



**St. Paul's Hospital Millennium Medical College
Graduate Study Program**

**Knowledge, Attitudes, and Practices of Sedation in Pediatric Intensive Care
Unit among consultants/fellow and Residents at St. Paul's Hospital Millennium
Medical College, Addis Ababa, Ethiopia, 2025.**

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Addis Ababa, Ethiopia

September 2025



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A THESIS SUMMITTED TO THE DEPARTMENT OF ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE, SAINT PAUL'S HOSPITAL MILLENIUM MEDICAL COLLEGE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR CERTIFICATION OF SPECIALITY IN DEPARTMENT OF ANESTHESIOLOGY AND CRITICAL CARE RESEARCH.

**Addis Ababa, Ethiopia
September 2025**

Academic Research Submission Form

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Full title of the research project	Knowledge, Attitudes, and Practices of Sedation in Pediatric Intensive Care Unit among consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025.
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Summary

Background: Sedation can be provided to facilitate a procedure or to stabilize patients admitted to PICU. Sedation is often necessary to maintain optimal care for critically ill children requiring Mechanical ventilation. However, if sedation is too deep or too light it has its own adverse effects, and hence it is important to monitor level of sedation and maintain an optimal level.

Objectives: To assess Knowledge, Attitudes, and Practices of sedation among Pediatric Intensive Care Unit consultant/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, From September 2025 to November 2025.

Methods: Institutional based cross-sectional study was conducted in the PICU of SPHMMC from September 2025 to November 2025. All PICU consultants/fellow and residents were included in the study. Hence, the sample size was equal to the study population which was 188. The convenience sampling method was used to include all eligible consultants/fellow and residents working in the PICU. The data was collected by standardized pretested questionnaire. Descriptive statistical analysis, to see the association between independent variables and outcome variables binary logistic regression was used. Independent variables with a p-value of < 0.25 at 95% CI in bi-variable analysis were retained for multivariable logistic regression analysis. Variables with a P-value ≤ 0.05 were declared as statistically significant.

Results: A total of 188 questionnaires were distributed, of which 180 were fully filled out and collected back making the response rate 95.7%. About 62.8% of the respondents scored above the mean knowledge score. Consultants/fellow and Residents who didn't get married were 65.1% (AOR = 0.349; CI = 0.156–0.78) less likely to have adequate knowledge than those who did get married. Being R1 and R2 were 94.1% (AOR = .059; CI = 0.020-0.179) and 67.6% (AOR=.324; CI=.135-.779) less likely knowledgeable than those consultants/fellow and Residents who were R3 respectively. 52.7% of consultants/fellow and Residents had good practice and 46.7% of consultants/fellow and Residents had unfavorable attitude towards pediatric pain management.

Conclusion and Recommendation: This study showed that while many PICU consultants and residents had reasonable knowledge about pediatric sedation, important gaps remain in everyday practice and attitude. The use of standardized sedation assessment tools and routine documentation was inconsistent, suggesting a gap between what clinicians know and what is consistently applied at the bedside. Differences in training level and experience influenced

knowledge and practice. Overall, sedation management in the PICU is variable and not yet fully aligned with evidence-based standards. Based on this study the proposed recommendation should rely on Focused training, implementation of a clear written sedation protocol, and routine use of validated assessment tools should be prioritized to improve consistency and patient safety. Ongoing quality improvement efforts and regular reinforcement during clinical rounds are essential to strengthen sedation practice and ensure better outcomes for critically ill children.

Key words: Sedation, Pediatric intensive care unit, Knowledge, Attitudes, and Practices.

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Acronyms and Abbreviations

CAPD	The Cornell Assessment of Pediatric Delirium(30)
CI	Confidence Interval
ETB	Ethiopian Birr
ICU	Intensive Care Unit
KAP	Knowledge, Attitude and Practice
LMICs	Low and Middle Income Countries(28)
NICU	Neonatal Intensive Care Unit(34-37)
PICU	Pediatric Intensive Care Unit
rFLACC	Revised Face, Legs, Activity, Cry and Consolability (29)
SBS	The State Behavioral Scale(8)
SCCM	The Society of Critical Care Medicine (9)
SPHMMC	St. Paulos Hospital Millennium Medical College
TASH	Tikur Anbessa Specialized Hospital (33)

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1. Introduction

1.1. Background

The Pediatric Intensive Care Unit (PICU) provides specialized care for critically ill infants, children, and adolescents who require intensive monitoring and advanced medical interventions(1). Adequate pediatric pain management is now universally considered an ethical obligation. Within this environment, effective sedation management is paramount, serving not only to alleviate pain and anxiety but also to facilitate diagnostic and therapeutic procedures, optimize mechanical ventilation, and prevent self-harm (2). The assessment and treatment of pain in children are important parts of pediatric practice, and failure to provide adequate control of pain amounts to substandard and unethical practice (3). Sedation in the PICU, however, presents a complex challenge, demanding a nuanced understanding of pediatric physiology, pharmacology, and the unique psychological and developmental needs of young patients(4). Unlike adults, pediatric patients' exhibit marked variability in their responses to sedative medications, influenced by factors such as age, weight, organ function, and underlying medical conditions(5). This heterogeneity necessitates individualized sedation strategies, coupled with meticulous monitoring to ensure patient safety and minimize potential adverse effects(6). Additionally, because pain and anxiety are subjective in non-verbal or pre-verbal children, sedation administration and titration must be guided by validated, objective assessment tools like the COMFORT Behavior Scale, the State Behavioral Scale (SBS), and the revised Faces, Legs, Activity, Cry, Consolability (rFLACC) scale(7,8).

The Society of Critical Care Medicine (SCCM) and other professional organizations have published clinical practice guidelines for managing pain, agitation, and delirium in critically ill patients, including recommendations for the use of sedation protocols and targeted sedation levels(9). Adherence to these guidelines has been shown to improve patient outcomes, reduce the duration of mechanical ventilation, and decrease the incidence of complications(10). Protocolized sedation, which involves the use of pre-defined algorithms for sedation administration and titration, promotes consistency in practice and reduces variability among healthcare providers. When compared to standard care without protocolized sedation, protocolized sedation appears to reduce overall mortality (15%), ICU and hospital

durations of stay (1.73 and 3.55 days, respectively), and tracheostomy (31%), among individuals on mechanical ventilation in closed, non-specialty intensive care units (11). The sedation procedures at PICUs continue to be inconsistent and frequently depart from established norms, despite the availability of evidence-based guidelines and validated assessment methods(12). A lack of standardized procedures, a lack of communication barriers among medical professionals, a lack of understanding of sedation principles, and unfavorable attitudes toward the use of objective assessment methods are some of the factors causing this variability(13,14).

