2020.

#### **3.2 Specific Objectives**

I. To assess nurses' level of knowledge about GCS among nurses working in adult intensive care units federally administered public hospital, Addis Ababa, Ethiopia, 2020.

ii. To assess nurses' practice on scoring critically ill patients by using GCS among nurses working in adult intensive care units federally administered public hospital, Addis Ababa, Ethiopia, 2020.

iii. To identify factors that affect the use of GCS in patients assessment among nurses working in adult intensive care units federally administered public hospital, Addis Ababa, Ethiopia, 2020.

## 4. METHODOLOGY

### 4.1 Study Area

Addis Ababa is found almost in the center of Ethiopia and it is at an altitude of about 2,400 meters above sea level. It had an area of 290 square km in 2007 and has an estimated population of 4 million (40). Currently, Addis Ababa has 12 governmental and more than 40 private hospitals. From 12 hospitals, the Federal Ministry of Health (FMOH) manages five, two are under the Army and Police, six are under the city government of the Addis Ababa health bureau (41). This study was conducted in all federally administered Addis Ababa hospitals except AaBET (affiliates of St. Paul's hospital) and Yeka kotebe hospital due to corona virus pandemic whereas Amanuel hospital was excluded due to it provides specific mental health services. Federally administered hospitals was selected purposively because both of them had well organized AICU which usually admit critically ill patients with altered levels of consciousness who required regular Glasgow coma scale assessment.

**Black Lion hospital** This hospital is the largest referral and comprehensive hospital in the country. The hospital adult ICU has six medical and six surgical beds. The AICU unit is staffed with 37 Bsc. nurses, 5 MSc. Nurses and different multidisciplinary resident and senior physicians.

**St. Paul's hospital** It is one of tertiary-care teaching multi-facility and multi-disciplinary medical center for Ethiopia. The hospital adult ICU has 9 beds with a mechanical ventilator and 5 beds without a mechanical ventilator which serves as patient recovery after weaning. The AICU is staffed by 42 nurses, different multidisciplinary residents, and senior specialist physicians.

**St. Peter Hospital:** It is one of the main tuberculosis hospitals in Ethiopia. It has a total of 292 beds of which 68 are exclusively designated to TB patients. Currently, the hospital receives both trauma and medical patients. The hospital adult ICU has 4 medical and 4 surgical beds which are staffed by around 20 BSc nurses and different multidisciplinary physicians.

**ALERT hospital:** This hospital receives almost all types of medical and surgical patients. The hospital has 6 AICU beds which are staffed by 22 nurses and different multidisciplinary physicians.

## **4.2. Study period**

The study was conducted from April 4, 2020, to April 24, 2020.

## **4.3. Study Design**

Institutional based cross-sectional study was conducted at federally administered hospitals, AA, Ethiopia.

## **4.4. Population**

### **4.4.1. Source Population**

All nurses who are working in federally administered Addis Ababa hospitals.

### **4.4.2. Study Population**

All nurses who are working in AICU federally administered Addis Ababa hospitals.

## **4.5. Eligibility Criteria**

### **4.5.1. Inclusion Criteria**

- ✓ Nurses who are directly involved in patient care management.
- ✓ Nurses who had six months and above work experience, as a probation period were over and a nurse was fully responsible to care for patients.

### **4.5.2. Exclusion Criteria:**

- ✓ Nurses who were on study leave, maternity leave, and annual leave during the time of the study.

## **4.6. Sample Size**

All nurses working at AICU of Addis Ababa federally administered hospitals were included in the study. The total number of nurses was 126.

## **4.7. Sampling technique**

Convenient sampling technique was used.

## **4.8. Variables**

### **4.8.1. Dependent Variable**

- ✓ Knowledge, Practice of nurses about Glasgow coma scale assessment

### **4.8.2. Independent Variable**

- ✓ Age
- ✓ Sex
- ✓ Level of nursing education,
- ✓ Years of experience
- ✓ Working hospitals
- ✓ Work overload

## 4.9. Operational Definitions

**Glasgow coma scale:** is a reliable and objective neurological assessment tool used for assessing and recording the level of a person's conscious state.

**Intensive care unit:** cater to patients with severe or life-threatening illnesses and injuries, which require constant care, close supervision from life support equipment and medication to ensure normal bodily function.

**Good knowledge:** Those responders who scored the mean and above the mean of knowledge questions.

**Poor knowledge:** Those respondents who scored below the mean score of the knowledge question.

**Good practice:** Refers to all AICU nurses who scored mean and above the mean of clinical scenario questionnaire towards GCS assessment.

**Poor practice:** Refers to all AICU nurses who scored less than the mean of clinical scenario questionnaire towards GCS assessment.

#### 4.10. Data Collection Tools and Procedure

The questionnaire used in this study adapted from previous similar studies (4,17,18,42). The tools written in the English language, because all nurses in Ethiopia receive their training, using the English language and some scientific words are difficult to translate into Amharic. This data collection tool consisted of four sections.

**Section one:** consists of nurses' demographic characteristics, including sex, age, and level of education, work experience, length of time in the current ward, and course or training related to the GCS.

**Section two:** Knowledge of nurses on the GCS was determined based on 15 multiple-choice questions. The level of knowledge of GCS was categorized based on the mean score as follows: good knowledge and poor knowledge.

