



St. Paul's Hospital Millennium Medical College

Department of Emergency and Critical Care Medicine

**Knowledge, Attitude, and Practice of Procedural Sedation Among
Residents at St. Paul's Hospital Millennium Medical College**

Investigator

**Lamessa Mosisa (MD, Emergency, and Critical Care Medicine
Resident)**

Addis Ababa, Ethiopia, December, 2023

St. Paul's Hospital Millennium Medical College
Department of Emergency, and Critical Care Medicine
Knowledge, Attitude, and Practice of Procedural Sedation Among Residents
at St. Paul's Hospital Millennium Medical College

Investigator

Lamessa Mosisa (MD, Emergency, and Critical Care Medicine Resident)

Advisor

**Hana Ketema (MD, Assistant Professor of Emergency, and Critical Care
Medicine)**

**Yonas Kefelegn (MD, Assistant Professor of Emergency, and Critical Care
Medicine)**

**A Thesis submitted to the Department of Emergency, and Critical Care
Medicine; Presented for partial fulfillment of the requirements for the degree
of specialist in Emergency, and Critical Care Medicine.**

Addis Ababa, Ethiopia, December 2023

I. Abstract

Introduction: The provision of Procedural sedation for procedures outside of the operating room has grown dramatically for both diagnostic and therapeutic purposes. Since Procedural sedation is now practiced across many medical emergency centers in Ethiopia, there is a need to ascertain whether practices are in keeping with current evidence-based guidelines. This study therefore aims to determine current practices, common indications, and major obstacles concerning the practice of Procedural sedation in selected departments of St. Paul Hospital.

Objective: To assess the Knowledge, Attitude, and Practice of Procedural Sedation Among Residents at St. Paul's Hospital Millennium Medical College, and Addis Ababa Burn, Emergency and Trauma Hospital, Addis Ababa, Ethiopia.

Methodology: A quantitative, descriptive, analytical, and cross-sectional questionnaire study was implemented to explore the level of awareness of procedural sedation among residents working at St. Paul's Hospital Millennium Medical College.

Results: A total of 184 respondents completed the questionnaire received from the four departments. The result of the study shows that the overall levels of awareness of procedural sedation were poor. Those who scored poor knowledge were higher than those who scored good knowledge (56% Vs 44% respectively). However, the emergency and critical care medicine group were more knowledgeable than others (AOR=1.31, 95%CI,0.564-3.041). Those who scored the unfavorable attitude were higher than those who scored the favorable attitude (65% Vs 35% respectively). However, the emergency and critical care medicine groups were more favorable than others (AOR = 6.252, 95%CI, 2.505-15.604). Those who scored poor practice were fairly higher than those who scored good practice (52.70% Vs 47.30% respectively).

Conclusion: The levels of awareness of procedural sedation in all groups were lacking.

Keywords: Procedural Sedation, Residents, Knowledge, Attitude, and Practice.

I. Acknowledgments

First of all, I would like to praise the God who helped me in all my ways. Next, I would like to thank the Department of Emergency, and Critical Care Medicine for giving me this golden opportunity to conduct this interesting research project. Moreover, I would like to forward my special gratitude to my advisors Dr. Hana Ketema, and Dr. Yonas Kefelegn for their assistance, encouragement, and constructive professional comments during the development of this proposal. Last but not least, I would like to thank the data collectors and all respondents.

I. Table of Content

I. Abstract.....	I
I. Acknowledgments	II
III. Lists of figures	VI
Figure 1 Conceptual framework for factors affecting the awareness of procedural sedation	9..... Error! Bookmark not defined.
Figure 2 The flow diagram shows the detail of inclusion and exclusion criteria.	13 . Error! Bookmark not defined.
Figure 3 shows the age distribution of respondents.	17..... Error! Bookmark not defined.
IV. Lists of table.....	VI
Table 1 shows the measure of respondents' awareness of procedural sedation with a mean, median, and frequency distribution.	19 VI
Table 2 shows the measure of the relationship between procedural sedation awareness with the field of specialty and year of residency.	20 VI
1. Introduction.....	1
1.1 Background of the study.....	1
1.2 Statement of Problem	2
1.3 Significance of the Study	3
2. Literature Review	4
2.1 Knowledge of procedural sedation	4
2.2 Attitude of Procedural Sedation	5
2.3 Practice of Procedural Sedation	6
2.4 Barriers to Implementation of Procedural Sedation	8
2.5 Conceptual framework	9
2.5 Objectives.....	10
2.5.1 General Objective	10
2.5.2 Specific Objectives	10
3. Methodology	11
3.1 Study Area, and Period.....	11

3.3 Source Population	11
3.4 Study Population	11
3.5 Sample Size	12
3.6 Sampling Procedures	13
3.7 Eligibility Criteria	14
3.7.1 Inclusion Criteria	14
3.7.2 Exclusion Criteria	14
3.8 Study Variables	14
3.8.1 Dependent Variable	14
3.8.2 Independent Variable	14
3.9 Operational Definition	14
3.10 Data Collection Instruments, and Procedure	15
3.11 Data Quality Control	15
3.12 Data Processing, and Analysis	15
3.13 Ethical Considerations	16
4. Result	17
4.1 Demographic characteristics	17
4.2 Knowledge of respondents on procedural sedation	18
4.3 Attitude of respondents on procedural sedation	18
4.4 The practice of respondents on procedural sedation	19
4.5 Discussion	21
4.6 Conclusion	23
4.8 Recommendation	23
4.7 Strength of study	24
4.8 Limitation of study	24
4.9 Consent for publication	24
4.10 Conflict of interest	24
Assurance of Principal Investigator	27
Appendix I	28
Questionnaire	28

II. List of Abbreviations

AaBET:	Addis Ababa Burn, Emergency, and Trauma
ALS:	Advanced life support
APLS:	Advanced pediatric life support
BVM:	Bag Valve Mask Intubation
ECCM:	Emergency, and Critical Care Medicine
ECG:	Echo Cardiographs
ECs:	Emergency centers
Eps:	Emergency Physicians
ETCo2:	End Tidal Co2 Detector
ETT:	Endotracheal Intubation
ICU:	Intensive Care Unit
KAP:	Knowledge Attitude, and Practice
NIB:	Non-Invasive Blood Pressure Monitoring
NSAIDs:	Non-steroidal anti-inflammatory Drugs
NSEP:	Netherlands Society of Emergency Medicine
PSA:	Procedural sedation, and Analgesia
SPHMMC:	Saint Paul's Hospital Millennium Medical College
SPSS:	Statistical Package for the Social Sciences

III. Lists of figures

Figure 1 Conceptual framework for factors affecting the awareness of procedural sedation	9
Figure 2 The flow diagram shows the detail of inclusion and exclusion criteria.	14
Figure 3 shows the age distribution of respondents.	17

IV. Lists of table

Table 1 shows the measure of respondents' awareness of procedural sedation with a mean, median, and frequency distribution.	19
Table 2 shows the measure of the relationship between procedural sedation awareness with the field of specialty and year of residency.	20

1. Introduction

1.1 Background of the study

Procedural sedation is described as the use of anxiolytics, sedatives, and dissociative drugs, with or without analgesics, to generate a condition that permits the patient to undergo unpleasant procedures while maintaining cardiorespiratory function [1].

The targeted sedative depth should be determined by the patient's unique needs and the procedure. The medical literature commonly mentions sedation depths of mild, moderate, and deep levels of altered awareness. These descriptions should be visualized as low degrees of consciousness on a sedative continuum leading to general anesthesia, critical care, and pain medicine. Procedural sedation was historically limited to the operating room due to the dangers associated with loss of airway control and other potential side effects. Despite this, the use of Procedural sedation for procedures performed outside of the operating room has increased considerably for both diagnostic and therapeutic purposes [2, 3].

