Addis Ababa University

College of Health Sciences

Department of Anesthesiology, Critical Care and Pain Medicine

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF PEDIATRICS PAIN ASSESSMENT AND MANAGEMENT AMONG ANESTHESIOLOGY, PEDIATRIC AND PEDIATRIC SURGICAL RESIDENTS AT TIKUR ANBESSA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA,2023/24

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A research thesis submitted to department of Anesthesiology, Critical care and Pain Medicine (ACCPM), school of medicine, college of health sciences, Addis Ababa University in partial fulfillment of the requirements for specialty certificate in Anesthesiology, Critical Care and Pain Medicine.

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Abstract

Background: Pain is one of the fifth vital sign which needs regular assessment and management. Inadequate children's pain assessment and management will expose children to the risks of long term physical and psychological sequelae, including among others, anticipatory anxiety during future procedures, a lowering of the pain threshold and sensitization to future pain. Among the hurdles to adequate pain treatment include health care worker's insufficient knowledg e on pain assessment instruments and bad attitude towards patient's pain management are the cite d ones.

Objective: To assess the knowledge, attitude and practice towards pediatrics pain assessment and management among anesthesiology, pediatrics and pediatrics surgical residents at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

Method: For this study, an institutionally based descriptive cross-sectional study design was used employing a random stratified sampling technique. The data was collected using a standardized online questionnaire. The data then exported from google format to Microsoft excel and cleaned before being uploaded to IBM SPSS version 27 for statistical analysis.

Result:

A total of 150 residents with a response rate of 100% had participated in the study. The result indicates that 63%, 55% and 34% of study participants have good knowledge, favorable attitude and good practice on pediatric pain assessment and management respectively. Year of residency, department and trainings taken on pediatrics pain assessment and management were factors significantly associated with knowledge, attitude and practice level towards pediatrics pain assessment and management.

Conclusion and recommendation:

The findings of this study suggest that pediatrics, pediatrics surgical and ACCPM residents need further education and training on pediatric pain assessment and management. Implementing interdisciplinary pediatric pain management programs will benefit from this study as well, since it will enhance the practice of pediatric residents in pain evaluation and manageme nt.

Acknowledgement

First of all, I want to thank God for giving me the courage to complete this study

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ACRONYMS

AAU	Addis Ababa University
ACCPM	Anesthesiology Critical Care and Pain Medicine
DC	Data Collector
ETB	Ethiopian Birr
IASP	International Association for the Study of Pain
IRB	Institutional Review Board
KAP	Knowledge Attitude and Practice
PI	Personal Investigator
PRN	Pro re nata
SPSS	Statistical Package For Social Sciences
TASH	Tikur Anbessa Specialized Hospital
VAS	Visual Analogue Scale

1. Introduction

1.1. Background

Pain is defined as “An unpleasant sensory and emotional experience associated with, or resembling with, actual or potential tissue damage,”.[1] It is one of the reasons patients seek medical attention. And it is one of the fifth vital sign which needs regular assessment and management. Uncontrolled pain has a negative impact on the physical, psychological, social and spiritual well-being of the individual.[3] Pain can influence their performance in school, activities, sports and relationships with their parents and colleagues. The assessment and treatment of pain in children are essential components of pediatric care, and "failure to provide adequate control of pain amounts to substandard and unethical practice" .[4]

Pain is a major worry for pediatric patients because it can be a result of several medical procedur es including venipuncture and vaccinations, as well as diseases like sickle cell crises, HIV/AIDS, cancer, and infections. [3]

A big pediatric hospital conducted a study in 2014 with 86% of its inpatients experiencing pain; patients admitted for surgical procedures reported pain at a higher rate than those with medical disorders(99%vs.65%).[5]
Estimates of the prevalence of a number of unpleasant conditions, such as headaches (8%–83%), back pain (14%–24%), musculoskeletal pain (4%–40%), combination pains (4%–49%), and other pains (5%–88%).[6]

Even so, pain is often misdiagnosed and poorly treated, putting children at risk for long-term psychological and physical effects like anticipatory anxiety during procedures in the future, a lowered pain threshold, and sensitization to pain in the future.[3]

Insufficient understanding among healthcare practitioners and challenges in getting analgesic drugs lead to suboptimal pain assessment and management in Sub-Saharan Africa.[3]

Anesthesiology, Pediatric and Pediatric surgical residents are mainly responsible for assessing and managing pain in the pediatric age group. But, our institution has not studied their approach of assessing and managing pain. Thus, this survey is conducted to assess the knowledge, attitude and practice of the above-mentioned residents in our institution, Tikur Anbessa Specialized Hospital, Addis Ababa University, Ethiopia.

1.2. Statement of the problem

Inadequate assessment and treatment of pediatric pain are commonplace. Children's pain can have underlying psychological and physiological effects if left untreated or not managed well. In addition, neglecting to address children's pain can negatively impact family dynamics and lower the standard of family life.[7]

Numerous studies have indicated that the most significant factors influencing pediatric pain man agement are knowledge gaps, unfavorable attitudes, and subpar practices by healthcare professio nals regarding pain assessment and management. Additionally, pediatric clinicians' attitudes and knowledge regarding pediatric pain management can influence their willingness to offer this type of care.[8][9] In Ethiopia, there is no relevant study on the prevalence of pain among hospitalized pediatric patients which shows that the care is neglected by health care providers.

Research related to knowledge, attitude and practice regarding pain assessment and management in hospitalized children also remains limited in this study area. To improve both the quality of care and healthcare outcomes, it is important to explore the level of knowledge, attitude and practice related to pain assessment and management among Anesthesiology, Pediatrics and Pediatrics Surgical residents.

So, this study will help to uncover the KAP gaps related widely recognized principles of pain ass essment and treatment practice.