**Section three:** Consists of 6 clinical scenario practice questions about GCS assessment. This question was used to assess the application of basic knowledge in real clinical situations. A right answer was offered 1 and 0 scores for an incorrect response and the total score was grouped into two levels (good clinical practice and poor clinical practice).

**Section four:** consists of questions that were evaluating factors affecting nurses' assessment of GCS.

The data collection was employed in each nurse's working shift. One supervisor and six data collectors who had a BSC degree in nursing were available on each shift and responsible for providing consent forms; administering questionnaires; assisting participants for any clarification; and collecting completed questionnaires to deliver to the principal researcher.

#### 4.11. Data Processing and Analysis Procedure:

Data were collected by using a pre-tested and self-administered structured questionnaire and was checked, cleaned, and entered into Epi-data version 4.6 and exported to SPSS version 21.0 software for analysis. During the process of analysis, descriptive statistics were used to provide an overall and coherent presentation and description of the data. Binary logistic regression was done to see the crude significant relation of each independent variable with dependant variables. Variables with a 95% confidence interval and P-value at <0.25 during the bivariate analysis were entered to multivariate logistic regression analysis to see the relative effect of confounding variables and interaction of variables. A P-value less than or equal to 0.05 during multivariate

analysis was taken as a cut of value to be significant. The final results were presented by the text, Pie-chart, table, and Graph.

#### **4.12. Data Quality Assurance**

To assure the quality of the data the following measures were undertaken; Two weeks before the actual data collection, the questionnaire was pre-tested on 10% of the estimated sample at Yekatit 12 hospital for its clarity, understandability, and completeness. Also for data collectors and supervisors, at least a one-day short training was given because of enhancing the quality of data and ensuring that all the data collectors and assistances should have been the same information about the study tools, to follow the same survey procedures. The data were cleaned for inconsistencies and missing values and amendments were considered as needed before data analysis.

#### **4.13. Ethical Consideration**

The ethical approval was taken from the research Institutional Review Board of Addis Ababa University, College of health science, department of emergency medicine for the conduction of the study. After obtaining an official letter from the department, permission letters were given to Addis Ababa federally administered hospitals before data collection. The participants of the study were told clearly about their right to leave or not forced to participate if he/she will not willing to participate in the study. The data collectors were taken appropriate informed consent from the participants who were interested to participate in the study and then informed verbally about the study and its purpose. The confidentiality of the information provided by the participants was not revealed directly. They were informed that there was not be any harm and direct benefit from participating in the study.

#### **4.14. Dissemination of Result**

The outcomes of this study were presented to AAU, college health science, Department of emergency medicine, and documents will be disseminated to all hospitals involved in the study. Furthermore, the thesis will be submitted to national and international peer-review journals for possible publication.

## 5. RESULTS

### 5.1. Socio-demographic characteristics of AICU nurses

Out of 126 nurses providing nursing care at AICU of four Addis Ababa federal administered hospitals, 121 of them participated in the study with a 96.03 % response rate. There were 65(53.7%) male nurses and 56 (46.3%), female nurses, in the study. Age ranged between 23 and 43 years with a mean of 30.07(STD=4.862). Most of the study participants were aged between 25-29 years (52.9%). Of these participants, 110 (90.9%) had a BSc degree and 11(9.1%) had an MSc degree. Regarding adult ICU experience of study participants, 58(47.9%) had 6month-2 years experience and only 12(9.9%) had greater than 10 years of work experience.

**Table1: socio-demographic characteristics of nurses working AICU in federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

| Variables            | Response         | Frequency(n) | Percentage (%) |
|----------------------|------------------|--------------|----------------|
| Age                  | 20-24 years      | 5            | 4.1            |
|                      | 25-29 years      | 64           | 52.9           |
|                      | 30-34 years      | 24           | 19.8           |
|                      | 35-39 years      | 17           | 14.0           |
|                      | 40 years & above | 11           | 9.1            |
| Sex                  | Male             | 65           | 53.7           |
|                      | Female           | 56           | 46.3           |
| Level of education   | BSc degree       | 110          | 90.9           |
|                      | MSc degree       | 11           | 9.1            |
| AICU work experience | 6 month-2 years  | 58           | 47.9           |
|                      | 3- 5 years       | 38           | 31.4           |
|                      | 6-10 years       | 13           | 10.7           |
|                      | 10 years & above | 12           | 9.9            |
| Working hospitals    | St. peter's      | 20           | 16.5           |
|                      | Alert            | 21           | 17.4           |
|                      | Black lion       | 40           | 33.1           |
|                      | St. Paul's       | 40           | 33.1           |
| Too much workload    | Yes              | 89           | 73.6           |
|                      | No               | 32           | 26.4           |

## 5.2. Knowledge of nurses on Glasgow Coma Scale assessment

The mean score of the knowledge question was 8.05/15(STD=2.683). Only 32.2% responded correctly to the question on how to check for motor response in a tetraplegic patient. The question related to the interval that classified head injury based on severity, half of (50.4%) of respondents answered correctly. Eight one (81%) of study participants responded that the total possible score for the eye component is four. Fifty-seven (57%) of participants were answered correctly the question regarding GCS score that is considered a deterioration sign for the patient.