However, studies have shown that Procedural sedation can be safely and effectively performed in the emergency center by trained emergency physicians, with success rates of up to 98.6%, as the use of Procedural sedation has been associated with a reduction in hospital cost and length of stay [4, 5].

Since procedural sedation is now used in many medical emergency centers in Ethiopia, it is necessary to determine whether current evidence-based standards are being followed. As a result, the purpose of this study is to identify existing practices, common indications, and key barriers to the practice of Procedural sedation in chosen departments of St. Paul Hospital. The findings of this study are expected to improve and enhance the practice of procedural sedation in the EC.

1.2 Statement of Problem

Because of the growing need to alleviate anxiety, discomfort, and pain during invasive diagnostic and therapeutic procedures, procedural sedation has become a common practice. Despite this, the majority of research demonstrates knowledge and competence gaps.

According to the European Society of Anesthesiology recommendations, all sedation practitioners are supposed to have resuscitation abilities to rescue a patient in the event of an unexpected deeper level of sedation, as well as the ability to offer cardiac support [6].

According to a South African study, the total knowledge score for radiography and emergency Medicine was 4.80 and 4.25, respectively, while the mean score for orthopedic surgery and emergency Medicine was 5.28 and 4.25, respectively. This demonstrates the total levels of awareness. This demonstrates that anesthesiologists' overall awareness of sedation protocols is low. According to a survey conducted in Johannesburg, South Africa, 73.59% of respondents were aware of the Procedural sedation standards, whereas Pharmacology knowledge was just 53.40%, indicating a pharmacologic knowledge gap. According to the same survey, 70.63% of respondents had finished BLS, 60.63% had completed ACLS, and 15.63% had undergone Procedural sedation training. Furthermore, the majority of previous research findings in the field of procedural sedation revealed a knowledge and ability gap [7, 8, 9].

There have been no such studies conducted in St. Paul Hospital in Ethiopia on these issues. As a result, the purpose of this study is to fill a research gap on the issues of procedural sedation knowledge, attitude, and practices at St. Paul's Hospital Millennium Medical College.

1.3 Significance of the Study

Non-Anesthesia Critical Care, Pain Medicine, and Pain Management practitioners are increasingly involved in the provision of procedural sedation. Cost-cutting measures, technological developments, increased demand for sedation services, and an increase in the amount of diagnostic, therapeutic, or invasive procedures conducted using Procedural sedation have all contributed to this trend. A non-Anesthesia Critical Care and Pain Medicine physician, as well as a registered nurse sedation team, can provide procedural sedation [10]. There is a lack of similar studies done in St. Paul Hospital as well in Ethiopia. Therefore, this study intends to cover the existing research gap on the problems of knowledge, attitude, and practices of procedural sedations in St. Paul's Hospital Millennium Medical College.

A similar study has not been conducted at St. Paul Hospital or in Ethiopia. As a result, the purpose of this study is to fill a research gap on the issues of procedural sedation knowledge, attitude, and practices at St. Paul's Hospital Millennium Medical College.

As a result, the proposed research will investigate the knowledge, attitude, and practice of procedural sedation as implemented in St. Paul Hospital; additionally, the study will determine the weaknesses and strengths of its core elements (knowledge, attitude, and practice of procedural sedation). This proposed study will also provide guidelines and training for the safe administration of Procedural sedation, which necessitates specific provider competencies such as patient pre-sedation assessment and evaluation, patient education, cardiovascular monitoring, drug selection, and administration, management of potential adverse reactions or complications, post-sedation recovery, and appropriate use of available and emerging technology.

2. Literature Review

Procedural sedation is defined as a technique of administering anxiolytics, sedatives, and dissociative agents with or without analgesics to induce a state that allows the patient to tolerate unpleasant procedures while maintaining cardiorespiratory function. Procedural sedation has become a widespread practice given the increasing demand to relieve anxiety, discomfort, and pain during invasive diagnostic and therapeutic procedures [1].

2.1 Knowledge of procedural sedation

According to a study published in the International Journal of Emergency Medicine, almost all emergency physicians (98.3%) are aware of the national recommendations on Procedural sedation and Analgesia (Procedural sedation) and regularly employ it as their default strategy (81.5%). According to a South African study on the departments of general surgery and trauma, radiology, emergency medicine, orthopedics, and Internal Medicine, the total knowledge score showed mean scores for radiology and emergency Medicine of 4.80 and 4.25, respectively, and mean scores for orthopedic surgery and emergency Medicine of 5.28 and 4.25, respectively. This demonstrates that non-anesthesiologists have a low level of awareness of sedation standards [8].

A study done in European Pediatric Emergency Medicine since October 2020 shows Specific Procedural sedation courses, in addition to pediatric advanced life support (ALS) courses, were required for the staff administering Procedural sedation in 48% of the sites, and a specific number of supervised Procedural sedation was required in 43% before performing independently. In 37% of the sites, the whole medical staff administering Procedural sedation was pediatric ALS course-certified, whereas less than a quarter were certified in 16% of the sites. Trainees were permitted to provide Procedural sedation in 62% of the sites, with 76% only permitted if they were in their senior year and 24% permitted at any time during their training. In 84% of the nations examined, emergency medicine was a board qualification, while pediatric emergency medicine was in 16%. A statistically significant difference in guideline awareness was identified between the emergency Medicine department and the orthopedic surgery department [11, 8], with a mean score were 1.50 and 3.41, respectively.

According to a study conducted in Nigeria on sedation practice among radiology residents, 34.4% of respondents claimed to know about sedation in radiology practice, largely via their medical colleagues. Despite having no official training in sedation, 52.5% of responders do at least one procedure per week. In contrast, less than half of respondents, 46.5%, thought their knowledge of sedation was adequate. Despite only 30.9% of respondents having received formal sedation training, less than half, 46.5%, considered their knowledge of sedation to be good to outstanding [7, 12]. Here in Ethiopia, the study done at Gondor Comprehensive Specialized Hospital shows 116 (87.2%), have heard and used ketamine and propofol combination 113 (85%), and around half of the participants, 77 (57.9%), rated their knowledge as an average level. More than two-thirds of the participants, 105 (78.9%), have never had a seminar or educational session about the combination of ketamine-propofol, but in the last 1 year more than three-fourths of the participants, 113 (85%), have used ketamine-propofol combination at the same time. Those who did not use in the last 1 year cited that the main reason is lack of experience, 11 (8.3%), followed by lack of knowledge, 3 (2.3%), and lack of propofol, 5 (0.8% [13]).

2.2 Attitude of Procedural Sedation

EPs reported on their Procedural sedation competence in both adult and pediatric Procedural sedation in the International Journal of Emergency Medicine in 2017. The emergency doctors (Eps) were questioned about their abilities and competencies in administering Procedural sedation, as well as their ability to provide adequate advanced life support (ALS)/advanced pediatric life support (APLS). When comparing their Procedural sedation competence in adults to juvenile patients, they agreed substantially more strongly. In contrast, less than half of the respondents, 46.5%, thought their understanding of sedation was good to excellent, despite only 30.9% having received experience This effect was unaffected by the EPs' age, years of registration, or work experience [12].

According to a South African study, the levels of comfort when executing Procedural sedation were compared across different professional levels and were divided into three categories: favorable, neutral, and unfavorable. There was a statistically significant link between pharmacology knowledge and level of comfort in recognizing problems associated with Procedural sedation, with the favorable group scoring 8.63 (57.55%) and the unfavorable group rating 7.03 (46.87%) ($p = 0.036$) [8].