All healthcare professionals involved in the care of critically ill children need to have a thorough understanding of the current state of sedation knowledge, attitudes, and practices because of the critical role that sedation plays in the PICU and the potential for both undertreatment and overtreatment to have a negative impact on patient outcomes. The quality of sedation management in the PICU can be raised, and the wellbeing of the most vulnerable patients can be improved, by addressing negative attitudes, identifying knowledge gaps, and encouraging the use of standardized, evidence-based methods. The purpose of this study was to support this endeavor by offering a thorough evaluation of the sedation practices, attitudes, and knowledge of PICU medical staff at St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia.

1.2. Statement of the Problem

In many Pediatric Intensive Care Units, assessment of sedation is through an informal approach by the nurses and physicians caring for the patients. Approximately 50–80% of patients experience pain during their hospitalization as a result of procedures, surgical intervention, and disease states(15). Effective sedation management in the Pediatric Intensive Care Unit (PICU) is crucial for minimizing patient discomfort, facilitating necessary procedures, and improving overall outcomes(16). Achieving optimal sedation levels in pediatric patients, however, presents unique challenges due to age-related differences in physiology, developmental stage, and individual responses to medications(17). Inadequate sedation can lead to patient agitation and increased oxygen consumption, while over-sedation can result in prolonged mechanical ventilation, increased risk of infections, and potential neurological sequelae(6).

There are several reasons why sedation practices are suboptimal, including poor knowledge of sedation principles and protocols, negative attitudes toward the use of sedation assessment tools, and a lack of standardized practices among healthcare professionals(18). Furthermore, differences in sedation knowledge, attitudes, and practices among physicians, nurses, respiratory therapists, and pharmacists working in the PICU can further contribute to inconsistent sedation management and may compromise patient safety (19). Even with established guidelines and resources, research indicates significant differences in sedation practices. According to European and Canadian surveys, merely 36% of pediatric intensivists consistently implemented sedation protocols, and the use of validated sedation tools varied greatly (12,20). While various studies have examined sedation practices in adult intensive care units, there is a relative scarcity of research specifically focused on the pediatric population and more studies often focus on a single profession (e.g., nurses) limiting the generalizability of the findings(21).

Therefore, there was a critical need for a comprehensive assessment of the knowledge, attitudes, and practices of sedation among all healthcare professionals working in the PICU. This study aimed to address this gap by conducting a multi-center assessment of knowledge, attitudes, and practices of sedation among

consultants/fellow and residents working in PICUs, providing valuable insights that can inform future efforts to improve sedation management in PICU.

1.3. Rationale of the Study

The rationale for this study was based on the recognition that effective sedation management is essential to ensure high quality care in PICU for critically ill children, and the understanding that current sedation practice often falls below recommended standards. By examining the knowledge, attitudes and practices of consultants/fellows and residents involved in the management of sedation. This study aimed to identify areas for improvement and inform the development of interventions to improve patient safety, support evidence-based practices and optimize clinical outcomes.

2. Literature Review

2.1. Introduction

From a patient's perspective, sedation is the state of being calmed, relaxed, or made unaware of their surroundings or pain, especially during a medical procedure, prioritizing comfort and minimizing unpleasant experiences(22). According to Researchers and clinicians perspective, sedation is the administration of medications to reduce anxiety, pain, and awareness, facilitating medical or surgical procedures and improving patient compliance and cooperation, all while maintaining patient safety through careful monitoring and titration(23–25). Pediatric pain has significant long-term negative sequelae as it can hinder the educational, social, and physical development of a youth, along with mental health ramifications(26).

2.2. Importance of Sedation in Pediatric Intensive Care.

Sedation is essential for alleviating pain, anxiety, and agitation in critically ill pediatric patients. It aids in diagnostic and therapeutic interventions, enhances mechanical ventilation management, and helps prevent self-harm, all of which lead to better patient comfort, safety, and overall results. Appropriate sedation also enhances the synchronization between the patient and ventilator, lowers oxygen consumption, and minimizes the likelihood of delirium, a major complication faced by critically ill individuals(3,24,25,27). A systematic review encompassing twenty-five studies indicated that over sedation (31.8%) occurs more frequently than under sedation (10.6%), while optimal sedation was observed in 57.6% of cases. Given that over-sedation can result in extended hospital stays, tolerance, and withdrawal, it is crucial to focus more on preventing over sedation in pediatric intensive care(6). Thus, optimal sedation is a balance that requires standardization and continuous monitoring. The Society of Critical Care Medicine (SCCM) guidelines highlight that sedation, when guided by validated tools and structured protocols, improves safety and clinical outcomes in children(9).

2.3. Sedation Assessment Tools

Validated behavioral scales are crucial since many pediatric patients cannot communicate verbally. The COMFORT Behavior (COMFORT-B) scale was specifically designed to evaluate sedation and distress in children on mechanical ventilation. Research has verified its validity across different cultures, including those

in low- and middle-income countries (LMICs), demonstrating reliability even after translation(28). Likewise, the State Behavioral Scale (SBS) offers a standardized way to assess infants and young children undergoing mechanical ventilation(8).

The FLACC scale and its updated version (r-FLACC) are commonly utilized observational tools for nonverbal children, including those who may have cognitive disabilities. The r-FLACC enhances interrater reliability in areas such as movement and activity, making it appropriate for evaluating pain and sedation in pediatric patients in resource-constrained ICUs(29).

Alongside sedation assessment tools, the Cornell Assessment of Pediatric Delirium (CAPD) has been developed as a quick bedside screening method for delirium in critically ill children. Validation studies indicate that CAPD can be utilized across the full pediatric age range, and adjustments in cutoff thresholds have further enhanced its diagnostic accuracy(30).

2.4. Global Variability in Sedation Practices

Despite the availability of guidelines and tools, studies highlight wide variability in sedation practices. A European multicenter survey revealed that only 36% of pediatric intensivists routinely used sedation protocols, and validated sedation tools were inconsistently applied(12). In Canadian PICUs, reported substantial variation in sedative choices and monitoring strategies, with limited adoption of written protocols(20). Systematic reviews of sedation bundles and protocols indicate that protocolized sedation is associated with reduced PICU length of stay, fewer unplanned extubations, and lower risk of withdrawal. However, implementation remains uneven, and many PICUs still rely on clinician judgment without standardized algorithms(31).

2.5. Knowledge, Attitudes, and Practices (KAP) among Healthcare Providers

Knowledge and attitudes of PICU staff directly influence sedation management. Poor knowledge of sedation principles, negative attitudes toward assessment tools, and lack of standardized practice contribute to inconsistent care. For example, a Sudanese study reported that 60% of pediatric residents were unaware of any pain assessment scale, and one-third incorrectly believed opioids were contraindicated in

children(32). In Ethiopia, several studies highlight gaps in pain and sedation management. At Tikur Anbessa Specialized Hospital (TASH), only 40% of pediatric and surgical residents demonstrated adequate knowledge and practice of pediatric pain management(33). Similar findings were reported among NICU nurses in Addis Ababa, West Oromia, Amhara, and Mekele, where knowledge levels ranged from 48% to 68.7%, yet good practice remained below 10% in some studies. Availability of protocols, training, and assessment tools consistently predicted better knowledge and practice(34–37).