**Table 2: Distribution answer of knowledge question about GCS assessment among nurses working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

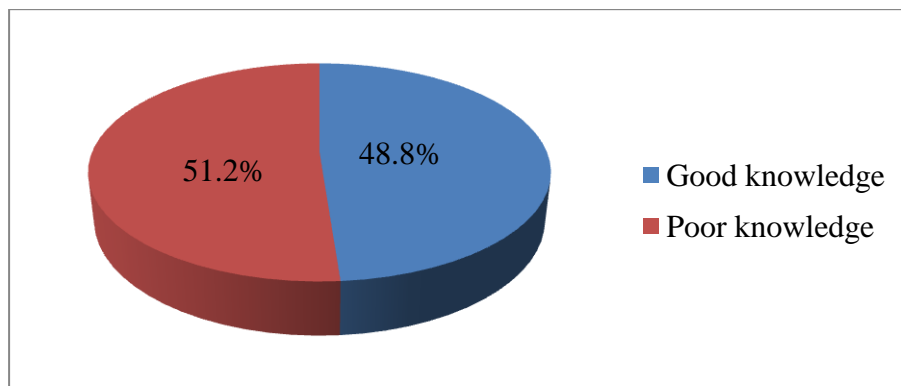
| Variable   | Response  | Frequency | Percentage |
|--|-----------|-----------|------------|
| What is the total possible score for the eye component of the Glasgow Coma Scale   | Correct   | 98        | 81.0       |
|  | Incorrect | 23        | 19.0       |
| Which is a total possible score for the verbal component of the Glasgow coma scale | Correct   | 85        | 70.2       |
|  | Incorrect | 36        | 29.8       |
| Which is the maximum possible score for the Glasgow Coma Scale                     | Correct   | 102       | 84.3       |
|  | Incorrect | 19        | 15.7       |
| Which is not a component of the Glasgow Coma Score                                 | Correct   | 87        | 71.9       |
|  | Incorrect | 34        | 28.1       |
| What is the minimum score on the Glasgow coma scale                                | Correct   | 73        | 60.3       |

|   |           |    |      |
|---|-----------|----|------|
|   | Incorrect | 48 | 39.7 |
| The GCS results that indicate a moderate head injury is between   | Correct   | 61 | 50.4 |
|   | Incorrect | 60 | 49.6 |
| What is the maximum score on the GCS that correlates with severe traumatic brain injury   | Correct   | 59 | 48.8 |
|   | Incorrect | 62 | 51.2 |
| Vital signs are a component of Glasgow coma scale   | Correct   | 74 | 61.2 |
|   | Incorrect | 47 | 38.8 |
| Which component of the GCS is the least indicator of brain injury severity  | Correct   | 37 | 30.6 |
|   | Incorrect | 84 | 69.4 |
| When testing the best motor response, you record  | Correct   | 25 | 20.7 |
|   | Incorrect | 96 | 79.3 |
| To test motor response in tetraplegia patients (paralyzed in all four limbs)  | Correct   | 39 | 32.2 |
|   | Incorrect | 82 | 67.8 |
| Patients with a Glasgow Coma Scale score of _____ and below are considered comatose.  | Correct   | 50 | 41.3 |
|   | Incorrect | 71 | 58.7 |
| In nursing practice, a reduction of the Glasgow Coma Scale score of _____ is considered as deterioration in conscious level and requires informing the medical team | Correct   | 69 | 57.0 |
|   | Incorrect | 52 | 43.0 |
| The Glasgow Coma Scale cannot assess intubated patient's level of consciousness   | Correct   | 90 | 74.4 |

|  |           |    |      |
|--|-----------|----|------|
|  | Incorrect | 31 | 25.6 |
| You are assessing a road traffic accident patient, who has swollen eyes. You instruct him to open his eyes, but he is unable to. The eye response score is | Correct   | 25 | 20.7 |
|  | Incorrect | 96 | 79.3 |

The mean score of knowledge questions about GCS answered correctly by study respondents' was 53.66%. The cut point of poor and good knowledge was determined based on the mean score of correct answers, where the staff who got 53.66 % or more considers as good knowledge, while those who got less than 53.66% were considered as poor knowledge.

From the total of study participants, 51.2% had poor knowledge while the remaining 48.8% scored more the mean termed as good knowledge.



**Figure 2: Percentage distribution of overall knowledge of nurses about GCS assessment working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

### 5.3. The practice of nurses on the Glasgow coma scale

The overall mean practice score of the study participants was  $2.28 \pm 1.55$  (38%) with a minimum score of 0 and a maximum score of 6 out of 6 clinical scenario items.

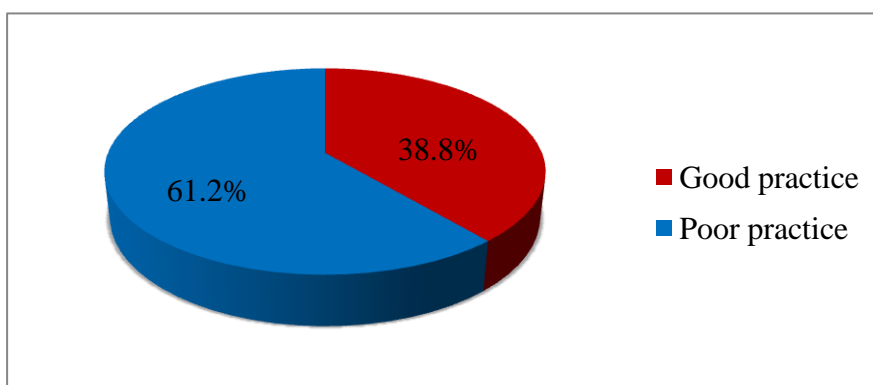
As indicated in the table(3) below only 18.2 % give the right answer about case scenario question 3, 25.6 % give the correct answer about case scenario question 2 and the Majority of them (70.2 % ) gave the correct answer about case scenario question 6.