2.3 Practice of Procedural Sedation

A report by the American Society of Anesthesiologists shows, that reversal agents in cases where airway control, spontaneous ventilation, or positive pressure ventilation is inadequate; administer naloxone to reverse opioid-induced sedation and respiratory depression; administer flumazenil to reverse benzodiazepine-induced sedation and respiratory depression; after pharmacologic reversal, observe, and monitor patients for a sufficient time to ensure that sedation and cardiorespiratory depression does not recur once the effect of the antagonist dissipates, and not use sedation regimens that include routine reversal of sedative or analgesic agents [13].

According to the American College of Emergency Physicians, there is inadequate evidence to support any specific fasting requirements before operative sedation, regardless of depth achieved or agent used. According to the 2018 European Society of Anesthesiology guidelines, fasting before Procedural sedation is recommended. According to the American College of Emergency Physicians, there is inadequate evidence to support any specific fasting requirements before operative sedation, regardless of depth achieved or agent used. According to the 2018 European Society of Anesthesiology guidelines, fasting before Procedural sedation is not evidence-based. A uniform regimen for preoperative fasting before surgery could reduce confusion and errors [6, 14].

According to the African Journal of Emergency Medicine, 71% of ECs routinely gave oxygen to patients receiving procedural sedation. Where oxygen was not routinely supplied, the decision was based on several factors, including the degree of oxygen saturation (17.6%), the sedating

medication used (17.6%), the patient's clinical condition (11.8%), and the patient's age (5.9%)[1, 4].

According to the study conducted at the University of Cape Town's Department of Family Medicine, 84.3% of patients were appropriately sedated, 8.4% were poorly sedated, 3% were too profoundly sedated but exhibited no evidence of respiratory compromise, and 4.2% suffered respiratory side-effects. Simple airway procedures were used to manage respiratory issues; no patient required intubation or developed breathing problems after waking up [17, 7, 8].

The use of sedation by Nigerian radiology residents demonstrates Computerized tomography, magnetic resonance imaging, interventional procedures, and HSG accounted for 65.3%, 63.6%, 16.1%, and 7.6%, respectively, of these operations. Only 22.0% of respondents across 5 centers have a standard protocol in place. Only 22.0% of responders across 5 centers have a defined procedure to guide their sedation practice, while radiologists/radiology residents provide sedation as frequently as anesthesiologists (40.7%). During radiographic operations, 40.7% of responders had a resuscitation tray, while 84.2% had a resuscitation tray for sedative treatments. None of the responders' resuscitation equipment includes oxygen, reversal drugs, or a defibrillator. However, 63.2% are wearing a face mask, and 21.1% are using an IV cannula. Blood pressure and temperature are the two vital signs most regularly monitored by 52.6% and 31.6% of this subset of responders, respectively. merely 26.3% of responders reported an adverse consequence after sedative use, which was merely aspiration [7].

The study at the University of Cape Town's Department of Family Medicine found no significant difference in the risk of adverse effects between the fasted and non-fasted groups, and the current literature does not provide enough evidence to test the hypothesis that pre-procedural fasting results in a lower incidence of adverse outcomes in patients undergoing Procedural sedation [14, 6, 17].

General safety and monitoring criteria, outlining indications and contraindications for sedation, staff required in the room, and monitoring needs, were included in 74% of cases, while pre-procedural checklists were present in 51%. 46% of the sites offered Capnography. During Procedural sedation with IV ketamine, physicians (59%), nurses (33%), and either a physician or a nurse (9%), provided the medicine. General safety and monitoring criteria, outlining indications and contraindications for sedation, staff required in the room, and monitoring needs, were included in 74% of cases, while pre-procedural checklists were present in 51%. 46% of the sites offered Capnography. During Procedural sedation with IV ketamine, physicians (59%), nurses (33%), and either a physician or a nurse (9%), provided the medicine [11, 18].

According to a local study conducted in Ethiopia, a total of 40 children were MRI and CT images performed at the hospital imaging sites. Out of the 20 standards, 6 of them had a 100% success rate, 3 of them had a 0% compliance rate, and 11 of them had a 0 to 100% success rate. the total intraoperative propanol used between the two groups was not significantly different, while the total intraoperative ketamine used was greater in group ii and significantly different than in group I ($p = 0.030$). The use of additional intraoperative drugs in the study was not statistically different between the groups. For neither of the two groups, preoperative analgesia was not provided. In group II, 26 patients and 5 patients in group I required intraoperative analgesia, which was statistically significant ($p=0.002$). For 3 patients in group I and 1 patient in group II, postoperative analgesia was administered ($p = 0.272$, not statistically significant) [19, 20].

2.4 Barriers to Implementation of Procedural Sedation

Physician (73%), nursing (72%), and physical space (69%) shortages were frequently cited as barriers to Procedural sedation and analgesia in European Pediatric Emergency Medicine since October 2020 [11].

2.5 Conceptual framework

This is the conceptual framework developed specifically for this study by the principal investigator through reviewing related literature such as the study done in South Africa [8] which this study aimed to compare. The framework tries to figure out associated factors that affect the awareness of procedural sedation practice, in SPHMMC and AaBET Hospital, Addis Ababa, Ethiopia.

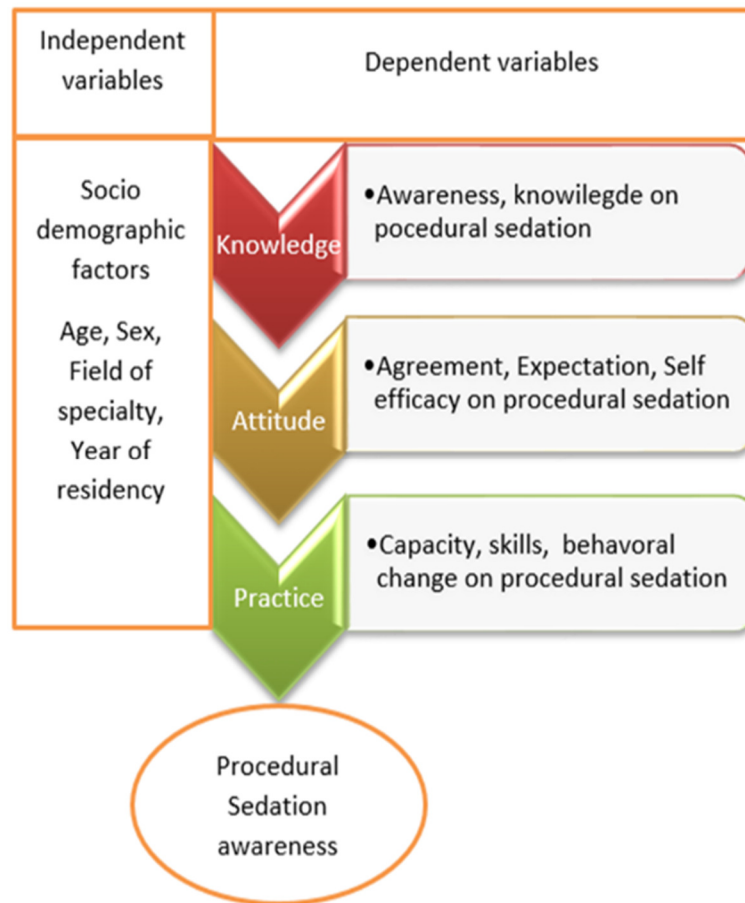


Figure 1 Conceptual framework for factors affecting the awareness of procedural sedation

2.5 Objectives

2.5.1 General Objective

To assess residents' knowledge, attitude, and practice of procedural sedation among Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

2.5.2 Specific Objectives

To assess the knowledge of procedural sedation among Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

To assess the Attitude of procedural sedation among Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, and Orthopedic Surgery residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

To assess the Practice of procedural sedation among Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

To identify the factors that influence residents' knowledge, attitude, and practice of procedural sedation in residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

To compare the degree of knowledge and practice of procedural sedation among Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery,

Orthopedic Surgery residents at St. Paul's Hospital Millennium Medical College and AaBET Hospital in Addis Ababa. From April 2023 to December 2023, Ababa, Ethiopia.