Attitudes towards sedation practices and assessment tools also play a crucial role in shaping sedation management strategies in the PICU. Studies have shown that healthcare professionals' attitudes towards the use of sedation scales, such as the COMFORT scale and the rFLACC scale, can influence their adherence to sedation protocols and the frequency with which they assess sedation levels(28). A survey conducted in Sudan to assess the attitude of residents towards the importance of pain control in children was generally good among surveyed residents (75%). Two-thirds of them had never used topical anesthetic cream/lotion, while 40% of them had never used non-nutritive sucking(32). A study conducted in Saudi Arabia to assess Nurses' Knowledge and Attitudes Regarding Pain Assessment and Management revealed that the majority of the participants (70.1%) had a poor level of knowledge and attitudes (score < 50%)(15). Another descriptive cross-sectional study was carried out in Iran, with the aim of assessing nurses' pain management knowledge, attitudes and barriers that revealed none of the participants attained adequate for proficiency in pain management knowledge and 64.5% of nurses had an unfavorable attitude toward pain management(14).

Survey of Sedation and Analgesia Practice among Canadian Pediatric Critical Care Physicians demonstrates that there was great variation in practice in the management of pain and anxiety in the PICU. Only 36% of respondents have routinely used sedation protocols, and 66% do not use noise reduction methods (20), while only 5.7% demonstrated good practices in neonatal pain management in Ethiopia (36). Studies conducted in Rwanda and West Oromia revealed that 84.8% and 66.8% of health providers have poor neonatal pain management practice, respectively(35,38). In terms of pain management methods, only 13.8% utilized breastfeeding as a remedy for pain relief, while 9.7% never employed this practice, 34.14% of healthcare

providers did not use sucrose/glucose as a pain relief measure, and 30.4% failed to prescribe opioids when necessary for pain management(35). Level of education, having a master's degree, a child's cooperativeness for taking pain medication, the presence of an evidence-based protocol for pediatric pain management in the facility, work experience in the nursing profession for more than 2 years, and the availability of a pediatric pain assessment tool also, had three times more engaged in good pediatric pain management practice and having training on pain management were among the factors affecting pediatric pain management practice(39).

2.6. Barriers to Standardized Sedation

Multiple studies have identified barriers to effective sedation practice. These include: Insufficient training and ongoing education, Lack of institutional guidelines and protocols, restricted access to validated sedation and pain assessment tools, Misunderstandings about opioid usage in pediatric patients, Heavy workloads and staff shortages that impede adherence to assessment protocols(4,6,13,25,27,31).

Currently, the majority of Ethiopian research focuses on neonatal and general pediatric pain, resulting in a significant lack of evidence regarding knowledge, attitudes, and practices (KAP) specific to sedation in pediatric intensive care units (PICUs). Research indicates that factors like training, the availability of guidelines, and the use of validated tools have a substantial impact on clinical practice. Evaluating the knowledge, attitudes, and practices of consultants/fellow and residents working in the largest pediatric ICU in Ethiopia (SPHMMC) will provide crucial baseline information. This information can guide targeted efforts such as staff training initiatives, the creation of local guidelines, and the implementation of validated assessment tools, thereby enhancing the quality of sedation and improving patient outcomes.

3. Objectives

3.1. General Objective:

To assess Knowledge, Attitudes, and Practices of Sedation among Pediatric Intensive Care Unit consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, From September 2025 to November 2025.

3.2. Specific objectives:

To assess the knowledge of PICU consultants/fellow and residents regarding sedation principles, protocols, and medications.

To examine the attitudes of PICU consultants/fellow and residents towards sedation practices, including perceived benefits, barriers, and challenges.

To describe the self-reported sedation level practices of PICU consultants/fellow and residents, including their adherence to protocols, use of assessment tools, and management of complications.

4. Methods

4.1. Study Setting: This study was conducted in the pediatric ICU of SPHMMC. The Department of Pediatrics is one of the major departments in the college, which has outpatient, inpatient, pediatric, and neonatal ICUs. The pediatric intensive care unit was established in 2007. It has a capacity of seven beds and is equipped with a central oxygen supply, patient care monitors, infusion pumps, and mechanical ventilators. The unit is staffed by consultants (an intensivist and pulmonology and critical care physicians), residents, and 10 nurses during working hours.

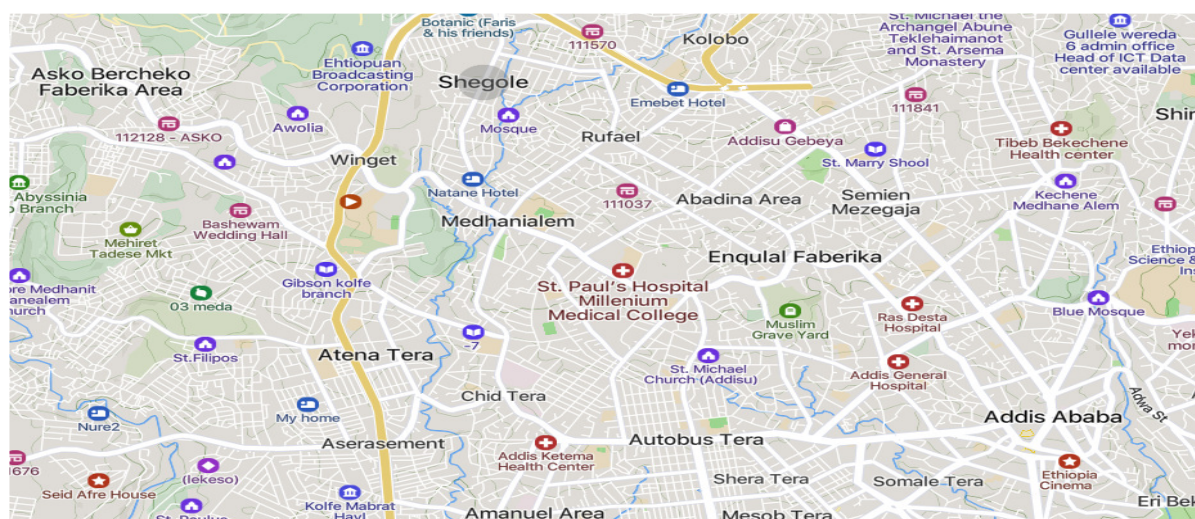


Figure 1. Map of St. Paul's Hospital Millennium Medical College
(<https://mapcarta.com/N8296886217>)

4.2. Study Period: This study was carried out from September 2025 to November 2025.

4.3. Study Design: Institutional-based cross-sectional study design was used.

4.4. Source and Study Population:

4.4.1. Source Population: all consultants/fellow and residents of SPHMMC.

4.4.2. Study Population: consultants/fellow and residents (R1-R3) who were working on PICU at SPHMMC.

4.4.3. Inclusion and Exclusion criteria:

4.4.3.1. Inclusion criteria; all consultant/fellow and residents who had six month cumulative PICU clinical exposure.

4.4.3.2. Exclusion criteria; consultant/fellow and residents who were on annual leave, maternity leave and who had less than six-month work experience were excluded.