1.3. Significance of the study

The knowledge, attitudes, and abilities of individuals who administer pain management determine the effectiveness of that care.[10] In this process, residents are essential because they are frequently the cornerstones of daily hospital work and serve as the main decision-makers, observers, and implementers in pediatric daily care, including pediatric pain management.[11] Finding the gap and evaluating their degree of KAP toward pain evaluation and management will be crucial goals of this study. Different hospital administrative bodies will use the research's findings as a springboard for their future planning, policy-making, and intervention. The findings of this study will serve as a guide for subsequent research endeavors who wants to further investigate and conduct a training that could improve the residents KAP on pediatric pain assessment and management

2. Literature Review

In 2008, Columbia University in New York City conducted a pilot study titled Assessing Resident Knowledge of Pain Assessment and Acute Pain Management in Hospitalized Children. Of the residents, 26 were pediatricians (43%), 19 were orthopedicians (32%), and 15 were anesthesiologists (25%). They discovered that, with a maximum score of 10, anesthesiology scored 7.74 (77%), orthopedics 6.15 (61%), and pediatrics 5.39 (54%). In summary, when it came to responding to questions about their understanding of acute pain management in hospitalized children, residents in the fields of pediatrics and orthopedics fared far worse than a comparative group of residents in the anesthesiology program.[12]

Pediatric clinicians from two medical centers and three general hospitals in Taiwan were the subjects of a cross-sectional descriptive comparative design aimed at assessing clinicians' knowledge and attitudes regarding pain management and describing the obstacles to applying pain management across pediatric and neonatal settings. The results showed a significant positive relationship between clinicians' knowledge and prior training experience. Pediatricians (66.7%) hesitated to prescribe opioid analgesics to children for relief of physiological discomfort. The proper provision of pain management in clinical practice has not been found to be positively correlated with the level of knowledge of clinicians. [15]

There were 77 participants in a prospective descriptive survey on the knowledge, attitudes, and behaviors of healthcare workers addressing pain in children that was done at a tertiary care hospital in North India in 2009. Of them, 47 (61.1%) were nurses, and 30 (38.9%) were pediatric residents. And they observed that the knowledge regarding pain scales among the examined healthcare professionals was not common. Majority of respondents stated that the best judge of level of pain is the child. Almost two thirds of the participants believed that non-pharmacological methods were superior for managing pain, and their behaviors indicated that the majority would consent to their parents being present during minimally invasive procedures.[16]

Anesthesiology trainees at Hospital Universiti Sain Malaysia in 2017 participated in a descriptive cross-sectional study to determine their knowledge of pediatric postoperative pain assessment and management. Of the 35 questions, the mean correct score was 20.4 ± 3.34 (58.2%). Thirteen was the lowest score, and 26 was the highest. The domain of pain assessment had a mean proportion

of correct scores of 53%, with a range of 20% to 90%. For pain treatment domain; the mean proportion of correct score was 60.4% (range 36% to 80%).[17]

A cross sectional survey between June and August 2017 on Management of Pediatric Pain: Knowledge and Practice of Healthcare Providers at a Tertiary Centre, Southern Nigeria and the most popular non-pharmacological pain management techniques were found to be cold compression (48(24.4%)), hot compression (38(19%)), and distraction (24(12%)), as reported by one-third of participants (30.4%). Immunization of newborns (20%) and venipuncture (17%) were the most common procedures for which non-pharmacological methods of pain management were typically performed; lumbar puncture (1.5%) was the least common technique. Of the respondents, half (52%) had never prescribed or supplied morphine to children.[3]

A quantitative cross-sectional survey conducted in 2015 at Kenyatta National Hospital on the knowledge and attitudes of healthcare professionals (nurses, pediatric post-graduate students, and pediatric consultants) regarding the assessment and management of pain in children revealed that 51% had good knowledge, 90% had an unfavorable attitude, and 92% had poor practice. 77% of respondents use distraction as the most effective non-pharmacological method of pain management.[18]

All medical or paramedical staff members of the pediatric department and pediatric surgical unit of Gabriel Toure Hospital who agreed to participate in the survey were included in the transversal prospective study, which took place from April 16 to May 15, 2018, to describe the knowledge, attitudes, and practices of health agents regarding the pain of sick children at Gabriel Toure Hospital, Bamako, Mali. The majority of respondents were general pediatric care givers (38.7%), followed by residents (33.4%). In order to assess pain, 56.8% of staff members asked the sick child, 58.6% asked the parents, and only 27% used a validated scale. The visual analog scale (73%) and the verbal rating scale (41%), however, were the most commonly used scales. At 56.7% and 26.7%, respectively, these two scales were most frequently utilized to measure pain. As for the assessment of pain at the time of patient admission, seventy-three caregivers (65.8%) agreed. The great majority (96.4%) said that employing an appropriate scale to systematically assess the patient's pain at admission would enhance the quality of care.[20]

The knowledge, attitudes, and practices of 174 pediatric residents on topics related to pediatric pain assessment and management were examined in a prospective, descriptive, cross-sectional

study carried out in 2017 in 9 major pediatric hospitals in Sudan. Of them, 70% claimed to have never received any kind of instruction, learning sessions, or training in pediatric pain assessment and management during their training, and 60% did not know of any pain assessment scale or tool. Of the residents, one-third said that opioids should not be used to treat chronic pain in children because short-term use could lead to dependence and/or addiction. Residents who were surveyed had an overall positive attitude regarding the significance of pain control in children (75%).[11]

A quantitative cross-sectional study was conducted among 381 healthcare workers (HCWs), on healthcare providers' knowledge, attitude, practice and associated factors towards pain management at Debre Markos referral hospital, Gojjam, Northwest Ethiopia and Medical doctors (94.5%) were the most knowledgeable experts, followed by anesthetists (92.8%), and pharmacists (21.4%). It was discovered that the majority of research participants (53.3%) lacked adequate understanding on pain management. A significant proportion of the participants (51.3%) expressed a negative attitude towards pain management. Furthermore, the majority of respondents (77.5%) had inadequate pain management practices. Workload and the availability of pain assessment tools were related to the use of pain management techniques. Furthermore, 62.7% of the responders did not evaluate the patients following the delivery of analgesic medication.[21]