3. Methodology

3.1 Study Area, and Period

The study was conducted at St. Paul's Hospital Millennium Medical College which is located in the capital city of Ethiopia, Addis Ababa. Currently, Saint Paul's Hospital Millennium Medical College has more than 700 beds. It serves about 1200 emergency and outpatient clients daily. The college has more than 2800 clinical, academic administrative, and support staff that provide medical specialty services to patients who are referred from all over the country, teaching medicine and nursing students and doing basic and applied research. It trains a large number of undergraduate medical students, 23 fields of specialties, and 15 subspecialties. The study will be conducted from April 2023 to December 2023.

3.2 Study Design

A quantitative, descriptive, analytical, and cross-sectional questionnaire study was implemented to explore the level of KAP of procedural sedation among residents working in St. Paul's Hospital Millennium Medical College.

3.3 Source Population

The source population was all residents working in St. Paul's Hospital Millennium Medical College, and AaBET Hospital.

3.4 Study Population

The target population for this research were all Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents working in St. Paul's Hospital Millennium Medical College, and AaBET Hospital.

3.5 Sample Size

The sample size for the study was determined using a single population proportion formula. Since the prevalence of the problem in the study area is not known, the P value is taken as 50% (0.5), and a 95% confidence interval was used, with a 5% margin of error tolerated.

$$n = \frac{(Z_{\alpha/2})^2 \cdot pq}{d^2}$$

Where: n = required sample size

$$p = 0.50$$

$$d = 1 - p = 0.5$$

$$Z_{\alpha/2} = 1.96 \text{ with CI} = 95\%$$

$$n = \frac{(1.96)^2 \times (0.5) \cdot (0.5)}{(0.05)}$$

$n = 384$, Since the study population ($n=327$) is less than the calculated sample ($n = 384$), no need to calculate using the correction formula, so all of them should be included in the sampling unit which means 327.

3.6 Sampling Procedures

All study populations were included in the sampling unit and the sampling procedure of the study was as shown in the following diagram.

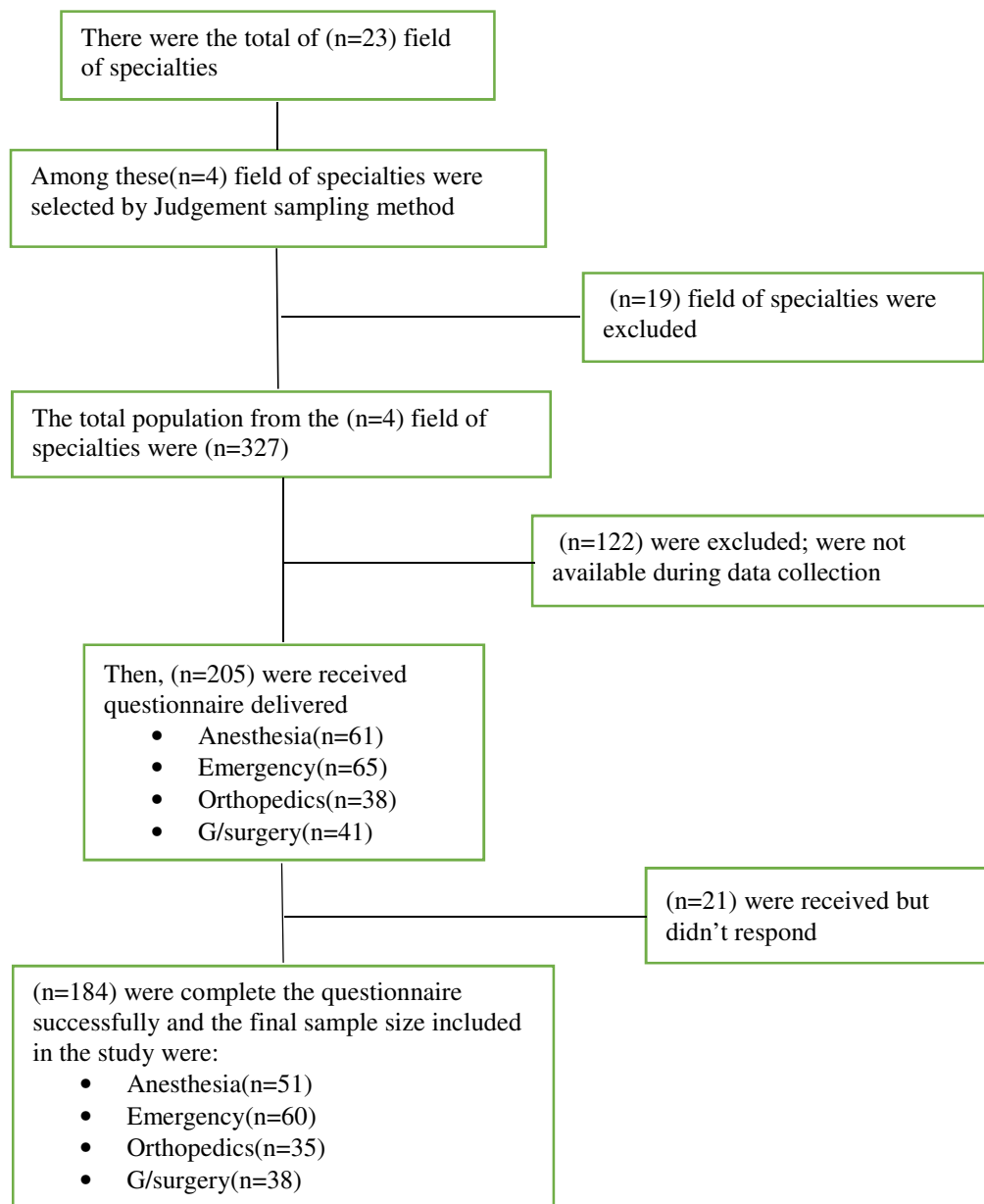


Figure 2 The flow diagram shows the detail of inclusion and exclusion criteria.

3.7 Eligibility Criteria

3.7.1 Inclusion Criteria

All Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents working in Saint Paul's Hospital Millennium Medical College, and AaBET Hospital who give consent.

3.7.2 Exclusion Criteria

Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, Orthopedic Surgery residents who are not available, and within reach during the study period, and those who do not give consent.

3.8 Study Variables

3.8.1 Dependent Variable

Knowledge, attitudes, and practice of Emergency, and Critical Care Medicine, Anesthesia Critical Care and Pain Medicine, General Surgery, and Orthopedic Surgery residents.

3.8.2 Independent Variable

Socio-demographic factors: - Age, sex, Marital status, field of specialty, and year of residency.

3.9 Operational Definition

Good Knowledge. It is the status of residents' knowledge of those scored median, and above (knowledge score, ≥ 56 percentile).

Poor Knowledge. It is the status of residents' knowledge of those who scored less than the median (knowledge score, < 56 percentile).

Favorable Attitude. It is the category of residents' attitudes that scored medians, and above.