**Table 3: Distribution answer of clinical practice question about GCS assessment among nurses working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

| Variable   | Response  | Frequency | Percentage |
|--|-----------|-----------|------------|
| Question 1. An 18-year-old male is hit on the head with a baseball bat. He withdraws & opens his eyes in response to deep painful stimuli. He also mumbles incomprehensibly. The GCS is_____   | Correct   | 32        | 26.4       |
|  | Incorrect | 89        | 73.6       |
| Question 2. An adult unconscious patient flexes his elbow and wrist when pressure is put on the nail bed. However, he does not open his eyes at all and makes grunting noises that are not understood. The GCS is_____   | Correct   | 31        | 25.6       |
|  | Incorrect | 90        | 74.4       |
| Question 3. A 40-year-old man is involved in a head-on collision while driving to work. In casualty resuscitation room, he opens his eyes to the pain, is mumbling inappropriately, & tries to stop the medical officer putting a cannula in his arm. The GCS is____ | Correct   | 22        | 18.2       |
|  | Incorrect | 99        | 81.8       |
| Question 4. A 50-year-old woman jumps from the seventh floor in an attempt to commit suicide. In the casualty resuscitation room, there is no eye-opening or speech. She does not respond when her nail bed is pressed. The GCS is ____                              | Correct   | 69        | 57         |
|  | Incorrect | 52        | 43         |
| Question 5. An adult patient in the ICU is seen to obey simple commands and opens his eyes when he hears you speak. He can talk to you in sentences but seems confused and not sure where he is at present. The GCS is_____  | Correct   | 37        | 30.6       |
|  | Incorrect | 84        | 69.4       |
| Question 6. A 31-year-old male is seen in the emergency department & undergoes a quick neurological evaluation following head trauma. He is unable to open his eyes, has no motor movement, & makes no verbal sounds. The GCS is_____                                | Correct   | 85        | 70.2       |
|  | Incorrect | 36        | 29.8       |

When nurses were asked clinical scenarios questions about GCS, only 38.8% of participants were able to answer mean and greater than mean of the questions correctly.

This study revealed that while many nurses may have knowledge about the basic theoretical concepts of the GCS, they are not able to apply that basic knowledge in actual clinical circumstances. For example, 48.8% of the participants in this study demonstrated good knowledge about basic concepts of the GCS, whereas only 47(38.8%) of the participants had a good practice on the application of the basic knowledge in clinical situations. The cut point of poor and good practice was determined based on the mean score of correct answers, where the staff who got 2.28(38%) or more considered as good in clinical practice, whereas those who got less than 2.28(38%) were considered as poor in clinical practice.



**Figure 3: percentage distribution of overall nurses' level of practice on the application of the basic GCS knowledge in clinical situations about GCS assessment working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

#### 5.4. Barriers to using GCS assessment for nurses.

The main factors that make it difficult for nurses to assess patients GCS include lack of continuous training and update (77.7%), work overload of nurses (73.6%), and lack of adequate knowledge and skills (61.2%).

**Table 4: Percentage distribution of barriers which make it difficult for nurses to assess patients by using GCS among nurses working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

| Variables                                 | Response | Frequency | Percentage |
|---|----------|-----------|------------|
| Too much workload with few nurses on duty | Yes      | 89        | 73.6       |
|   | No       | 32        | 26.4       |
| lack of the GCS assessment tools          | Yes      | 64        | 52.9       |
|   | No       | 57        | 47.1       |
| lack of adequate knowledge and skills     | Yes      | 74        | 61.2       |
|   | No       | 47        | 38.8       |

|   |     |    |      |
|---|-----|----|------|
| lack of continuous training and update                                | Yes | 94 | 77.7 |
|   | No  | 27 | 22.3 |
| The hospital policy does not allow nurses to assess patients with GCS | Yes | 50 | 41.3 |
|   | No  | 71 | 58.7 |
| The nursing services department doesn't enforce to assess patent GCS  | Yes | 65 | 53.7 |
|   | No  | 56 | 46.3 |
| Patient condition (endotracheal intubation, sedative, eye swelling).  | Yes | 51 | 42.1 |
|   | No  | 70 | 57.9 |

### 5.5. Factors associated with knowledge of nurses about GCS assessment

Bivariate logistic regression analysis was made for different variables. Participants' age, sex, educational level, experience, training, and workload were tested if they had a significant association with the knowledge of nurses regarding GCS assessment. All variables with a p-value of less than 0.25 were entered together into a multivariate logistic regression to control confounding factors. A P-value less than or equal to 0.05 during multivariate analysis was taken as a cut of value to be significant. Based on these the result of multiple logistic regression showed that male nurses found around 4 times, higher have good knowledge (AOR=4.28, CI=1.87-10, P=0.001) than female nurses. Educational level showed MSc degree holders of study participants were found about 7.3 times higher to had good knowledge than BSc holder nurses working in AICU(AOR=7.28, CI=1.14-34, P=0.035).