A descriptive cross-sectional study on Dec 2019 to assess knowledge, attitude, and practice of childhood pain assessment and the management among pediatrics and pediatric surgical residents in Tikur Anbessa Specialized Hospital was done and They discovered that the majority of the study groups (86.2%) did not use pain assessment tools; that residents' knowledge and attitude were 57% and 50%, respectively, and that 97.8% of the residents answered positively to the use of distraction during procedures on children. The final-year students scored 5.5 (95% CI=1.38-21.85) points higher than the "average and above" group than the other year participants.[2]

3. Objectives of the study

3.1 General objective

- To assess the KAP on pediatric pain assessment and management among anesthesiology, pediatrics and pediatrics surgical residents at TASH

3.2 Specific objectives

- To assess the knowledge of residents on pediatrics pain assessment and management
- To assess the attitude of residents on pediatrics pain assessment and management
- To assess the practice of residents on pediatrics pain assessment and management
- To evaluate factors associated with KAP of residents on pediatrics pain assessment and management among anesthesiology, pediatrics and pediatrics surgical residents at TASH

4. Methodology

4.1 Study Setting and Period

The study was conducted in one of the oldest and largest hospitals of the country, named TASH. Established in 1972G.C; is located in the heart of Addis Ababa, the capital city of Ethiopia. The Federal Ministry of Health transferred TASH, the nation's largest referral hospital with 700 beds, to the School in 1998, and it has since evolved into a university teaching hospital serving as the primary teaching hospital for clinical and preclinical training across most disciplines. In addition, TASH serves as an institution that provides the country with specialized clinical services unavailable in other public or private institutions. In 2018, the hospital implemented a digital record system that allows clinical data and other relevant patient profiles to be saved and retrieved as needed. As per its official website, TASH has over 200 doctors, 379 nurses and 115 other health professionals dedicated to providing health care services. The various departments, faculties and residents under specialty training in the School of Medicine provide patient care in the hospital. The pediatric department is staffed with consultants, physicians, residents, interns, nurses, and other support workers. The department occupies the seventh floor of the structure. The department has 170 beds in 5 different wards, 39 beds at Neonatal Intensive Care Unit (NICU), 4 beds at Pediatric Intensive Care Unit (PICU), and the pediatrics emergency unit have 40 beds. And it has consultants and 110 residents. Pediatrics surgical unit has 6 consultants and 20 residents. The ACCPM department occupies the fourth floor of the structure. And it has 6 beds at Surgical Intensive Care Unit. It has 15 consultants and 80 residents.

4.2 Study time

The study was conducted from November, 2023 to February, 2024

4.3 Study Design

For this study, an institutionally based descriptive cross-sectional study design was used.

4.4 Source and study population

The source population comprised all anesthesiology, pediatrics and pediatrics surgical residents who work at TASH.

The study population was all anesthesiology, pediatrics and pediatrics surgical residents who work at TASH during the study period who fulfilled the inclusion criteria.

4.5 Eligibility criteria

4.5.1 Inclusion criteria

- All anesthesiology, pediatrics and pediatrics surgical residents who work at TASH and gave consent during the data collection period included in the study.

4.5.2 Exclusion criteria

- Those not willing to give an informed consent

4.6 Sample Size Determination

- By using single proportion population formula

$$ni = \frac{z^2_{1-\frac{\alpha}{2}} \times p \times (1-p)}{d^2}$$

Where

- ni = Initial estimated sample size
- Z = Confidence level (alpha, α)
- P = prevalence
- d = marginal error

- Since there is no previous study, our p value is 50% with confidence level of 95% and degree of precision of 5%
  - $\frac{z^2_{1-\alpha/2} \times p \times (1-p)}{d^2} = \frac{(1.96)^2 0.50(1-0.5)}{(0.05)^2} \approx 384$
- Since the population is <10,000 which is 384. The correction formula will be used to get the final sample size
  - $nf = \frac{ni}{1+ni/N}$ Where nf – final sample size

    ni– initial sample size

    N – Sampled population
  - $nf = \frac{384}{1+\frac{384}{210}} = 135.7$
  - $nf = 136$
  - The final sample size will be 150 when we include the 10% non-respondent proportion

4.7 Sampling Techniques

- A stratified random sample technique was employed in the research;

4.8 Study variables

4.8.1 Dependent variables

- Knowledge related to pediatrics pain assessment and management
- Attitude related to pediatrics pain assessment and management
- Practice related to pediatrics pain assessment and management

4.8.2 Independent variables

- Department, Residency Year, Formal Training

4.9 Data collection

Data was collected at TASH with a self-administered semi structured questionnaire adopted from research conducted on pediatrics nurses' knowledge and attitude survey regarding pain (Punkies-Shriner's revision 2002). The resident's knowledge, attitude, and practice regarding pain assessment and management were evaluated using the questionnaire. A panel of pain specialists from the World Health Organization and the American Pain Society recognized and validated the questionnaire's content. And a panel of experts (comprising of one pediatrician, one neonatologist, one academic pediatric nursing professor, and two senior pediatric nursing practitioners) established the other content validity [15]. The principal investigator oversaw the data collection process from November 2023 to February 2024. The questionnaire has four parts

Part 1: General Information: department, residency year and formal training

Part 2: Knowledge questions: 16 true/false questions.

Part 3: Practice questions: 7 questions using a 4-point Likert scale as seldom (1-25%), sometimes (26-50%), often (51-75%), routinely (76%-100%)

Part 4: Attitude questions: 11 questions using a 3-point Likert scale as agree, disagree, neutral

4.10 Data Quality Control

Maximum effort was applied to ensure data quality. The questionnaire's simplicity and clarity were examined. The obtained data was provided to the lead investigator and reviewed for completeness. The lead investigator was responsible for monitoring, supervising and assessing questionnaires on each day of data collecting.