Unfavorable Attitude. It is the category of residents' attitudes that scored less than the median.

Good practice. It is the category of residents practice those scored median, and above.

Poor practice. It is the category of residents who practice those who scored less than the median.

3.10 Data Collection Instruments, and Procedure

Data was collected using self- self-administered questionnaire used in collecting the data to gain in-depth information on specific questions, which were adopted from a previous similar study. The study participants were oriented on the questionnaire, and written consent was provided before data collection. Three second-year Emergency, and critical care Medicine residents will collect the data, and one of them used as supervisor. They were given short time training about the questionnaire before data was collected on the study objectives and data collection procedures. The questionnaire was developed based on the knowledge, attitudes, and practice. The questionnaire has four items (1) Socio-demographic (2) knowledge (3) attitude (4) practice. Comprises,10 knowledge questions, 19 practice questions, and 9 attitudes questions which evaluated with two items. Each item was organized on a five-point Likert scale from strongly disagree- represents (1) to strongly agree- represents (5).

3.11 Data Quality Control

To increase data quality and response rate the questionnaire was prepared with great emphasis then information was given to the data collectors, and supervisors. Data clean-up and cross-checking were done before analysis.

3.12 Data Processing, and Analysis

To improve data quality and response rate, the questionnaires were carefully prepared before being distributed to data collectors and supervisors. Before analysis, data will be cleaned and cross-checked. The data was sorted and summarized when it was collected and reviewed for completeness and accuracy. The data was then entered into the computer using a specified data entry format, coded for each category of variables, and error checks were performed. After coding, the data was input into SPSS version 25 and analyzed by the investigator using the same computer package. To compute the various rates, proportions, and pertinent associations,

descriptive statistics and multiple linear regressions were used. During the analysis, the p-value and/or 95% CI will be utilized to determine the significance of the associations.

3.13 Ethical Considerations

The Saint Paul's Hospital Millennium Medical College Ethics Research Committee approved this study. Ethical clearance was obtained from the Institutional Review Board (IRB) of Saint Paul's Millennium Medical College. A permission letter was submitted to the medical record unit from the Department of ECCM & Research Directorate to retrieve and review the charts. Following this, the introduction and familiarization of the data collectors with the team unit was secured. The collected data were kept anonymous and confidential.

3.14 Dissemination Plan

The study's findings were disseminated through a presentation, oral communication, and written report presented to each department's school of Medicine department for partial fulfillment of this thesis, as well as to other health institutions. Furthermore, dissemination can be facilitated through public outreach such as presentations in associations and various conferences, and to those who require these results and will accordingly advocate for those who can implement it, such as the Ministry of Health, Hospitals, and health center administration for the arrangement of some training for their specific staffs.

4. Result

4.1 Demographic characteristics

In this study, 184 participants participated with a response rate of 89.58%. 98(58.1%) of the participants were under the age of 25 years. The mean age of the respondents was 29.61 ± 2.4 SD years, with minimum and maximum age being 25, and 40 years, respectively. Over two-thirds of the participants, 152 (82.6%), were male, and 32 (17.4%) were female. According to the area of expertise, 60(32.6%) were emergency, and critical care residents, 51(27.7%) were anesthesia critical care, and pain medicine critical care residents, 35(19%) were orthopedic surgery residents, and 38(20.7%) were general surgery residents. The frequency distribution based on year of residency 60(32.6%) were year I, 64(34.8%) were year II, 51(27.7%) were year III, and, 9(4.9%) were year IV residents.

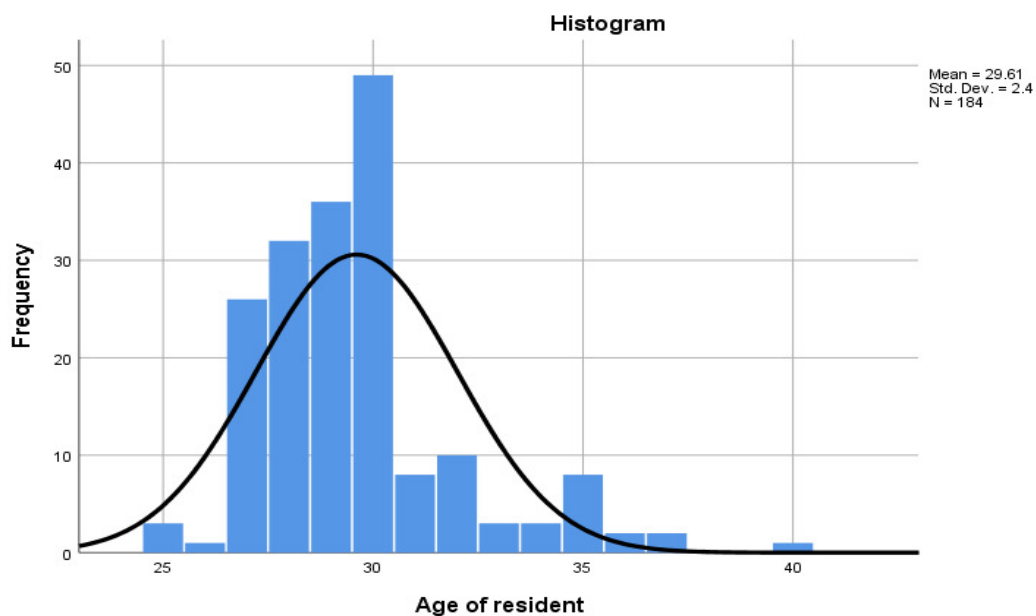


Figure 3 shows the age distribution of respondents.

4.2 Knowledge of respondents on procedural sedation

knowledge of respondents to procedural sedation one hundred and eighty-four percent of the total accessible population of 205 respondents (89.58%) agreed to participate and completed questionnaires. The results of the study are shown in the table.1 and 2, which show that the four groups of residents had poor knowledge.

There is no statistically significant variation found within the group of the level of knowledge related to procedural sedation, with the poor knowledge group scoring 103(56%) with a mean score of $2.36 \pm 1.083SD$, and good knowledge 81(44%) with a mean score of $2.28 \pm 1.109SD$ with emergency and critical care medicine are more knowledgeable than other with (AOR=1.31, 95%CI,0.564-3.041 p = 0.53), Anesthesia, critical care and pain medicine (AOR = 0.817, 95% CI 0.344-01.941, p= 0.647), Orthopedic surgery (AOR=0.653 95%CI 0.235-1.813, p = 0.413) and general surgery (AOR=0.961, 95%CI 0.725-1.273, p = 0.679). Knowledge by year of residence with a (AOR = 1.56,95% CI 0.383-0.819, p= 0.003), which shows significant to have adequate knowledge about procedural sedation with increased year of residency.

4.3 Attitude of respondents on procedural sedation

The levels of comfort when performing procedural sedation were compared among the different professional levels Table 2 shows the number of respondents per professional level. A statistically significant relationship was found between the group of the level of comfort related to procedural sedation, scoring 71 (35%) with a mean score of $2.11 \pm 0.919SD$, and the unfavorable group scoring 113 (65%) with a mean score of $2.46 \pm 1.173SD$, with emergency and critical care medicine are significantly favorable than other with (AOR = 6.252, 95%CI, 2.505-15.604, p = 0.00), Anesthesia, critical care and pain medicine (AOR = 1.254, 95% CI 0.491-3.2, p= 0.647), Orthopedic surgery (AOR=0.393, 95%CI 0.107-1.445, p = 0.016) and general surgery (AOR=1.101, 95%CI 0.418-2.898, p = 0.845). The majority of respondents reflected their opinion that the lack of emergency drugs, resuscitation, and

monitoring equipment, as well as the inability of trained personnel to administer procedural sedation, were the biggest obstacles.