4.5. Sample Size: All PICU consultant/fellow and residents ((R1-R3) were included in the study. Hence, the sample size was equal to the study population which is 188.

4.6. Sampling Procedures: Convenience sampling (non-probability sampling) method was used to include all eligible consultant/fellow and residents working in the PICU to participate in this study.

4.7. Measurement

4.7.1. Study Variables:

Dependent variable: consultant/fellow' and residents' knowledge, attitude, and practice of sedation.

Independent variables: Age, sex, marital status, educational level, work experience, presence of protocols and guidelines, availability of standardized tools, drugs, training, and workload.

4.7.2. Data collection tools

Data was collected using a self-administered electronic questionnaire adopted from different literature(13,16,18–20,24,25,34,35). A written structured questionnaire in English language was prepared to assess the knowledge, attitude and practice, of sedation among consultants/fellow and residents in the PICU. The questionnaire consists of 41 items, 6 questions related to demographic data, 15 assessment scales and knowledge related questions, 10 attitude related questions and 10 practice related questions. Data collection was conducted by three trained and experienced GPs.

4.8.Data Collection and Procedures:

The study participants were provided data through a pretested structured, self-administered questionnaire in English. Data collection was carried out by three general practitioners among all qualified consultant/fellow' and residents in the Pediatric Intensive Care Unit (PICU). The data collectors were stationed in their respective work areas or nurses' stations. To prepare the data collectors working in the PICU, The principal investigator was conduct a two-day training and briefing session.

4.9. Operational Definitions:

Adequate knowledge: those who scored above the mean on knowledge items.

Inadequate knowledge: those who scored below mean to knowledge items(40).

Good practice: It is the category of consultant/fellow and residents when they scored mean and above value.

Poor practice: It is the category of consultant/fellow and residents when they scored less than the mean value(41).

Favorable Attitude: It is the category of consultant/fellow and residents when they scored mean and above value.

Unfavorable attitude: It is the category of consultant/fellow and residents when they scored less than the mean value(42).

4.10. Data Quality Control and Management:

The days before the actual start of data collection, the principal investigator was performed pretesting of the questionnaires among 5% of consultant/fellow and residents working in TASH to make sure the validity and reliability of the questionnaires. To ensure the completeness, accuracy, and consistency of data collection, a certain minutes' session was held with the data collectors each day before the start of data collection. During data collection, thorough checking was done before using the questionnaires. Data editing was done daily to check for accuracy, consistency, and completeness of the questionnaires. Finally, the data from kobo toolbox were exported to IBM SPSS Statistics version 27 for further encoding, entering, cleaning, storing, recoding and analysis.

4.11. Data Analysis Plan and Procedures:

After data collection, the data from kobo toolbox were exported to IBM SPSS Statistics version 27 for further encoding, entering, cleaning, storing, recoding and analysis and interpretation. Descriptive statistical analysis such as simple frequencies, measures of central tendencies, and measures of variations was computed to summarize and describe the characteristics of study participants and the information was presented using frequencies, summary measures, graphs, tables, and figures. Bi-variable analysis was used to see the association between independent variables and outcome variables by using binary logistic regression. Independent variables with a p-value of < 0.05 at 95% CI in bi-variable analysis was

retained for multivariable logistic regression analysis. Multi-collinearity was checked to see the linear correlation among the associated independent variables by using the variance inflation factor (VIF) and standard error. Hosmer-Lemeshow test was performed to ensure the model fitness (significant at p-value >0.05). Variables with a P-value ≤ 0.05 were declared as having a statistically significant association with the outcome variable.

4.12. Ethical Consideration:

An ethical approval was obtained from the institutional ethical review board of SPHMMC. The purpose of the data collection, the nature of the study and all the necessary information about the study was explained and a formal written consent was obtained from participants willing to participate in the study. All data obtained in the course of the study was kept and used confidentially solely for the purpose of the research. The name of respondents or study participants was never be used by any means throughout the research and participants were told they had the right to withdraw themselves from study anytime they want.

4.13. Dissemination of Results:

This research will be presented for partial fulfillment of specialty certificate in anesthesiology critical care and pain medicine. The Soft copy and hard copy of finding of this research will be disseminated kindly to the department of anesthesiology and for selected department of the hospital. Finally, the result of the study will be disseminated to the scientific community through seminars, workshops, and conferences of health professionals' association and publications in peer reviewed scientific journals.

5. Results

Out of 188 pediatric intensive care unit consultants and residents whom expected to be part of the study on Knowledge, attitude and practice on sedation regarding pediatric intensive care unit at SPHMMC 180 were willing to participate in the study, which gave the response rate of 95.7%.

5.1. Socio-demographic characteristics of respondents

The mean age of the respondents was 31.83 years. Fifty-Six (56.1%) of the respondents were below 31 years old. Among 180 respondents 102 (56.7%) were male and 78 (43.3%) were female. One hundred seven (59.4%) were married. Twenty three (12.8%) were consultant, (35)19.4%, (49)27.2%, and 73(40.6%) were year one, year two and year three residents respectively. 118 (65.6%) of respondents reported for having under 2 year experience of working in the pediatric intensive care. Among the respondents, majority of them 126(70%) were treating mechanically ventilated patients on daily basis (Table 1).

Table 1. Socio-demographic characteristics of consultant/fellow' and residents in the Pediatric Intensive Care Unit in St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia, 2025 (n=180).

S. No	Variable	Frequency (n=180)	Percentage (%)
1	Age of the respondent		
	Below 31 years	101	56.1
	Above 31 years	79	43.9
2	Sex of the respondent		
	Male	102	56.7
	Female	78	43.3
3	Marital status		
	Married	107	59.4
	Unmarried	73	40.6
4	Current Role		
	Consultant /Fellow	23	12.8
	R1	35	19.4

	R2	49	27.2
	R3	73	40.6
5	Work experience in PICU		
	< 2 Years	118	65.6
	2-5 Years	54	30.0
	5-10 Years	8	4.4
6	Do you treat mechanically ventilated patients on daily basis?		
	Yes	126	70
	No	54	30

5.2. Knowledge of consultants/fellow and Residents about Sedation of PICU

Consultants/fellow and Residents were asked fifteen item questions to assess their knowledge about Sedation knowledge in PICU, Sedation assessment tools and pharmacology and safety of sedative drugs. The mean for knowledge of consultants/fellow and Residents about Sedation of PICU is 2.53 with standard deviation of 0.27. About 62.8% of the respondents scored above the mean knowledge score (figure 2).