**Table 5: The comparison of nurses' knowledge about GCS assessment with independent variable working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

| Variables  |              | Level of knowledge |               | COR(95% CI)     | p-value | AOR(95% CI)     | P-value |
|------------|--------------|--------------------|---------------|-----------------|---------|-----------------|---------|
|            |              | Good<br>N (%)      | Poor<br>N (%) |                 |         |                 |         |
| Sex        | Male         | 41(33.9)           | 24(19.8)      | 3.6(1.69-7.7)*  | 0.001   | 4.28(1.87-10)** | 0.001   |
|            | Female       | 18(14.9)           | 38(31.4)      | 1               |         |                 |         |
| Age        | 20-24        | 2(1.7)             | 3(2.5)        | 0.8(0.9-6.45)*  | 0.84    |                 |         |
|            | 25-29        | 36(29.8)           | 28(23.1)      | 1.54(0.43-5.6)* | 0.51    |                 |         |
|            | 30-34        | 7(5.8)             | 17(14.0)      | 0.49(0.11-2.2)* | 0.35    |                 |         |
|            | 35-39        | 9(7.4)             | 8(6.6)        | 1.35(0.29-6.2)* | 0.699   |                 |         |
|            | ≥ 40         | 5(4.1)             | 6(5.0)        | Ref             |         |                 |         |
| Education  | MSc degree   | 9(7.4)             | 2(1.7)        | 5.4(1.12-26)*   | 0.036   | 7.28(1.14-34)** | 0.035   |
|            | BSc degree   | 50(41.3)           | 60(49.6)      | Ref             |         |                 |         |
| Experience | 2moth-2years | 29(24.0)           | 29(24.0)      | 1.4(0.39-4.9)*  | 0.6     |                 |         |
|            | 3-5 years    | 17(14.0)           | 21(17.4)      | 1.13(0.30-4.2)* | 0.85    |                 |         |
|            | 6-9 years    | 8(6.6)             | 5((4.1)       | 2.24(0.45-11)*  | 0.32    |                 |         |
|            | ≥10 years    | 5(4.1)             | 7(5.8)        | Ref             |         |                 |         |
| Hospitals  | St. peter's  | 13(10.7)           | 7(5.8)        | 2.5(0.83-7.6)   | 0.105   | 1.94(0.58-6.52) | 0.284   |
|            | Alert        | 9(7.4)             | 12(9.9)       | 1.8(0.62-5.25)  | 0.279   | 1.62(0.49-5.33) | 0.427   |
|            | Black lion   | 17(14.0)           | 23(19.0)      | 1(0.42-2.43)    | 0.99    | 0.82(0.31-2.16) | 0.692   |
|            | St. Paul's   | 17(14.0)           | 23(19.0)      | Ref             |         |                 |         |
| Workload   | Yes          | 43(35.5)           | 46(38.0)      | 0.93(0.4-2.09)* | 0.87    |                 |         |
|            | No           | 16(13.2)           | 16(13.2)      | Ref             |         |                 |         |

Key: \* P-value is Significant at  $p < 0.25$ , \*\*P-value is significant at  $P \leq 0.05$ , Ref= Reference, COR-Crude odds ratio, and AOR-Adjusted odds ratio

## **5.6. Factors associated with the practice of nurses about GCS assessment**

Bivariate logistic regression analysis was made for different variables. All variables with a p-value of less than 0.25 were entered together into a multivariate logistic regression to control confounding factors and P-value less than or equal to 0.05 during multivariate analysis was taken as a cut of value to be significant. Based on these the result of multiple logistic regression showed that male was found about 2.7 times higher to have good skills towards clinical practice question (AOR=2.7, CI=1.2-6, P=0.018) than female nurses working in AICU. On the other hand, MSc degree holders of study participants were found about 10.4 times higher to have good skills in the clinical application of GCS assessment (AOR= 10.4, CI=2.0-53, P=0.0055) than BSc degree holder nurses working in AICU.

**Table 6: The comparison of nurses practice about GCS assessment with independent variable working at AICU of federally administered hospitals, Addis Ababa, Ethiopia, June 2020 (n=121).**

| Variables  |              | Level of practice |               | COR(95% CI)     | p-value | AOR(95% CI)     | P-value |
|------------|--------------|-------------------|---------------|-----------------|---------|-----------------|---------|
|            |              | Good<br>N (%)     | Poor<br>N (%) |                 |         |                 |         |
| Sex        | Female       | 16(13.2)          | 40(33.1)      | Ref             |         |                 |         |
|            | male         | 31(25.6)          | 34(28.1)      | 2.28(1.0-4.8)*  | 0.033   | 2.7(1.2-6.0)**  | 0.018   |
| Age        | 20-24        | 2(1.7)            | 3(2.5)        | 1.8(0.19-16.5)* | 0.613   |                 |         |
|            | 25-29        | 27(22.3)          | 37(30.6)      | 1.95(0.47-8.0)* | 0.357   |                 |         |
|            | 30-34        | 7(5.8)            | 17(14.0)      | 1.1(0.22*5.4)   | 0.908   |                 |         |
|            | 35-39        | 8(6.6)            | 9(7.4)        | 2.37(0.46-12)*  | 0.300   |                 |         |
|            | ≥40          | 3(2.5)            | 8(6.6)        | Ref             |         |                 |         |
| Education  | BSc degree   | 38(31.4)          | 72(59.5)      | Ref             |         |                 |         |
|            | MSc degree   | 9(7.4)            | 2(1.7)        | 8.53(1.7-41)*   | 0.008   | 10.44(2.0-53)** | 0.005   |
| Experience | 2moth-2years | 19(15.7)          | 39(32.2)      | 0.49(0.14-1.7)* | 0.262   |                 |         |
|            | 3-5 years    | 14(11.6)          | 24(19.8)      | 0.58(0.16-2.2)* | 0.42    |                 |         |
|            | 6-9 years    | 8(6.6)            | 5(4.1)        | 1.6(0.33-7.85)* | 0.56    |                 |         |
|            | ≥ 10 years   | 6(5.5)            | 6(5.0)        |                 |         |                 |         |
| Hospitals  | St. peter's  | 9(7.4)            | 11(9.1)       | 1.36(0.46-4.1)  | 0.577   |                 |         |
|            | Alert        | 10(8.3)           | 11(9.1)       | 1.52(0.52-4.41) | 0.446   |                 |         |
|            | Black lion   | 13(10.7)          | 27(22.3)      | 0.8(0.32-2.01)  | 0.639   |                 |         |
|            | St. Paul's   | 15(12.4)          | 25(20.7)      | Ref             |         |                 |         |
| Workload   | Yes          | 33(27.3)          | 56(46.3)      | 0.76(0.33-1.7)* | 0.507   |                 |         |
|            | No           | 14(11.6)          | 18(14.9)      | Ref             |         |                 |         |