Table 1 shows the measure of respondents' awareness of procedural sedation with a mean, median, and frequency distribution.

Variables		Frequency	Percentage	Mean	SD
Knowledge	Poor	103	56.0	2.36	1.083
	Good	81	44.0	2.28	1.109
Attitude	unfavorable	113	61.4	2.46	1.173
	Favorable	71	38.6	2.11	0.919
Practice	Poor	97	52.7	2.21	1.108
	Good	87	47.3	2.46	1.065

4.4 The practice of respondents on procedural sedation

The practice of respondents to procedural sedation out of 184 respondents, approximately two third 126(68.5%) were involved in sedation procedure, 58(31.5%) were never involved in the sedation practice, and nearly two-thirds had not received any form of training on Procedural sedation, and BLS/ACLS, 158(85.9%), and 115(62.5%) respectively.

The study shows more than two third of respondents lack written protocol for procedural sedation, and emergency monitoring materials 158(85.9%), and 9(4.9%), respectively. In their practice, above one-third 71(38.6%) assessed the level of sedation subjectively from their practice, 77(41.8%) were using the RASS Score, and 36(19.6%) were using the Ramsay scale. The monitoring equipment available at the emergency room during their practice was 78(42.4%) NIV, 62(33.7%) pulse oximetry, 32(17.4%) cardiac monitor/scenography, and 9(4.9%) none of the monitoring devices available.

As shown in Tables 2 and 3, there is no statistically significant relationship between the group regarding practice related to procedural sedation, with the good practice scoring 87 (47.30%)

with a mean score of $2.46 \pm 1.065SD$, and the poor practice scoring 97 (52.70%) with a mean score $2.21 \pm 1.108SD$, with emergency and critical care medicine (AOR=0.96, 95% CI 0.418-2.207, $p = 0.924$), Anesthesia, critical care and pain medicine (AOR = 0.425, 95% CI 0.177-1.019, $p = 0.055$), Orthopedic surgery (AOR=0.452 95%CI 0.169-1.21, $p = 0.114$) and general surgery (AOR=0.405, 95%CI 0.168-0.977, $p = 0.044$). were more likely to have good practice. Finally, procedural sedation practice educational levels were compared with each other. The total practice score shown in Table 3, that there is a statistically significant practice variation based on year of residency (AOR = 1.448, 95%CI, 1.009-2.079, $p = 0.045$), which indicates an increase in practice level with an increase in the year of residency.

Table 2 shows the measure of the relationship between procedural sedation awareness with the field of specialty and year of residency.

Variables		Coefficient (β)	SE	P value	AOR	95% Confidence Interval for AOR	
						Lower Bound	Upper Bound
Good knowledge	Year of residency	0.58	0.194	0.003	1.56	0.383	0.819
	Anesthesia	-0.202	0.442	0.647	0.817	0.344	1.941
	Emergency	0.27	0.43	0.53	1.31	0.564	3.041
	Orthopedic surgery	-0.426	0.521	0.413	0.653	0.235	1.813
	General surgery	-0.182	0.441	0.679	0.833	0.351	1.977
Favorable attitude	Year of residency	-0.115	0.21	0.582	0.891	0.59	1.344
	Anesthesia	0.226	0.478	0.636	1.254	0.491	3.2
	Emergency	1.833	0.467	0.00	6.252	2.505	15.604
	Orthopedic surgery	-0.933	0.664	0.16	0.393	0.107	1.445
	General surgery	0.096	0.494	0.845	1.101	0.418	2.898
Good practice	Year of residency	0.370	0.185	0.045	1.448	1.009	2.079
	Anesthesia	-0.855	0.446	0.055	0.425	0.177	1.019
	Emergency	-0.041	0.425	0.924	0.96	0.418	2.207
	Orthopedic surgery	-0.794	0.503	0.114	0.452	0.169	1.21
	General surgery	-0.905	0.45	0.044	0.405	0.168	0.977

Reference; poor, unfavorable

4.5 Discussion

Analysis of the research was conducted at an academic hospital and involved residents from four specialties. This report reveals that there are gaps in knowledge of procedural sedation techniques in all four groups of specialties. The result of the study shows, that there is no statistically significant relationship within the group of the level of knowledge related to procedural sedation, with the poor knowledge group scoring 103(56%) with a mean score of 2.36, and good knowledge 81(44%) with a mean score of 2.28 with emergency and critical care medicine are more knowledgeable than other with (AOR=1.31, $p = 0.53$). Knowledge by year of residence with a (AOR =1.56, $p= 0.003$), which shows more likely to have adequate knowledge about procedural sedation with increased year of residency.

This implies knowledge of procedural sedation is lacking. There is no statistically significant difference within the groups in terms of procedural sedation, with the good practice scoring 87 (47.30%) with a mean score of 2.46, and the poor practice scoring 97 (52.70%) with a mean score of 2.21, more likely to have good practice. Several studies show similar results. The total knowledge score was similar to a study done in South Africa on the departments of general surgery, and trauma, radiology, emergency Medicine, orthopedics', and Internal Medicine, the total knowledge score showed a mean score for radiology, and emergency Medicine was 4.80, and 4.25, respectively, and the mean scores for orthopedic surgery, and emergency Medicine were 5.28, and 4.25, respectively [8]. Similarly, a study done in Nigeria on sedation practice among radiology residents shows, knowledge, attitude, and practice, 34.4% of respondents claimed to know about sedation in radiology practice, mostly from their medical colleagues [7, 12]. Here in Ethiopia, the study done at Gondor Comprehensive Specialized Hospital shows more than two-thirds of the participants, 105 (78.9%), have never had a seminar or educational session about the combination of ketamine-propofol, but in the last 1 year more than three-fourths of the participants, 113 (85%), have used ketamine-propofol combination at the same

time. Those who did not use in the last 1 year cited that the main reason is lack of experience, 11 (8.3%), followed by lack of knowledge, 3 (2.3%), and lack of propofol, 5 (0.8%) [13].

This study shows the proportion of residents with procedural sedation training was very low. Out of 184 respondents nearly two-thirds, 126(68.5%) were involved in sedation procedure, 58(31.5%) were never involved in the sedation practice, and nearly two-thirds had not received any form of training on Procedural sedation, and BLS/ACLS, 158(85.9%), and 115(62.5%) respectively. Likewise, the International Journal of Emergency Medicine 2017 shows EPs reflected on their procedural sedation competencies in both adult and pediatric Procedural sedation. The emergency physicians (Eps) were queried on their capabilities, and competencies in performing Procedural sedation, and if they were able to perform advanced cardiac life support (ACLS) appropriately. This may indicate the reason why the level of awareness is lacking in all groups of field specialties.

The comfort levels were compared among the different professional levels, showing the number of respondents per professional level and their respective levels of comfort when administering procedural sedation. A statistically significant relationship was found between the group and the level of comfort related to procedural sedation, with the favorable group scoring 71 (35%) with a mean score of $2.11 \pm 0.919SD$, and the unfavorable group scoring 113 (65%) with a mean score $2.46 \pm 1.173SD$, with emergency and critical care medicine are more favorable than other with (AOR = 6.252, $p = 0.00$), which indicates the having favorable attitude is low. Similar to the study done in South Africa, the levels of comfort when performing Procedural sedation. A statistically significant relationship was found between the group, and the level of comfort in identifying complications related to Procedural sedation, with the favorable group scoring 8.63 (57.55%), and the unfavorable group scoring 7.03 (46.87%) ($p = 0.036$) standards [8].