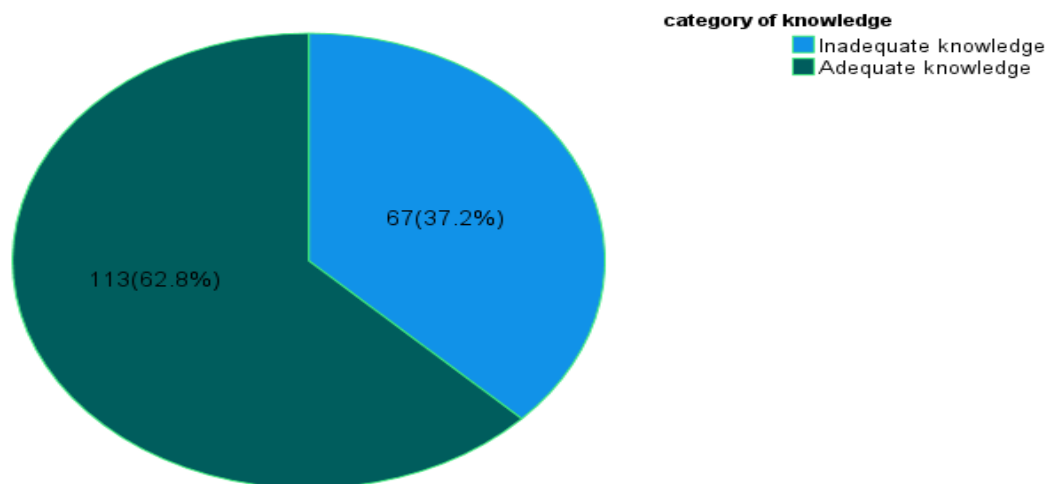


Figure 2. Knowledge of Pediatric Intensive Care Unit Consultants/Fellows and Residents Regarding Sedation at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025 (n=180).

Table 2. *Knowledge of Pediatric Intensive Care Unit Consultants/Fellows and Residents Regarding Sedation at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025 (n=180).*

Questions(15)	Response (n=180)		
	True	False	Don't know
Sedation in PICU is primarily used to reduce pain, anxiety, and agitation.	168(93.4%)	8(4.4%)	4(2.2%)
Both under-sedation and over-sedation can increase morbidity and mortality.	164(91.1%)	2(1.1%)	14(7.8%)
Sedation levels should be assessed and documented at least every 4 hours	159(88.3%)	7(3.9%)	14(7.8%)
Sedation is equivalent to pain control	54(30%)	113(62.8%)	13(7.2%)
Sedation should always be individualized for each patient.	162(90%)	11(6.1%)	7(3.9%)
The RASS (Richmond Agitation-Sedation Scale) is a validated sedation tool for children.	86(47.8%)	50(27.8%)	44(24.4%)
The COMFORT-B scale is suitable for mechanically ventilated non-verbal children	85(47.2%)	9(5%)	86(47.8%)
The State Behavioural Scale (SBS) is used in infants and young children under ventilation.	99(55%)	22(12.2%)	59(32.8%)
The r-FLACC scale is primarily a behavioural tool for non-verbal or cognitively impaired children	130(72.2%)	11(6.1%)	39(21.7%)
Sedation assessment tools improve consistency and safety compared to subjective judgment.	171(95%)	1(0.6%)	8(4.4%)
Midazolam and dexmedetomidine are commonly used sedatives in PICU.	69(38.3%)	83(46.1%)	28(15.6%)
Continuous benzodiazepine infusion is associated with risk of delirium and withdrawal.	157(87.2%)	11(6.1%)	12(6.7%)
Daily sedation interruption ("sedation vacation") reduces ventilation duration.	160(88.9%)	5(2.8%)	15(8.3%)
All sedatives carry risk of respiratory depression and hypotension.	93(51.7%)	85(47.2%)	2(1.1%)
Propofol infusion is safe for prolonged sedation in children.	24(13.3%)	150(83.3%)	6(3.3%)

5.3. Practice regarding Sedation among PICU consultants/fellow and Residents

All respondents answers to practice (five point Likert scale) were computed to obtain total mean score= 2.48 with SD= 0.64. Among 180 respondents, 34 (18.9%) responded that they assess sedation levels in ventilated PICU patients routinely whereas 36 (20%) assess sedation levels in ventilated PICU patients seldom. Of the respondents, 50 (27.8%) claims that they often use a standardized sedation tool (e.g., COMFORT-B, SBS, and RASS) whereas 23(12.8%) seldom use a standardized sedation tool (e.g., COMFORT-B, SBS, and RASS). Only 29(16.1%) respondents routinely document sedation levels in the patient chart. The majority of the respondents, 82(45.2%) often titrate sedative medication according to sedation scores. Of the respondents 33 (18.3%) routinely reassess sedation after medication changes or procedures while 22 (12.2%) does seldom. Respondents were asked How often do they check for adverse drug effects (respiratory depression, hypotension, and bradycardia), and they responded 56 (31.1%) routinely, 91 (50.6%) often, 24 (13.3%) sometimes and 9(5%) seldom. Among the respondents who were asked about the practice of sedation interruption/lightening in there unit 22(12.2%) were practicing routinely, 57 (31.7%) were practicing often, 73(40.6%) were practicing sometimes and 28(15.6%) were practicing seldom. Most of the respondents 67 (37.2%) often discuss sedation levels during daily rounds or handover while the remaining 35 (19.4%), 60(33.3%), and 18(10%) were routinely, sometimes and seldom discuss sedation levels during daily rounds or handover respectively. Majority of the respondents 70(38.9%) often follow a written protocol when sedating patients. Seventy eight 78(43.3%) respondents often combine non-pharmacological strategies (e.g., parental presence, positioning, and music) with drug sedation (table 3).

Table 3. Practice regarding Sedation among PICU consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025(n=180).

Questions(10)	Response (n=180)			
	Routinely (>75%)	Often (51-75%)	Sometimes (26-50%)	Seldom (1-25%)
How often do you assess sedation levels in ventilated PICU patients?	30 (16.7%)	50 (27.8%)	77 (42.7%)	23(12.8%)
How often do you use a standardized sedation tool (e.g., COMFORT-B, SBS, and RASS)?	34(18.9%)	36 (20%)	74(41.1%)	36(20%)
How often do you document sedation levels in the patient chart?	29(16.1%)	39(21.7%)	56(31.1%)	56(31.1%)
How often do you titrate sedative medication doses according to sedation scores?	28(15.6%)	82 (45.6%)	41(22.8%)	29(16.1%)
How often do you reassess sedation after medication changes or procedures?	33 (18.3%)	79 (43.9%)	46 (25.6%)	22(12.2%)
How often do you check for adverse drug effects (respiratory depression, hypotension, and bradycardia)?	56 (31.1%)	91 (50.6%)	24 (13.3%)	9(5%)
How often do you practice sedation interruption/lightening in your unit?	22(12.2%)	57 (31.7%)	73(40.6%)	28(15.6%)
How often do you discuss sedation levels during daily rounds or handover?	35 (19.4%)	67 (37.2%)	60(33.3%)	18(10%)
How often do you follow a written protocol when sedating patients?	16 (8.9%)	70(38.9%)	46(25.6%)	48(26.7%)
How often do you combine non-pharmacological strategies (e.g., parental presence, positioning, and music) with drug sedation?	10(5.6%)	29(16.1%)	63(35%)	78(43.3)