Key: Key: \* P-value is Significant at  $p < 0.25$ , \*\*P-value is significant at  $P \leq 0.05$ , Ref= Reference, COR-Crude odds ratio, and AOR-Adjusted odds ratio

## 6. DISCUSSION

This Institutional based cross-sectional study was conducted to assess knowledge, practice, and factors affecting GCS assessment among nurses working in adult intensive care units federally administered public hospital, Addis Ababa, Ethiopia.

This study showed that the majority of the participants in the study were males aged between 25-29 years. This result agreed with results obtained from a study done in the University of Baghdad (1) which reported that the demographic characteristics of participating nurses comprised a majority were (28-32) years old, and most of whom (56.0%) were male. This study showed that the majority (90.9%) of the participants had a bachelor's degree in nursing. This result consistent with the study done in Saudi Arabia (9) which was indicated that the majority (79.2%) had a bachelor's degree in nursing.

The finding of this study revealed that 63(52.1%) of nurses had poor knowledge about GCS assessment. This is higher than the study conducted in Ghana and the United Arab Emirates which showed 50.4% and 49.7 % of the staff nurses had poor knowledge towards GCS respectively (6,18). It is much higher than the study conducted in a selected tertiary hospital in Nigeria, which showed that 33.0% of nurses had poor knowledge about GCS assessment (19). These might be due to economical and setting differences.

The finding of this study is less than the study conducted in Malaysia which showed 55.56% of nurses had poor knowledge about GCS assessment (17). Similarly, the study conducted in, University of Baghdad indicated that all nurses had inadequate knowledge about the Glasgow coma scale (1). This difference might emerge from differences in assessment tools and respondents' characteristics.

The study also indicated that even though several nurses have adequate knowledge about the basic theoretical concepts of the GCS, they are not able to apply that basic knowledge in clinical scenarios. For instance, while 48.8% of the participants in this study demonstrated good knowledge about basic concepts of the GCS, whereas only 38.8% of the participants had good knowledge of the application of the basic knowledge in a clinical setting, which means that the knowledge could not be translated into practice. This is consistent with the study done in Vietnam, where the majority of the nurses (>90%) responded correctly to questions regarding their GCS basic knowledge; however, only 47.9% of the nurses answered correctly questions related to clinical scenarios requiring the application of the basic knowledge (23). Similarly, the study conducted in Ghana showed that 62.6% of the participants in the study had good basic

theoretical knowledge about GCS, whereas only 5.2% of the participants had good knowledge in the application of this basic theoretical knowledge in practice related clinical scenario question (18). In contrast, results were found in a study conducted in India, showed that only 16.36% had the inadequate skill (32). The differences in this study might be a result of the differences in the tools, setting and the quality of training the respondents' received.

Major factors affecting the utilization of GCS in the neurological evaluation of the patient by nurses in this investigation include; too much workload, lack of ongoing training and update on GCS, lack of nursing coordinator enforcement, lack of the GCS assessment tools, lack of adequate knowledge and skill. This finding is in line with the finding from Nigeria (4) who reported that lack of continuous training and update courses on GCS, lack of enforcement of its use by the nursing services coordinators and inadequate knowledge and skill were major factors affecting the use of GCS in the neurological assessment of a patient. The present study also congruent with a study done in Egypt (10) who reported that knowledge and practice level of nurses significantly improved after continuous training and updates on GCS.

The result of this study on the association between knowledge and sex shows that there was a statistically significant association between the two variables (AOR=4.28, CI=1.87-10, P=0.001). Similar results were also documented by, who reported that male nurses had much higher knowledge than females(6). In contrast, another study reported that female nurses had significantly higher knowledge than males (18,23). This difference might be due to differences in educational interventions between females and males towards GCS assessment.

In this study, nurses with postgraduate degrees had better knowledge related to basic theoretical concepts compared to nurses with a bachelor's degree (AOR=7.28, CI=1.14-34, P=0.035). The same result was found in a study conducted in Malaysia and Saudi Arabia (9,17). This showed that ongoing education and practices are important to improve the GCS assessment skill of nurses.