4.11 Data processing and Analysis

SPSS version 27 was the statistical program used to enter and evaluate the data. Frequencies, percentages, and suitable graphic representations from descriptive statistics were employed in the analysis. Logistic regressions, both bivariate and multivariate, were fitted. To account for any co-founders and find important factors connected to the outcome variable, independent variables with a p-value of less than 0.25 in the bivariate analysis were added to the final multivariate logistic regression model. Ultimately, the strength of the association was evaluated using the adjusted odds ratio (AOR) and 95% confidence interval, and a P value <0.05 was deemed statistically significant in the multi-nominal analysis of this study.

4.12 Operational definition

Good knowledge: the residents' level of knowledge when they scored a mean or higher score

Poor knowledge: is the residents' level of knowledge when their score is below mean

Favorable attitude: represents the group of residents who scored a mean and above value score.

Unfavorable attitude: is the group of residents whose score was below mean

Good practice: is the group of residents who scored mean and higher scores.

Poor practice: is the group of residents whose score was below mean.

4.13 Ethical Considerations

The research was conducted in accordance with the ethical guidelines. Ethical clearance was obtained from the Institutional Review Board of the Addis Ababa University. Written informed consent was obtained from each study participant after being introduced to the purpose of the study and informed about their rights not to participate in the study. Confidentiality was maintained at all levels of the study and the data gathered was anonymous and did not contain participant names or any other kind of personal identification.

4.14 Dissemination of research finding

The findings of the research will be communicated to all concerned body. We will do our utmost to have the paper published in peer-reviewed scientific journals.

5. Result

5.1 General information of the study participants

In the present study, a total of 150 residents with a response rate of 100% had been participated. Among them, 41.3% of the study participants were year three residents and 51.3% were pediatric residents. From all the study participants, 42% didn't take any form of formal training before on pediatrics pain assessment and management.

Table 8. General information of the study participants who were pediatrics, pediatrics surgical and anesthesiology, critical and pain medicine residents in Addis Ababa university, 2023/24.

Variable	frequency	Percent
Residency in years		
R1	39	26.0
R2	39	26.0
R3	62	41.3
R4	5	3.3
R5	5	3.3
Department		
Anesthesiology Resident	56	37.3
Pediatrics Resident	77	51.3
Pediatrics surgical resident	17	11.3
Formal Training		
Yes	87	58.0
No	63	42.0

5.2 Knowledge of the study participants on pediatric pain assessment and management

The finding of the study showed that 63% of the study participants scored above the mean from 16-point scale of knowledge-based measurement with a mean score of 12.5 ± 2.35

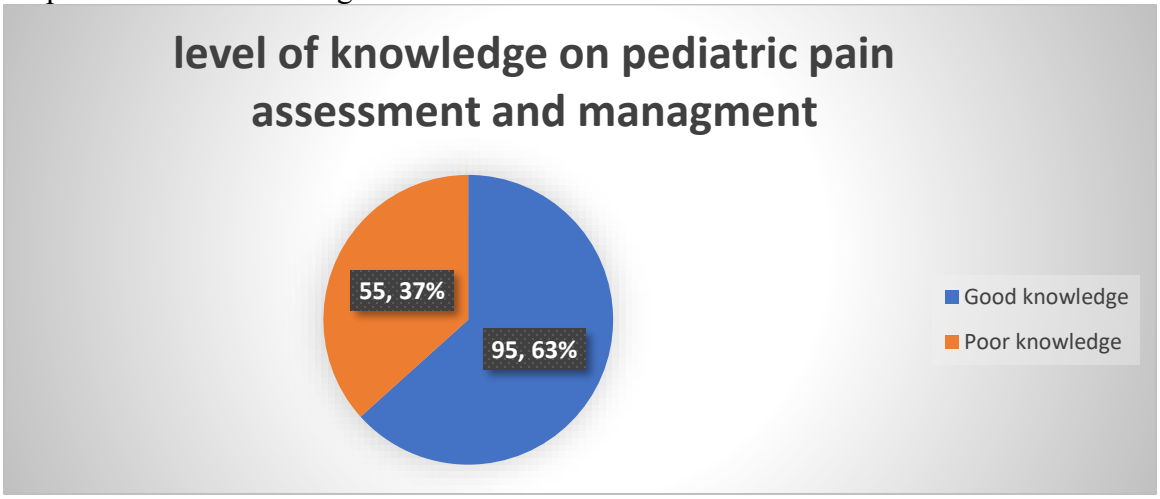

Figure 5. The knowledge level of the study participants on pediatric pain assessment and management.

Regarding the specific knowledge-based assessment, 98.7% of the participants know that the patient is the most accurate judge of the intensity of pain and all the participants know the importance of frequently assessing and documenting pain. 42.7% of the study participants know the presence of pain despite a child doesn't express/show pain. 16% of the study participants thought narcotics shouldn't be used in pediatric patients because it can cause respiratory depression and 78% of the participants know combining analgesics that work by different mechanisms may result in a better pain control than using a single analgesics agent. As indicated by the table below, 92% of participants are aware that a patient's vital signs may be a good indicator of how much pain they are experiencing.

Table 9. Knowledge of the study participants on pediatric pain assessment and management.

Variable	Correct answer	Frequency	Percent
The patient is the most accurate judge of the intensity of the patient's pain	True	148	98.7
For children who can communicate, it's recommended to regularly assess and document pain	True	150	100
For children who are not able to communicate, it's important to routinely assess and document pain	True	147	98
When giving opioid analgesics to children experiencing acute, severe pain with an abrupt onset (such as pain following surgery or trauma), the intramuscular route is the recommended method.	False	108	72
Giving opioids on a regular schedule is better versus as required (PRN)schedule for continuous pain	True	104	69.3
Children don't have pain if they don't express or show it	False	64	42.7
Pain perception can be reduced by diversion, such as listening to music or practicing relaxation.	True	143	95.3
A patient's increasing need for analgesics is an indication that they are developing a drug addiction	True	110	73.3
Compared to patients with acute pain, people with severe chronic pain frequently require larger dosages of analgesics	True	84	56
when asked if family/patient claims he/she has reduced pain following administration of narcotics, you should provide lower amount of the narcotics dosage for the next time	False	87	58.0
Children should not be given opioids due to the possibility of respiratory depression	False	126	84.0
Psychological problems later in life is one of the effects of chronic, untreated pain in children	True	147	98.0
Administering analgesics to patients who exhibit decreased facial expression is crucial	True	130	86.7
A patient should experience discomfort prior to giving the next dose of pain meds	False	85	56.7
Combining analgesics with distinct mechanisms of action may lead to reduced side effects and improved pain management compared to the use of a single analgesics	True	117	78
A patient's vital signs may indicate how severe their pain is	True	138	92