5.4. PICU consultants/fellow and Residents' Attitudes about Sedation

Most PICU consultants/fellow and Residents 126(70%) strongly agree that Sedation is as important to monitor as other vital signs (HR, BP, and SpO₂). Most PICU consultants/fellow and Residents 112(62.2%) strongly agree that Sedation should always be guided by validated tools, not clinical impression alone. Of the respondents' majority of them, 120(66.7%) were strongly agreed that written sedation protocols improve safety and should be implemented in every PICU. One hundred six (58.9%) respondents had a positive evaluation of nurses and residents should be empowered to titrate sedatives according to scores. Most respondent's - 77(42.8%), strongly disagreed that daily sedation interruption is unsafe and unnecessary in children. Only 16(8.9%) were strongly disagreed that over-sedation is more dangerous than under-sedation in critically ill children. Most respondent's 51(28.3%), strongly disagreed that Monitoring sedation adds to workload without much benefit while only 14(7.8%) of the respondents strongly agreed. More than half of the participants 102(56.7%) strongly agreed that family involvement is important in achieving optimal comfort and sedation. In addition, 121(67.2%) participants strongly agreed that adequate training in sedation assessment tools would improve their practice. Furthermore, 60(33.3%) were agreed that feel confident in their current ability to assess and manage sedation in PICU patients (Table 4).

Table 4. PICU consultants/fellow and Residents' Attitudes about Sedation at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025 (n=180).

Questions(10)	Response (n=180)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Sedation is as important to monitor as other vital signs (HR, BP, and SpO ₂).	1 (0.6%)		4 (2.2%)	49(27.2%)	126(70%)
Sedation should always be guided by validated tools, not clinical impression alone.		2(1.1%)	6(3.3%)	60(33.3%)	112(62.2%)
Written sedation protocols improve safety and should be implemented in every PICU	1 (0.6%)		4(2.2%)	55(30.6%)	120(66.7%)
Nurses and residents should be empowered to titrate sedatives according to scores.	2(1.1%)	5(2.8%)	12(6.7%)	55(30.6%)	106(58.9%)
Daily sedation interruption is unsafe and unnecessary in children	77(42.8%)	58(32.2%)	20(11.1%)	15(8.3%)	10(5.6%)
Over-sedation is more dangerous than under-sedation in critically ill children.	16(8.9%)	42(23.3%)	41 (22.8%)	39(21.7%)	42(23.3%)
Monitoring sedation adds to workload without much benefit.	51(28.3%)	77 (42.8%)	25(13.9%)	13(7.2%)	14(7.8%)
Family involvement is important in achieving optimal comfort and sedation.	3 (1.7%)	1 (0.5%)	14(7.8%)	60(33.3%)	102(56.7%)
Adequate training in sedation assessment tools would improve my practice	1 (.6%)		6(3.3%)	52(28.9%)	121(67.2%)
I feel confident in my current ability to assess and manage sedation in PICU patients.	3 (1.7%)	20(11.1%)	59(32.9%)	60(33.3%)	38(21.1%)

5.5. Factors related to Knowledge, Practice and Attitude regarding Sedation among PICU consultants/fellow and Residents

Binary and multivariable logistic regression was used to determine the set of predictor variables which predicted consultants/fellow and Residents' Knowledge, Practice and Attitude regarding Sedation in pediatric intensive care unit (PICU). Among those predictors, age, marital status, current role, work experiences in PICU and treating mechanically ventilated patients on daily basis were associated with the knowledge of consultants/fellow and Residents' regarding sedation in binary logistic regression analysis ($p < 0.25$). Those variables that have association with the outcome variable in binary regression analysis were included in the multiple logistic regression models. Among those predictors, marital status and current role in PICU were significantly associated with the knowledge of consultants/fellow and Residents' regarding sedation in PICU after controlling for the effect of potentially confounding variables using multiple logistic regression ($p < 0.05$). Consultants/fellow and Residents who didn't get married were 65.1% (AOR = 0.349; CI = 0.156–0.78) less likely to have adequate knowledge than those who did get married. Being R1 and R2 were 94.1% (AOR = .059; CI = 0.020-0.179) and 67.6% (AOR=.324; CI=.135-.779) less likely knowledgeable than those consultants/fellow and Residents who were R3 respectively, as shown in Table 5.

Among those predictors, gender, age, marital status, current role in PICU, and work experience in PICU were associated with consultants/fellow and Residents' practice on managing sedation in PICU in binary logistic regression analysis ($p < 0.25$). Using multiple logistic regression models with $p < 0.05$; age, current role, and work experience in PICU were significantly associated with consultants/fellow and Residents' practice on managing sedation in PICU. Those consultants/fellow and Residents being under the age of 31 were 2.52-fold (AOR = 2.52; CI = 1.14–5.59) more likely to have good practice of sedation in PICU than those who were being older than the age of 31. Those consultants/fellow and Residents who were R1 and R2 were 6.27 times (AOR = 6.27; CI = 2.231–17.595) and 3.16 time (AOR = 3.155; CI = 1.28–7.755) more likely to practice sedation management than those who were R3 residents. Consultants/fellow and Residents who had 2-5 years of experience in

PICU 88.6% (AOR = .114; CI = .024–.545) were less likely to have good practice of sedation in PICU than those who had 5-10 Years of experience, as depicted in Table 6.

Those consultants/fellow and Residents who were under the age of 31 were 80.1% (AOR = .199; CI = .092–.430) less likely to have favorable attitude towards sedation in PICU than those who were being older than the age of 31, as depicted in Table 7.

Table 5. Binary and Multivariable Analysis to identify Factors related to Knowledge regarding Sedation among PICU consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025(n=180).

Variables	Category	Knowledge		COR (95%CI)	AOR (95%CI)	P-value
		Adequate	Inadequate			
Age category	below 31 age	53	48	.350(.183, .668)		
	Above 31 age	60	19	1		
Marital status category	Unmarried	35	38	.342 (.18, .64)	.349 (.156, .78)	0.01*
	Married	78	29	1		
	Consultant /Fellow	23	0			
Current role	R1	7	28	.082 (.031, .219)	.059(.020, .179)	.001*
	R2	28	21	.436(.201, .949)	.324 (.135, .779)	.012*
	R3	55	18	1		
Work experience in PICU	< 2 Years	63	43	.195 (.042, .898)		
	2-5 Years	35	22	.212 (.044, 1.02)		

	5-10 Years	15	2	1
Do you treat mechanically ventilated patients on daily basis?	Yes	92	34	4.252(2.17, 8.34)
	No	21	33	1

Table 6. Binary and Multivariable Analysis to identify Factors related to Practice regarding Sedation among PICU consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025 (n=180).