Years of experience in ICU had no association with basic knowledge GCS assessment. This finding is in line with the finding from Ghana(18). In contrast, another study reported that there were statistically significant relationships found between years of experience and knowledge of GCS (6). The discrepancy might be due to the difference in supportive supervision and refreshment training.

In this study, there was a non-significant relationship between nurses' knowledge and their age. This result agreed with the study which was done in Iran (1). Unlike the result of the current

study age of participants were significant factors as a co-determinant of nurses' knowledge of GCS (17). This variation might be due to the difference in the study setting, sample size, and the respondents' characteristics.

In this study, working hospitals was a non-significant association with nurses' knowledge. But similar previous studies conducted in the Jordan showed that there was a significant relationship among nurses' knowledge and their working hospitals (2). This variation might be due to the difference in the study setting. In this study setting all hospital are governmental hospitals whereas in Jordan there was both governmental and private hospitals.

The result of this study on the association between clinical practice and sex shows that there was a statistically significant association between the two variables (AOR=2.7, CI=1.2-6, P=0.018). In contrast, results were found in a study conducted in Ghana, showed that female nurses demonstrating statistically significantly higher levels of knowledge of the GCS with its application of practice related clinical scenario questions in the clinical situation (18). The possible reason for the finding might be related to sample size.

The result of this study showed that education was significantly associated with clinical practice towards GCS assessment (AOR=10.44, CI=2.0-53, P=0.005). It is in agreement with (10) who reported that there is a highly statistically significant improvement in the competent level of nurses' practice regarding GCS; this was noticed immediately after educational program implementation in comparison to the pre-educational program. The more education the nurses' staff received regarding GCS knowledge, the more accurately practice they would perform.

The finding of this study showed that Years of experience in ICU had no association with the application of GCS in clinical scenarios. This finding is consistent with a study in Vietnam (23).

## **7. STRENGTH AND LIMITATION OF THE STUDY**

### **7.1. Strengths of the study**

To the best of our knowledge, this is the first study in assessing nurses' knowledge, practice, and associated factors about GCS assessment in Ethiopia.

The second Strength of the study was that it was done in different tertiary and secondary hospitals where the highest numbers of patients are expected and qualified experts are trained.

### **7.2. Limitations of the study**

- ✓ It is better if this study was supported by a qualitative method and observational checklist rather than use a self-administered clinical scenario questionnaire to assess practice.
- ✓ The finding is not generalized to the target population because of the sampling methods.

## 8. CONCLUSION AND RECOMMENDATION

### 8.1. Conclusion

An institutional-based cross-sectional study was carried out to assess the knowledge, practice, and associated factors regarding GCS assessment among nurses working in AICU Addis Ababa federally administered hospitals, Ethiopia from April 4-24, 2020.

The present study showed that 51.2% of the participants had good knowledge about basic theoretical concepts of the GCS, whereas only 38.8% demonstrated good practice on the application of the basic knowledge in clinical scenarios. These findings suggest that nurses are not able to incorporate their theoretical knowledge of the GCS with its practical application in the clinical situation.

Sex of participants and educational level were factors that were significantly associated with knowledge and practice of nurses regarding GCS assessment.

Lack of continuous training and update on GCS, lack of nursing administrators' enforcement, lack of the GCS assessment tools, lack of adequate knowledge, and too much workload were also identified as factors affecting the nurse practice regarding GCS assessment.

### 8.2 Recommendation

#### **To FMOH and Federal Ministry of Education**

- ✓ Nursing administrators could provide educational involvement and strategies for GCS performance to all nurses who care for unconscious patients.
- ✓ The assessment guidelines should be distributed by nursing directors to the nurses working in the ICU that includes the standards for the GCS technique.
- ✓ It's better if an ongoing professional development program should include neurological assessment as one of its major courses to be taught to all nurses.

#### **To Addis Ababa federal hospitals**

- ✓ Better to assign more qualified and knowledgeable nurses in ICU.
- ✓ Hospital management should organize training and update courses for nurses on the GCS.

#### **To professional nurses**

The nurse should enhance their level of knowledge and clinical practice on GCS assessment.

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## ANNEX

### Annex I: Consent Explanation

I am Habtamu Andualem a second-year postgraduate student at Addis Ababa University College of health sciences, department of Emergency Medicine. **Dear participant**

I intend to carry out a study on *‘nurses’ knowledge, practice and associated factors about Glasgow coma scale assessment among nurses’ working in adult intensive care units of federally administered hospitals’* as part of my course requirement. The study has no material or monetary benefit. Your participation is voluntary and will not result in any physical or psychological harm. You will have the right to withdraw at any time without any penalty. We will require you to fill a questionnaire which will take 20- 30 minutes. You are free to ask questions about the study at any time. Study findings will be used to develop strategies on how to improve nurses’ neurological assessment using GCS and service quality.

The information you provide will be kept confidential and anonymous, and on that note, you will not write any of the personal particulars. Your participation will be highly appreciated.

In case of any questions or clarifications feel free to contact the principal investigator on mobile number 0929458761 or email [habtamuandualem5@gmail.com](mailto:habtamuandualem5@gmail.com).