The majority of respondents reflected their opinion that the lack of emergency drugs, resuscitation, and monitoring equipment, as well as the inability of trained personnel to administer procedural sedation, were the biggest obstacles. The study shows more than two third of respondents lack written protocol for procedural sedation, and emergency monitoring materials 158(85.9%), and 9(4.9%), respectively. In their practice, surprisingly, above one-third

71(38.6%) assessed the level of sedation subjectively from their practice, 77(41.8%) were using the RASS Score, and 36(19.6%) were using the Ramsay scale. The monitoring equipment available at the emergency room during their practice was 78(42.4%) NIV, 62(33.7%) pulse oximetry, 32(17.4%) cardiac monitor/capnography, and 9(4.9%) none of the monitoring devices available.

A similar shortage was reported in the study done in Europe, problem Physician (73%), nursing (72%), and physical space (69%) shortages were frequently cited as barriers to Procedural sedation and analgesia. This shortage could be attributed to the reason why the level of awareness is lacking in all groups of field specialties. On the contrary, the use of sedation by Nigerian radiology residents demonstrates, that only 22.0% of respondents across 5 centers have a standard protocol in place. During radiographic operations, 40.7% of responders had a resuscitation tray, while 84.2% had a resuscitation tray for sedative treatments. None of the responders' resuscitation equipment includes oxygen, reversal drugs, or a defibrillator[11, 18]. According to a local study conducted in Ethiopia, a total of 40 children were MRI and CT images performed at the hospital imaging sites. Out of the 20 standards, 6 of them had a 100% success rate, 3 of them had a 0% compliance rate, and 11 of them had a 0 to 100% success rate. the total intraoperative propanol used between the two groups was not significantly different, while the total intraoperative ketamine used was greater in group ii and significantly different than in group I ($p = 0.030$) [19, 20].

4.6 Conclusion

In conclusion, the levels of awareness of procedural sedation in all groups are lacking. The low levels of knowledge indicate that there is a need to address this problem to improve patient safety as the amount of sedation performed is only expected to increase with the increased demand for healthcare services. Procedural sedation guideline knowledge was substantially important to address these gaps in the form of Procedural sedation-specific training.

4.7 Recommendation

The study's findings should be disseminated through a presentation, oral communication, and written report presented to each department's school of Medicine department for partial

fulfillment of this thesis, as well as to other health institutions. Furthermore, dissemination should be facilitated through presentations at various conferences, and those who require these results should accordingly advocate for those who can implement it, such as the Ministry of Health, Hospitals, and Hospital administration the arrange some training for their specific staff and necessary to adapt the standardized procedural sedation to the local situation by designing a local protocol.

4.8 Strength of study

The study used data quality kept at all stages and used regression for data analysis as a strength of the study. This study provides direction for future researchers on the complications associated with procedural sedation.

4.9 Limitation of study

Due to the lack of data accessibility regarding the practice of sedation, the use of judgmental sampling may have contributed to bias.

4.10 Consent for Publication

Not applicable.

4.11 Conflict of interest

No conflict of interest was disclosed by the authors.

4.12 Authors contribution

All authors were revised and have equal contributions to the paper.

4.13 Funding

It was the author's declaration that no money was obtained for this research. However, St. Paul's hospital millennium medical college paid for logistic costs for data collection, for transportation duplication of the study instruments.

References

- [1] Heleen Lameijer, MD a, "Propofol versus midazolam for procedural sedation in the emergency," *American Journal of Emergency Medicine*, © 2017 Elsevier.
- [2] Delecia K. Wood-Thompsona, "African Journal of Emergency Medicine," October 2018.
- [3] Steven A. Godwin, MD (Subcommittee Chair), "Procedural Sedation and Analgesia in the Emergency Department," Vols. Volume 63, no. 2, February 2014.
- [4] Delecia K. Wood-Thompsona, "Procedural sedation and analgesia practices in the emergency centre," *African Journal of Emergency Medicine*, 2019.
- [5] Martyn Harvey, Grant Cave, Chris Betham, "Contemporary sedation practice in a large New Zealand," vol. Vol 124 No 1344, October 2011.
- [6] Jochen Hinkelbein, Massimo Lamperti, Jonas Akeson, Joao Santos, Joao Costa,, "European Society of Anaesthesiology and European," *GUIDELINES*, Eur J Anaesthesiol 2018; 35:6–24.
- [7] AD Omisorea, "Sedation practice among Nigerian radiology residents," 2016.
- [8] Karin-Ann Ben-Israel¹, Juan Scribante¹ and Helen Perrie, "Levels of Awareness of Procedural Sedation and," *Wits Journal of Clinical Medicine Academic Hospital in Johannesburg*, p. 13–22, 2019, 1(1).

- [9] J. A. Martin, "Procedural sedation: Policy, practice & knowledge," 2016.
- [10] AANA.com Professional Practice Division, "Non-anesthesia Provider Procedural Sedation and Analgesia," *American Association of Nurse Anesthesiology*.
- [11] Cyril Sahyoun¹ & Aymeric Cantais¹ & Alain Gervais¹ & Silvia Bressan² & Ruth Löllgen³ & Baruch Krauss⁴ & "Pediatric procedural sedation and analgesia in the emergency," *European Pediatric Emergency Medicine*, 28 January 2021.
- [12] Maybritt I. Kuypers^{1,6*}, Gaël J. P. Smits², "Procedural sedation and analgesia practices by emergency physicians in the," *International Journal of Emergency Medicine*, 2017.
- [13] N. A. W. a. A. S. Mohammed², "Clinical knowledge and practice of ketofol at Gondor comprehensive specialized Hospital," <https://www.frontiersin.org/journals/medicine>, p. 3, 2021.
- [14] A Report by the American Society of Anesthesiologists Task, "Practice Guidelines for Moderate Procedural Sedation," vol. V 128 • No 3, 2018.
- [15] James R. Miner, MD, "Emergency Department Procedural sedation," *American College of Emergency Physician*, vol. Volume 50, 2007.
- [16] G Wenzel-Smith, B Schweitzer, "Safety and efficacy of procedural sedation and analgesia," *Department of Family Medicine, University of Cape Town*, Vols. Vol. 101,, p. No. 12, December 2011, .
- [17] Keira P. Mason ^{1,*} , Mark G. Roback ², "Results from the Adverse Event Sedation Reporting," *Journal of clinical medicine*, 16 October 2019.
- [18] Z. A. M. H. G. K. Debas Yaregal Melesse*, "Assessment of the practice of pediatrics procedural sedation and analgesia formagnetic resonance imaging and computed tomography scan at a teachinghospital, Ethiopia, 2020: A clinical audit," *Journal of Medical Imaging* , p. 274, 2020:.
- [19] E. M. b. *. G. Meron Woubshet, "Effectiveness of ketamine and propofol (ketofol) in 1:2 versus 1:3 combinationsfor procedural sedation and analgesia in pediatric patients undergoing bonemarrow aspiration and / or biopsy: A prospective cohort study," *International Journal of Surgery Open*, vol. 27, pp. 67-68, 2020.
- [20] Martyn Harvey, Grant Cave and Chris Betham, "Contemporary sedation practice in a large New Zealand," vol. Vol 124, October 2011.
- [21] Sylvester Chuks Nwokediuko, Olive Obienu, "Sedation practices for routine diagnostic upper gastrointestinal," *World J Gastrointest Endosc* , vol. | Volume 4, no. | Issue 6 | , June 16, 2012.
- [22] A Burgera* , PW Hodgkinsonb and LA Wallisc, "Emergency Centre-based paediatric procedural sedation: current practice andchallenges in Cape Town," *Southern African Journal of Anaesthesia*

and Analgesia, © 2019.