Variables	Category	Practice		COR (95%CI)	AOR (95%CI)	P-value
		Good	Poor			
Sex	Female	43	35	1.755(.97, 3.18)		
	Male	42	60	1		
Age category	below 31 age	63	38	4.295(2.28, 8.11)	2.52(1.14, 5.59)	.023*
	Above 31 age	22	57	1		
Marital status category	Unmarried	43	30	2.218 (1.21, 4.07)		
	Married	42	65	1		
Current role	Consultant /Fellow	4	19	0.359(.110, 1.165)	.19(.045, .788)	.022*
	R1	25	10	4.259 (1.78, 10.21)	6.27(2.231, 17.595)	.001*
	R2	29	20	2.470(1.18, 5.19)	3.155(1.28, 7.755)	.012*
	R3	27	46	1		
Work experience in PICU	< 2 Years	45	61			
	2-5 Years	34	23	2.710 (.878, 8.36)	.114(.024, .545)	.007*

5-10 Years	6	11	1
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Table 7. Binary and Multivariable Analysis to identify Factors related to Attitude towards Sedation among PICU consultants/fellow and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa, Ethiopia, 2025 (n=180).

Variables	Category	Attitude		COR (95%CI)	AOR (95%CI)	P-value
		favourable	Unfavourable			
Age category	below 31 age	37	64	.196 (.102, .375)	.199(.092, .430)	.001*
	Above 31 age	59	20	1		
Marital status category	Unmarried	32	41	.524 (.287, .958)	1	
	Married	64	43	1		
Current role	Consultant /Fellow	15	8		.389 (.170, .894)	
	R1	13	22			
	R2	24	25	.633(.305, 1.313)		
	R3	44	29	1		
Work experience in PICU	< 2 Years	59	47		.326 (.101, 1.046)	
	2-5 Years	25	32			
	5-10 Years	12	5	1		

6. Discussion

This study demonstrated that 62.8% of participants had adequate knowledge regarding pediatric sedation in the PICU. Although this proportion appears encouraging, detailed analysis of specific knowledge domains revealed notable deficiencies, particularly in familiarity with validated pediatric sedation assessment tools such as COMFORT-B and the State Behavioral Scale (SBS). Similar knowledge gaps have been reported in other settings, where clinicians were aware of sedation principles but lacked structured understanding of validated tools (12,13,20). Evidence indicates that sedation assessment guided by validated scales improves interobserver reliability, reduces variability in sedation depth, and enhances patient safety compared to subjective clinical judgment (8,9,28). The Society of Critical Care Medicine (SCCM) guidelines strongly recommend the routine use of structured sedation assessment tools in critically ill children to optimize outcomes and reduce complications (9). Therefore, incomplete knowledge regarding these tools may contribute to inconsistent sedation practices in our setting.

With regard to practice, only a minority of respondents reported routinely assessing and documenting sedation levels or practicing regular sedation interruption. This finding is clinically significant, as suboptimal sedation monitoring has been associated with both over-sedation and under-sedation, each of which carries substantial risks (6,18). A systematic review by Vet et al. reported that over-sedation occurs more frequently than under-sedation in PICU patients and is associated with prolonged mechanical ventilation and extended ICU stay (6). Furthermore, meta-analyses of protocolized sedation strategies have demonstrated reductions in duration of mechanical ventilation, ICU length of stay, and overall complications when structured sedation protocols are implemented (11,31). Despite strong evidence supporting sedation protocols, surveys from the United Kingdom and Canada revealed that only about one-third of PICUs consistently implement written sedation guidelines (12,20). The practice patterns observed in this study mirror these international findings and suggest that implementation barriers, rather than absence of awareness, may be responsible for practice variability.

The association between level of training and knowledge observed in this study is consistent with previous literature. Senior residents demonstrated significantly higher knowledge compared to junior trainees, likely reflecting cumulative exposure and

clinical experience. Similar associations between level of education, years of experience, and improved pain or sedation management have been reported in Ethiopian studies conducted at Tikur Anbessa Specialized Hospital and other regional institutions (33,36,39). These studies consistently identified training exposure and availability of protocols as key determinants of improved clinical practice. Interestingly, younger clinicians in the current study were more likely to report good practice but less favorable attitudes. Comparable discrepancies between knowledge, attitude, and practice have been described in international KAP studies, where improved knowledge did not always translate into consistent clinical behavior (14,45). This suggests that behavioral and institutional factors, including workload, supervision, and protocol availability, may play a stronger role than knowledge alone.

Attitudinal findings in the present study were mixed. While the majority strongly agreed that sedation monitoring is as important as other vital signs and supported the use of written protocols, nearly half demonstrated unfavorable attitudes overall. Similar unfavorable attitudes toward pain and sedation management have been documented in Saudi Arabia, Iran, Sudan, and other LMIC settings (14, 15, 32). In many of these studies, lack of structured training and absence of institutional guidelines were strongly associated with negative attitudes and inconsistent practice (34–38). Importantly, the SCCM pediatric guidelines emphasize that effective sedation management requires not only pharmacologic knowledge but also institutional commitment to protocol implementation, interdisciplinary communication, and ongoing education (9). Therefore, the findings of this study underscore the need for structured educational programs, integration of validated sedation scoring tools into routine documentation, and development of locally adapted sedation protocols within SPHMMC PICU.

Overall, the results suggest that while baseline knowledge is moderate, there remains a significant implementation gap between evidence-based recommendations and bedside practice. Addressing this gap will require system-level interventions rather than individual knowledge improvement alone. Evidence from protocolized sedation studies indicates that bundled interventions combining education, written guidelines, and routine monitoring produce measurable improvements in clinical outcomes(11,31).Thus, strengthen institutional frameworks for sedation assessment

may improve safety ,reduce complications , and optimize outcomes for clinically ill children in this setting.

7. Conclusion and recommendation

This study assessed the knowledge, attitude and practice of sedation management among consultants/fellows and residents working in the PICU at St. Paul's hospital millennium medical college.

The finding demonstrate that while a moderate proportion of participants had adequate knowledge (62.8%),significant gaps remain in key domains, particularly in the consistent use of validated sedation assessment tools and routine documentation practices. Although most respondents acknowledged the importance of structured sedation monitoring and supported the implementation of written protocols, actual bedside practice did not consistently reflect these attitudes.

Routine use of standardized tool such as COMFORT-B and SBS was limited and daily sedation interruption as not consistently practiced .These finding suggest a clear knowledge and practice gap.

Level of training was significantly associated with knowledge and age and work experience influenced both practice and attitude. This indicates that sedation competence improves with exposure and structured clinical responsibility. However, variability across training levels highlighted the need for standardized institutional reinforcement.

Overall, the study reveals that sedation management in the PICU, while partially aligned with international recommendations, remains inconsistent .without structured protocols and systemic monitoring, patients may be at risk over-sedation, prolonged ventilation, and other preventable complications, as documented in international evidence (6,9,11,31).

Therefore, targeted interventions are necessary to bridge the gap between awareness and consistent evidence based practice.