5.3 The determinant factor of knowledge on pediatric pain assessment and management

The finding of the study revealed that year of residency, department and training had association with knowledge on pediatric pain assessment and management by bivariate logistic regression. The multivariate logistic regression revealed that study participants whose residency level were year three had 11.8 times increase in knowledge on pediatric pain assessment and management

compared to year one residents (AOR=11.8, 95%CI=2.71, 51.69) and Pediatrics and child health department study participants were 96% less knowledgeable on pediatric pain assessment and management compared to department of anesthesiology, critical care and pain medicine (AOR=0.04, 95%CI=0.01, 0.14). The study participants who took training on pain management and assessment had 5.1 times increase in knowledge on pain assessment and management compared to their counterparts (AOR=5.1, 95%CI=1.68, 15.00).

Table 10. The bivariate and multivariate logistic regression of association between knowledge on pediatric pain assessment and management with independent variable.

Variable	Knowledge on pain assessment and management		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Good (%)	Poor (%)				
Residency year						
R1	14(35.9)	25(64.1)	1		1	
R2	20(51.3)	19(48.7)	0.173	1.9(0.76, 4.66)	0.665	1.4(0.32, 6.06)
R3	51(82.3)	11(17.7)	0.001	8.3(3.29, 20.84)	0.001	**11.8(2.71, 51.69)**
R4	5(100)	0				
R5	5(100)	0				
Department						
Anesthesiology Resident	49(87.5)	7(12.5)	1		1	
Pediatrics Resident	30(39)	47(61)	0.001	0.09(0.04, 0.23)	0.001	**0.04(0.01, 0.14)**
Pediatrics surgical resident	16(94.1)	1(5.9)	0.455	2.3(0.26, 20.02)	0.057	0.08(0.01, 1.07)
Training						
Yes	70(90.9)	17(9.1)	0.001	6.3(3.01, 13.01)	0.004	**5.1(1.68, 15.00)**
No	25(39.7)	38(60.3)	1		1	

5.4 Attitude of the study participants on pediatric pain assessment and management

The figure below showed that the level of attitude of the study participants on pediatric pain assessment and management with a mean score of 31.7 ± 1.68

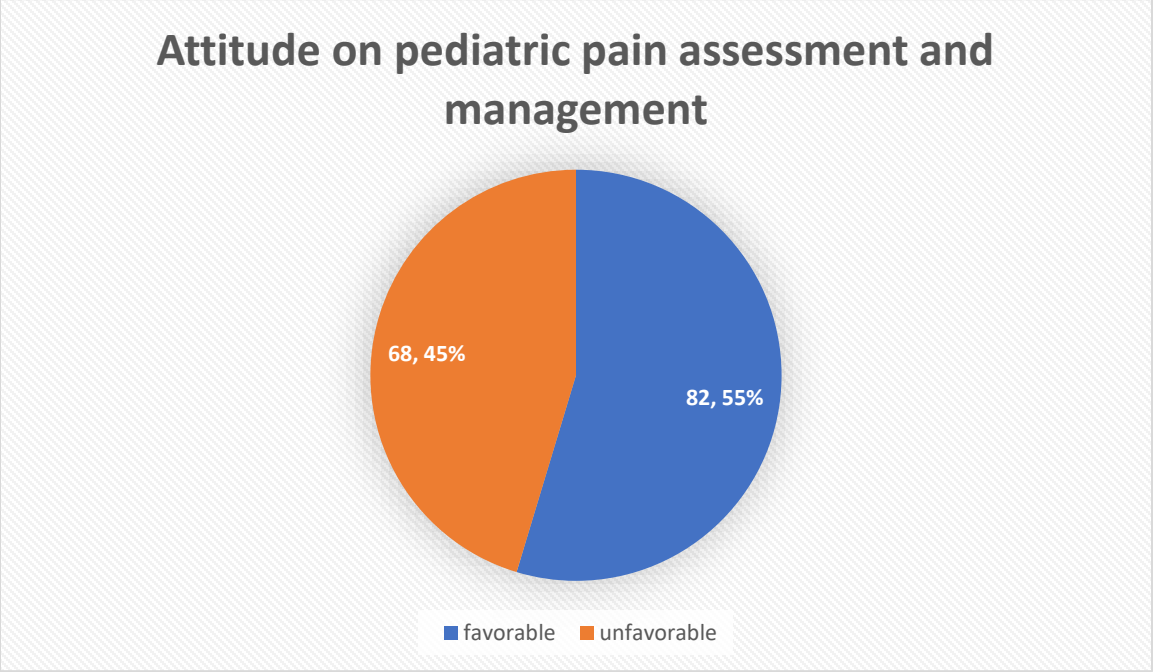

Figure 6. The level of the attitude of the study participants on pediatric pain assessment and management

The specific attitude-based assessment tool revealed that 91.3% of the participants disagree on the idea that 'children tolerate pain better than adults do' and 38% of the participants disagree on the parental presence during painful procedures. Almost 99% of the study participants agree on the priority of pain management and relief in children and 99.3% of the study participants agree on the children's right on appropriate assessment and management of pain in children. 93% of the study participants agree on the discussion of children's pain with their parents and 98.7% of the study participants agree on the documentation of pain score like other vital signs.

Table 11. Attitude of the study participants on pediatric pain assessment and management.