**THANK YOU!!!**

**HABTAMU ANDUALEM (principal investigator)**

## Annex II: Informed Consent

I have read the consent explanation and understood its content. I have been given an opportunity to discuss all my concerns with the investigator. I do therefore agree voluntarily to participate in the study on *“nurses’ knowledge, practice and associated factors about Glasgow coma scale assessment among nurses working in adult intensive care units of federally administered hospitals”*

Signature of participant \_\_\_\_\_ Date \_\_\_\_\_

Signature of researcher \_\_\_\_\_ Date \_\_\_\_\_

### Annex III: Questioners

**Instruction: Choose and Circle the answer that seems best for you from the alternatives that are under each question and for those that you give a direct answer, write the answer in the space provided.**

#### Section one: socio-demographic characteristics

1. Age.....

2. Sex

A. male

B. female

3. Highest level of education earned in nursing.....

A. Diploma

B. Bachelor degree.

C. Master's degree and above

D. Others specify.....

4. Year of experience in the AICU:

A. 6month-2years

B. 3-5years

C. 6-10yeras

D. 10 years and above

6. Hospital.....

A. Black lion

B. St. Peter's hospital

C. St. Paul's hospital

D. Alert hospital

## Section two: knowledge about the Glasgow coma scale

**In this section, we will test your knowledge of the GCS. Please answer all the questions in this section by circling the alphabet corresponding to the right answer.**

1. What is the total possible score for the eye component of the Glasgow Coma Scale?

- A. Zero
- B. Four
- C. Six
- D. Seven

2. Which is a total possible score for the verbal component of the Glasgow coma scale

- A. Three
- B. Four
- C. Five
- D. Six

3. Which is the maximum possible score for Glasgow Coma Scale?

- A.5
- B.9
- C.11
- D.15

4. Which is not a component of the Glasgow Coma Score?

- A. eye-opening
- B. sensory response
- C. verbal response
- D. motor response

5. What is the minimum score on the Glasgow coma scale?

- A. 0
- B. 3

C. 8

D. 1

6. The GCS results that indicate a moderate head injury is between

A. 3-8

B. 13-15

C. 9-12

D. 8-14

7. What is the maximum score on the Glasgow Coma Scale that correlates with severe traumatic brain injury?

A.12

B.10

C.8

D.3

8. Vital signs are a component of Glasgow coma scale

A true

B. false

9. Which component of the Glasgow Coma Scale is the least indicator of brain injury severity?

A. eye component

B. motor component

C. verbal component

D. None of the above

10. When testing the best motor response, you

A. record the response in the best arm

B. record the response in the worst arm

C. record the best response from the leg

- D. record response the response in all four limbs
11. To test motor response in tetraplegia patients (paralyzed in all four limbs),
- A. Inflict a pain stimulus in the arms until there is a response
  - B. Inflict a pain stimulus in the legs until there is a response.
  - C. Ask the patient to nod or head
  - D. Lift the arm and let it drop to the bed three times.
12. Patients with a Glasgow Coma Scale score of \_\_\_\_\_ and below are considered comatose.
- A. 1
  - B. 3
  - C. 8
  - D. 10
13. In nursing practice, a reduction of the Glasgow Coma Scale score of \_\_\_\_\_ is considered as deterioration in conscious level and requires informing the medical team.
- A. 1
  - B. 3
  - C. 8
  - D. 10
14. The Glasgow Coma Scale cannot assess intubated patient's level of consciousness.
- A. True
  - B. False
15. You are assessing an RTA (road traffic accident) patient, who has swollen eyes. You instruct him to open his eyes, but he is unable to. The eye response score is
- A. 4
  - B. C
  - C. 2
  - D. 0

**Section three: Questions about the practice of nurses towards Glasgow coma scale assessment.**

**In this section, we will test your practice of the GCS by clinical questions. Please answer all the questions in space provided based on clinical scenarios.**

1. An 18-year-old male is hit on the head with a baseball bat. He withdraws and opens his eyes in response to deep painful stimuli. He also mumbles incomprehensibly.

The GCS is \_\_\_\_\_

2. An adult unconscious patient flexes his elbow and wrist when pressure is put on the nail bed. However, he does not open his eyes at all and makes grunting noises that are not understood.

The GCS is: \_\_\_\_\_

3. A 40-year-old man is involved in a head-on collision while driving to work. In the casualty resuscitation room, he opens his eyes to the pain, is mumbling inappropriately, and tries to stop the medical officer putting a cannula in his arm. The GCS is: \_\_\_\_\_

4. A 50-year-old woman jumps from the seventh floor in an attempt to commit suicide. In the casualty resuscitation room, there is no eye-opening or speech. She does not respond when her nail bed is pressed. The GCS is: \_\_\_\_\_

5. An adult patient in the ICU is seen to obey simple commands and opens his eyes when he hears you speak. He can talk to you in sentences but seems confused and not sure where he is at present. The GCS is: \_\_\_\_\_

6. A 31-year-old male is seen in the emergency department and undergoes a quick neurological evaluation following head trauma. He is unable to open his eyes, has no motor movement, and makes no verbal sounds. The GCS is: \_\_\_\_\_

**Section four: - factor affecting the assessment of GCS among nurses.**

Among the following factors, apply (√) what you consider as factors contributing to the non-usage of the GCS in the assessment of patients.

A. Too much workload with few nurses on duty

B. lack of the GCS assessment tools

C. lack of adequate knowledge and skills

D. lack of continuous training and update

E. The hospital policy does not allow nurses to assess patients with GCS

F. The nursing services department doesn't enforce to assess patient GCS

G. patient condition (endotracheal intubation, sedative, eye swelling) make GCS assessment difficult

H. Are there other factors? Specify

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