[23] Jochen Hinkelbein, Massimo Lamperti, Jonas Akeson, Joao Santos, Joao Costa,, "GUIDELINES," *European Society of Anaesthesiology and European*, Eur J Anaesthesiol 2018; 35:6–24.

Assurance of Principal Investigator

I agree to accept all responsibilities for the scientific, and ethical conduct of the research project. I will provide timely progress reports to my advisor, and seek the necessary advice, and approval from my primary advisors in the course of the research. I have communicated timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Appendix I

Questionnaire

Informed Consent

My name is Lamessa Mosisa (MD), a postgraduate student in Emergency and critical care medicine at Saint Paul's Hospital Millennium Medical College.

As part of my coursework, I am required to perform clinical research. I am surveying the knowledge, attitude, and practice of procedural sedation among Emergency Medicine and Critical Care, Anesthesia, General Surgery, and Orthopedic Surgery residents working at Saint Paul's Hospital Millennium Medical College and AaBET Hospital.

The study aims to assess our practice, knowledge, and attitude of procedural sedation, and identify our strengths and weaknesses. This will help improve the quality of procedural sedation given to patients, and also to compare with international standards. To do this I shall obtain information in the form of a questionnaire administered to you. The results obtained will enable us to come up with recommendations. Therefore, I shall need your consent as a participant to be included in the study.

This is a voluntary exercise and no victimization will occur based on refusal to participate in the study. One can withdraw from the study at any point in time. Any information obtained in the course of the study is beneficial to the management of the patient. All information shall be treated with utmost confidentiality.

Investigator Signature

Part I. Demographic Information

- 1) Serial No.....
- 2) Age
- 3) Sex ☐A. male ☐B. Female
- 4) Marital status, ☐A. single ☐B. married
- 5) Department of Practice ☐A. E/Medicine ☐B. G/Surgery ☐C. Anesthetics ☐D. Orthopedic Surgery
- 6) Year of residency ☐A. I ☐B. II ☐C. III ☐D. IV

Part II. Knowledge

- 7) On pre-procedure evaluation, it is noted that a patient can only open her mouth 1 cm because of temporomandibular joint disease. Which of the following is most likely?
☐ A. The patient will have difficulty breathing while awake.
☐ B. It may be difficult to rescue the patient if she stops breathing.
☐ C. The patient is likely to become hypoxic during minimal sedation.
☐ D. The patient will require a greater-than-expected dose of sedative agents.
- 8) Following the administration of midazolam for colonoscopy, a patient becomes sedated to the point where his airway is partially obstructed, but he responds purposefully following painful stimulation. This corresponds to which of the following levels of sedation?
☐ A. Minimal sedation ☐ B. Moderate sedation ☐ C. Deep sedation ☐ D. General anesthesia

- 9) Findings of pre-procedure evaluation should be reconfirmed at which one of the following times?
- ☐ A. Only if a complication occurs ☐ B. Within a week before the procedure
- ☐ C. On the day before the procedure ☐ D. Immediately before the procedure
- 10) Continuous electrocardiographic monitoring is optional in which of the following?
- ☐ A. Healthy pt. undergoing moderate sedation ☐ B. Healthy patient undergoing deep sedation
- ☐ C. Pt. with CHF undergoing moderate sedation ☐ D. Pt. with irregular pulse undergoing moderate sedation
- 11) A patient who is breathing supplemental nasal oxygen develops complete airway obstruction during moderate sedation. Which of the following is likely to occur first?
- ☐ A. Decrease in SPO2 reading by pulse oximeter ☐ B. Cessation of breath sounds
- ☐ C. Sinus bradycardia on electrocardiogram ☐ D. Hypotension on automated BP cuff
- 12) A specific individual should be dedicated to monitoring patients during procedural sedation. During moderate sedation, this individual may assist with an endoscopic procedure under which of the following circumstances?
- ☐ A. They don't leave the procedure room for more than 5 min. ☐ B. The alarms of the pulse oximeter are activated.
- ☐ C. The tasks are minor and interruptible, and monitoring is maintained. ☐ D. Supplemental oxygen is administered.
- 13) During moderate sedation, an individual with advanced life support skills must be available
- ☐ A. within the procedure room ☐ B. within 5 minutes ☐ C. within 10 minutes
- ☐ D. within 15 minutes
- 14) Flumazenil will antagonize the respiratory depression associated with which of the following medications?
- ☐ A. Meperidine ☐ B. Methohexital ☐ C. Midazolam ☐ D. Propofol
- 15) During sedation with propofol, a patient stops breathing and becomes unresponsive to verbal or tactile stimulation. The pulse oximeter reads 86%. Which of the following is most likely to improve the patient's oxygenation?
- ☐ A. Positive pressure ventilation ☐ B. Supplemental INo2 ☐ C. IV flumazenil
- ☐ D. IV naloxone
- 16) The use of supplemental oxygen during procedural sedation _____.
- ☐ A. increases the likelihood of hypoxia ☐ B. delays the detection of apnea by pulse oximetry
- ☐ C. should be avoided during moderate sedation ☐ D. decreases the likelihood of airway obstruction

Part III. Attitude question

17) How do you agree with the importance of procedural sedation listed in the table below?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Preparation of emergency equipment					
Patient counseling and taking consent					
Patient risk assessment					
Patient continuous monitoring					
Documentation with checklist					
Assessing the level of sedation					

18) Self-reflection of residents regarding PSA

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I am capable of performing PSA					
I can perform ACLS appropriately					
I am aware of the indication, C/I, and precaution of PSA					
I can recognize and treat the most common adverse events and/or complications					

Part III. Practice Question

19) Have you ever performed procedural sedation? ☐A. Yes ☐B. No

20) If yes, have you ever received any form of training on sedation during residency training?

☐A. Yes ☐B. No

21) If no, what is the source of your knowledge?

☐A. Internet ☐B. Medical colleagues ☐C. Books and publications ☐D. Others, please specify.....

22) Have you ever observed any adverse event with the use of sedatives? ☐A. Yes ☐B. No

- 23) Have you ever trained on basic life support (BLS)/ Advanced cardiac life support (ACLS)?
☐A. Yes ☐B. No
- 24) How do you assess the level of sedation in your patients?
☐A. Subjectively from experience ☐B. Ramsay scale ☐C. RASS ☐D. Others, Specify.....
- 25) Do you have a written protocol for procedural sedation in your ED? ☐A. Yes ☐B. No.
- 26) Do you let the patient go fasting? ☐A. Yes ☐B. No.
- 27) An otherwise healthy patient requires moderate sedation for elective cardiac catheterization. He should not consume clear liquids for a minimum of how many hours before the beginning of the procedure? ☐A. 1 ☐B. 2 ☐C. 4 ☐D. 6
- 28) What monitoring devices are available during procedural sedation? Please, Mark
☐A. None ☐B. NIB ☐C. ETCO₂/ capnography ☐D. Pulse Oximetry ☐E. ECG
☐F. Defibrillator
- 29) Do you administer oxygen to the patient during procedural sedation? ☐A. Yes ☐B. No
- 30) If no, please explain why?.....

31) How frequently you will consider each of these agents? Please, mark

Drug	Never	Seldom	Regularly	Often	Always
Ketamine					
Propofol					
Etomidate					
Midazolam					
Morphine					
Fentanyl					
Nitrous Oxide					
Other (please specify)					

35). In your opinion, what are the major obstacles to using procedural sedation in daily practice within your Emergency Centre? please specify

Thank You!!