Variable	Response		
	Agree	Neutral	disagree
Children tolerate pain better than adult do	4(2.7%)	9(6%)	137(91.3
Postoperative pain in children should be eliminated	144(96%)	1(0.7%)	5(3.3%)
Parents should be present during painful procedures	88(58.7%)	24(16%)	38(25.3%)
In the treatment of children, pain relief and management are the priorities	148(98.7%)		2(1.3%)
Children should be able to have their pain appropriately assessed and managed	149(99.3%)		1(0.7%)
The physician can discuss with the child's parents to better assess the child's pain	140(93.3%)	5(3.3%)	5(3.3
Improving the assessment and management of a child's pain results in improved parent satisfaction	149(99.3%)		1(0.7%)
The pain score should be recorded, just like other vital signs	148(98.7%)		2(1.3%)
To ensure patient's comfort and pain relief is one of the most important tasks of residents	149(99.3%)	1(0.7%)	
Available techniques for measuring of pain are the best for determining pain intensity in children	127(84.7%)	14(9.3%)	9(6%)
It is possible to influence the healing process and shorten hospital stays by measuring and managing a child's pain	147(98%)		3(2%)

5.5 The determinant factor of attitude on pediatric pain assessment and management

The finding of the study showed that department of the study participants had an association with the attitude of the study participants on pediatric pain assessment and management by bivariate logistic regression. The multivariate logistic regression revealed that study participants who were year three had 1.6 times favorable attitude compared to year one residents (AOR=1.6, 95%CI=1.29, 4.25) and Pediatric surgery study participants had 74% less favorable attitude compared to ACCPM residents (AOR=0.26, 95%CI=0.04, 0.55).

Table 12. The bivariate and multivariate logistic regression of association between attitude on pediatric pain assessment and management with independent variable.

Variable	attitude on pain assessment and management		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Good (%)	Poor (%)				
Residency year						
R1	19(48.7)	20(51.3)	1		1	
R2	21(53.8)	18(46.2)	0.651	1.2(0.51, 2.99)	0.955	1.1(0.38, 2.81)
R3	39(62.9)	23(37.1)	0.162	1.8(0.79, 4.02)	0.015	**1.6(1.29, 4.25)**
R4	2(40)	3(60)	0.714	0.70(0.11, 4.67)	0.513	2.4(0.17, 34.32)
R5	1(20	4(80)	0.251	0.26(0.03, 2.57)	0.949	0.91(0.05, 17.14)
Department						
Anesthesiology Resident	30(53.6)	26(46.4)	1		1	
Pediatrics Resident	47(61.1)	30(38.9)	0.390	1.4(0.68, 2.73)	0.176	1.8(0.77, 4.32)
Pediatrics surgical resident	5(29.4)	12(70.6)	0.027	0.36(0.11, 0.66)	0.037	**0.26(0.04, 0.55)**
Training						
Yes	49(56.3)	38(43.7)	0.632	1.2(0.61, 2.25)	0.725	1.2(0.50, 2.68)
No	33(52.4)	30(47.6)	1			
Knowledge						
Poor	28(50.9)	27(49.1)	1			
Good	54(56.8)	41(43.2)	0.148	1.3(0.65, 2.47)	0.285	1.7(0.65, 4.43)

5.6 Practice of study participants on pediatric pain assessment and management

The figure below showed that 34% of the study participants had good practice on pediatric pain assessment and management while 66% of the study participants had poor practice with a mean score of 15.1 ± 4.1

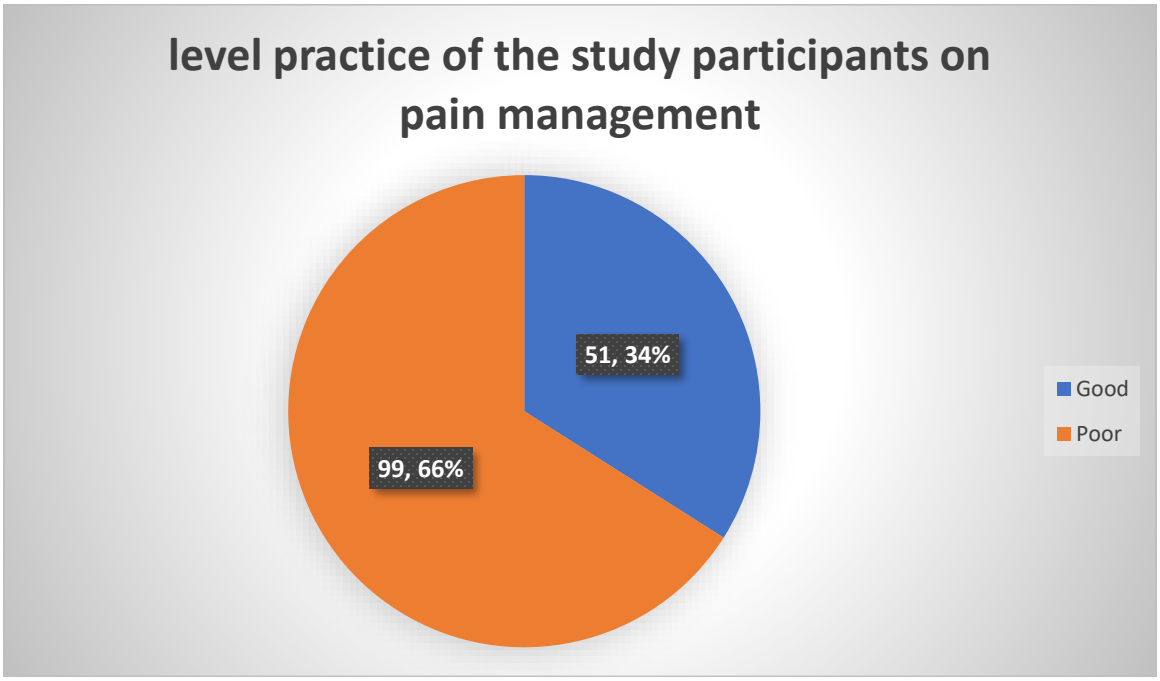

Figure 7.level of Practice on pediatric pain assessment and management of the study participants

All the study participants were assessing the pain of the children and from those only 8.7% of the participants routinely use pain assessment tool and 26.7% of the participants often use visual analog scale for pain assessment. Only 8% of the research participants were consistently reevaluating children's discomfort following the administration of analgesics to gauge the efficacy of the medication and as seen in the table below, 7.3% of research participants regularly check for skin rash, headache, vomiting, and elevated heart rate following the administration of opioid medications.