Significantly low knowledge and attitudes were found in this study, adding to the widespread worry about low understanding and attitudes around pain management. Because of this, there is a need for a number of educational and quality-improvement

programs in pain management that could increase residents' understanding of the field and ultimately enhance procedures to improve the quality of life for pediatric patient.

Based on the findings of this study the following recommendations are proposed

1. development and implementation of a written sedation protocol which should be locally adapted , evidence based sedation protocol based on the society of critical care medicine(SCCM) pediatric guideline (9).
2. Integrate a validated sedation tool in to day to day practice such as COMFORT-B and SBS in to the routine monitoring charts alongside vital sign.(8,28)
3. Structured and periodic training programs regular in-service training, workshops, and simulations sessions for junior residents. (33,36,39)
4. Multidisciplinary reinforcement during daily rounds sedation levels, target score, and adjustment plans should be routinely discussed during daily rounds.
5. Quality improvement initiatives and framework should be established to audit sedation documentation, tool utilization rates and clinical outcomes. (11,31)
6. further multicenter studies should be conducted to determine national pattern of sedation practice and to evaluate the impact of protocol implementation on clinical outcomes.

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9. Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate 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: _____

10. Annexes

Annex I. English Version information sheet and Consent form.

Good morning/ afternoon?

_____ is my name. For _____, a postgraduate student at St. Paulos hospital Millennium Medical College studying anesthesiology critical care and pain medicine, I am collecting data on his behalf. This study's goal is to assess level of Sedation Knowledge, Attitudes, and Practices among Pediatric Intensive Care Unit Nurses and Residents at St. Paul's Hospital Millennium Medical College Addis Ababa.

The interview could last between 20 and 30 minutes. Your name won't appear anywhere on the form, and we'll keep all of the information you provide private and confidential unless it's necessary for this study. It won't ever be shared with the third parity. Additionally, I want to let you know that there are no risks or benefits to taking part in this study, either in the short or long term. I also want to let you know that you have the right to interrupt the interview at any point, discontinue the study, or skip any questions you don't want to answer. Your cooperation and willingness to participate in the interview are highly beneficial in

determining the issues of level of Sedation Knowledge, Attitudes, and Practices
Pediatric Intensive Care Unit Nurses and Residents.

So do you agree to participate in this study?

Respondent agrees to be interviewed, then go to the next part.

Respondent does not agree to be interviewed, then stop interview.

Thank you in advance for your cooperation

Data collectors Name_____ sign: _____

If you have any question or doubt, you can contact as with the address below.

Name of the principal Investigator:

Mobile: +251 9

E-mail:- _____

Annex II. English Version Questionnaire

Part 1: Demographic information	
1.1. Age in year	_____
1.2. Sex	A) Male B) Female
1.3. Marital status	A) Never married B) Married C) Living together D) Divorced E) Separated F) Widowed
1.4. current role	A) Resident- ○ R1 ○ R2 ○ R3 B) CONSULTANT /FELLOW
1.5. specialty (if consultant/fellow):	Specify here:-----

1.6. Work experience in PICU	A) <2 yrs B) 2-5yrs C) 5-10 yrs D) >10 yrs
1.7. Do you treat mechanically ventilated patients on daily basis?	A) Yes B) No
Part 2: Knowledge (Answer: True /False/don't know)	

2.1. sedation in PICU is primarily used to reduce pain, anxiety, and agitation.	A) True B) False C) Don't know
2.2. Both under-sedation and over-sedation can increase morbidity and mortality.	A) True B) False C) Don't know
2.3. Sedation levels should be assessed and documented at least every 4 hours	A) True B) False C) Don't know
2.4. Sedation is equivalent to pain control	A) True B) False C) Don't know
2.5. Sedation should always be individualized for each patient	A) True B) False C) Don't know
Sedation assessment tools	
2.6. The RASS (Richmond Agitation-Sedation Scale) is a validated sedation tool for children.	A) True B) False C) Don't know
2.7. The COMFORT-B scale is suitable for mechanically ventilated non-verbal children	A) True B) False C) Don't know
2.8. The State Behavioral Scale (SBS) is used in infants and young children under ventilation. .	A) True B) False C) Don't know

2.9. The r-FLACC scale is primarily a behavioral tool for non-verbal or cognitively impaired children	A) True B) False C) Don't know
2.10. Sedation assessment tools improve consistency and safety compared to subjective judgment	A) True B) False C) Don't know

2.11. Sedation assessment tools improve consistency and safety compared to subjective judgment	A) True B) False C) Don't know
Pharmacology and safety	
2.12. Midazolam and dexmedetomidine are commonly used sedatives in PICU.	A) True B) False C) Don't know
2.13. Continuous benzodiazepine infusion is associated with risk of delirium and withdrawal.	A) True B) False C) Don't know
2.14. Daily sedation interruption ("sedation vacation") reduces ventilation duration.	A) True B) False C) Don't know
2.15 All sedatives carry risk of respiratory depression and hypotension	A) True B) False C) Don't know
2.16. Propofol infusion is safe for prolonged sedation in children	A) True B) False C) Don't know
Part 3: Practice Purpose: To explore self-reported actual practices of sedation monitoring and management.	

Format: Likert scale — Seldom (1–25%), Sometimes (26–50%), Often (51–75%), Routinely (>75%)	
3.1 How often do you assess sedation levels in ventilated PICU patients?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.2. How often do you use a standardized sedation tool (e.g., COMFORT-B, SBS, RASS)?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.3. How often do you document sedation levels in the patient chart?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.4. How often do you titrate sedative medication doses according to sedation scores?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.5. How often do you reassess sedation after medication changes or procedures?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.6. How often do you check for adverse drug effects (respiratory depression, hypotension, bradycardia)?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.7. How often do you practice sedation interruption/lightening in your unit?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.8. How often do you discuss sedation levels during daily rounds or handover?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
3.9. How often do you follow a written protocol when sedating patients?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)

3.10. How often do you combine non-pharmacological strategies (e.g., parental presence, positioning, music) with drug sedation?	A) Seldom (1-25%) B) Often (51-75%) C) Sometimes (26-50%) D) Routinely (>75%)
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Part 4: Attitude related Purpose: To assess beliefs, perceptions, and openness to protocols. Format: strongly agree/Agree / Neutral / Disagree / strongly disagree	
4.1. Sedation is as important to monitor as other vital signs (HR, BP, SpO ₂).	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.2. Sedation should always be guided by validated tools, not clinical impression alone.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.3. Written sedation protocols improve safety and should be implemented in every PICU	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree

4.4. Nurses and residents should be empowered to titrate sedatives according to scores.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.5. Daily sedation interruption is unsafe and unnecessary in children	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.6. Over-sedation is more dangerous than under-sedation in critically ill children.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.7. Monitoring sedation adds to workload without much benefit.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.8. Family involvement is important in achieving optimal comfort and sedation.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.9. Adequate training in sedation assessment tools would improve my practice.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree
4.10. I feel confident in my current ability to assess and manage sedation in PICU patients.	A) Strongly Agree B) Agree C) Disagree D) Neutral E) Strongly disagree