Table 13. The Practice study participants on pediatric pain assessment and management

Variable	Response			
	Yes		No	
Do you assess pain for children able to communicate?	150(100%)		0	
	Seldom	Sometimes	Often	Routinely
If yes, how often do you employ a pediatric patient pain assessment tool?	13(8.7%)	96(64%)	28(18.7%)	13(8.7%)
In your practice, do you evaluate children's pain using the Visual Analogue Scale (VAS)?	36(24%)	70(46.7%)	40(26.7%)	4(2.7%)
In your practice, do you assess children's pain using the FACE Scale?	26(17.3%)	82(54.7%)	34(22.7%)	8(5.3%)
How frequently do you reevaluate children's pain following the administration of analgesics to see how effective the drug is?	34(22.7%)	72(48%)	32(21.3%)	12(8%)
Following the administration of opioid analgesics, how often you examine for skin rash, headache, vomiting, and elevated heart rate?	62(41.3%)	59(39.3%)	18(12%)	11(7.3%)
How often is the topic of pain management and scores discussed throughout rounds?	9(6%)	88(58.7%)	36(24%)	17(11.3%)
When managing pain in children, how frequently do you employ nonpharmacological intervention?	16(10.7%)	99(66%)	31(20.7%)	4(2.7%)

5.7 List of non-pharmacological intervention for children pain management

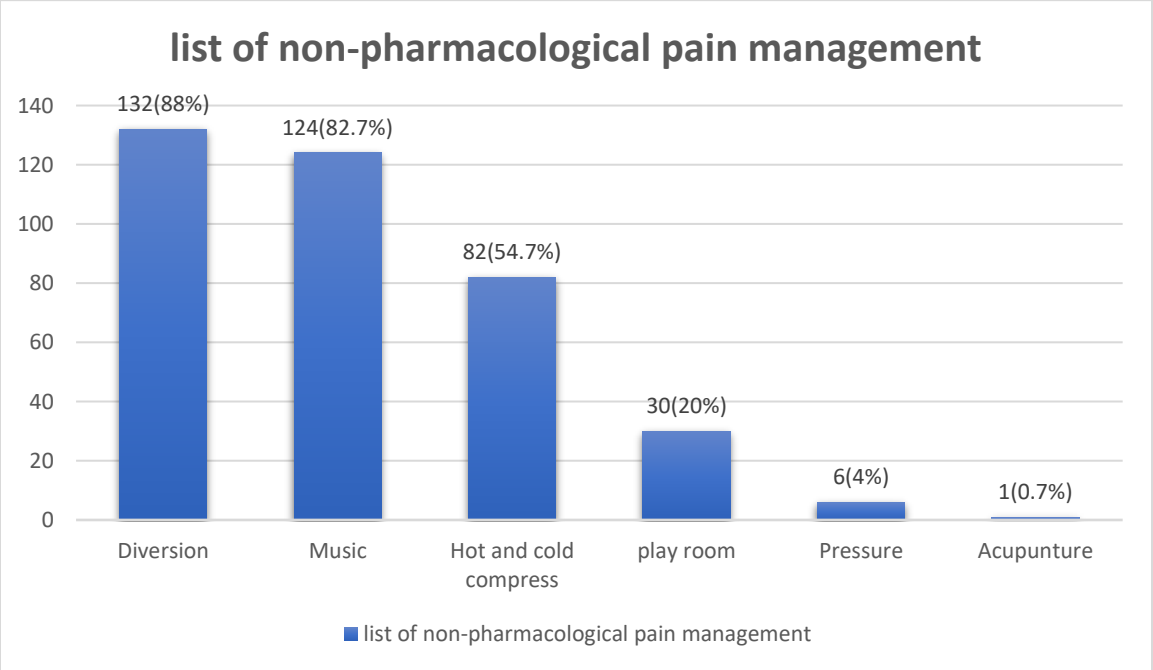

Figure 8. The non-pharmacological internation for children pain management used by study participants

5.8 The determinant factor of practice on pediatric pain assessment and management

The finding of this study revealed that level of residency, department of the residents, level of knowledge, training on pain assessment and management have associations with the practice of pain management by bivariate logistic regression. The multivariate logistic regression revealed that year three residents had 4.8 times increase in level of practice compared with year one residents (AOR=4.8, 95%CI=1.30, 17.41). Pediatric and pediatric surgery department study participants were 96% and 97% less likely to practice pain assessment and management compared to anesthesiology residents respectively (AOR=0.04, 95%CI=0.01, 0.15 & AOR=0.03, 95%CI=0.01, 0.28). Study participants who have good knowledge on pediatric pain assessment and management had 1.7 times increase on practice compared to its counterparts (AOR=1.7, 95%CI=1.22, 2.55).

Table 14. The bivariate and multivariate logistic regression of association between practice on pediatric pain assessment and management with independent variable.

Variable	practice on pain assessment and management		p-value	COR with 95%CI	P-value	AOR with 95%CI
	Good (%)	Poor (%)				
Residency year						
R1	9(23.1)	30(76.9)	1		1	
R2	10(25.7)	29(74.3)	0.792	1.1(0.41, 3.24)	0.947	0.96(0.25, 3.59)
R3	27(43.6)	35(56.4	0.039	2.6(1.05, 6.31)	0.018	**4.8(1.30, 17.41)**
R4	3(60)	2(40)	0.104	5.0(0.72, 34.73)	0.019	**4.1(1.85, 91.89)**
R5	2(40)	3(60)	0.419	2.2(0.32, 15.43)	0.066	18.3(0.83, 40.55)
Department						
Anesthesiology Resident	36(64.3)	20(35.7)	1		1	
Pediatrics Resident	9(11.7)	68(88.3)	0.001	0.07(0.03, 0.18)	0.001	**0.04(0.01, 0.15)**
Pediatrics surgical resident	6(35.3)	11(64.7)	0.039	0.30(0.09, 0.94)	0.003	**0.03(0.01, 0.28)**
Training						
Yes	36(41.4)	51(58.6)	0.027	2.2(1.10, 4.64)	0.161	2.1(0.74, 6.13)
No	15(23.8)	48(76.2)	1			
Knowledge						
Poor	8(14.6)	47(85.4)	1			
Good	43(45.3)	52(54.7)	0.001	4.8(2.07, 11.38)	0.049	**1.7(1.22, 2.55)**
Attitude						
Unfavorable	23(40.8)	45(69.2)	1			
Favorable	28(34.1)	54(65.9)	0.697	1.1(0.52, 2.00)	0.979	0.99(0.41, 2.38)

6. Discussion

The finding of this study indicates that 63% of the study participants were knowledgeable on pediatric pain assessment and management. This finding was comparable with the study done in 2019 at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia (61.2%) [2]. From those the knowledge of anesthesiology residents was 87.1% and the knowledge of pediatric resident were 39.1%. This indicates that knowledge of pediatric residents was significantly poorer than knowledge of anesthesiology residents. This finding was supported by the study done in Columbia university, New York City (77% vs 54%) [12]. The difference in the percentage is explained by the difference of the number of residents participated in each study. This difference in knowledge regarding pain management between anesthesiology residents and pediatric residents primarily stems from differences in their training focus. That is anesthesiology residents typically spend a significant portion of their training in operating rooms, and critical care units where they directly manage pain in real-time during surgical procedures and postoperative care. Anesthesiology residents work closely with attending anesthesiologists and pain specialist, gaining hands-on experience in pain management techniques. In contrast, pediatric residents rotate through various pediatric specialties, including general pediatrics, neonatology, and pediatric subspecialties. While they encounter patients with pain during their rotations, their exposure to advanced pain management techniques may be limited compared to anesthesiology residents.

In this study the study participants who has taken training on pain management and assessment had 5.1 times increased knowledge on pain assessment and management compared to their compartments (AOR=5.1, 95%CI=1.68, 15.00). This finding was congruent with the study done in Taiwan (p = .001) [15]. This could be due to the fact that training enhances their clinical judgment and decision-making abilities in tailoring individualized pain assessment and management plans. We can infer from this finding that daily practice coupled with training is necessary to improve pediatric pain assessment and management.

Year three residency level study participants had 11.8 times increase knowledge on pediatric pain assessment and management compared to year one residents (AOR=11.8, 95%CI=2.71, 51.69). This result was consistent with the 2019 TASH research [2]. This could be due to the fact that medical residency programs are designed to be progressive, with a curriculum that builds upon foundational knowledge and skills over time. In the first year, residents focus on developing a broad understanding of basic medical concepts and acquiring essential clinical skills.

This study showed that from 150 residents, 16% of the study participants thought narcotics shouldn't be used in pediatric patients because it can cause respiratory depression. This finding was supported by a study done in Sudan 33% [11]. The difference has been explained by the difference in the study setting the later was done on 9 different hospitals. And this thought has a great negative impact on pediatrics pain management.

The finding of the study also showed that 55% of the study participants had favorable attitude on pediatrics pain assessment and management. The finding was comparable with the study done in 2019 at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia 58.2% [2]. And this finding was lower than the study done in Sudan 75% [11]. This could be due to variations in study setting which can impact the reported prevalence of attitude about pain assessment and management.

The finding also showed that 34% of the study participants had good practice on pediatric pain assessment & management. This finding was lower than the study done in 2019 at Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia 52.7% [2]. From this, we can understand we have to work on our practices of pediatrics pain assessment and management.

Non-pharmacological methods used accordingly for the management of pain in this study were diversion (88%) followed by music (82.7%), hot and cold compression (54.7%), play room (20%), pressure (4%) and 0.75%). This finding was supported by the study done in Kenyatta National Hospital in which 77% use diversion as the most effective non-pharmacological method of pain management [18].

Study participants whose level of residency were year three had 4.8 times increase in level of practice compared with year one residents (AOR=4.8, 95%CI=1.30, 17.41). This could be attributed to the fact that higher-level residents have typically completed more clinical rotations and gained exposure to a broader range of pediatric patient populations and clinical scenarios. This diverse clinical experience provides them with opportunities to encounter various types of pain conditions, understand the unique pain experiences of pediatric patients across different age groups and developmental stages, and tailor individualized pain management plans accordingly.

Pediatric and pediatric surgery resident study participants were 96% and 97% less likely to practice pain assessment and management compared to anesthesiology resident respectively (AOR=0.04, 95%CI=0.01, 0.15 & AOR=0.03, 95%CI=0.01, 0.28) and Study participants who has good knowledge on pediatric pain assessment and management had 1.7 time increase in practice compared to its compartments (AOR=1.7, 95%CI=1.22, 2.55).

Limitations of the study

The study used a questionnaire rather than observation of healthcare professionals' actual assessment and management practices. As with any self-report study, respondent bias is possible. Our study was limited to TASH, Addis Ababa, which is the capital city of Ethiopia hence the results might not be representative of the entire country.

Strengths of the study

Our study tried to assess the knowledge, attitude and practices of pediatrics, pediatrics surgical and ACCPM residents and where our gap is.

Additionally, it can be a springboard for additional research and policy development in the future.

Our study aimed to examine and resolve the various misconceptions and malpractices around the assessment and management of pain in pediatrics.

7. Conclusion

In this study the knowledge, attitude and practice of the study participants on pain assessment and management were 63%, 55% and 34% respectively. The determinant factors for knowledge of study participants were year of residency, department and trainings taken on pain management and assessment. The determinants of study participant’s attitude were year of residency and department. Lastly, the determinant factors of study participants practice were year of residency, department and knowledge on pediatric pain assessment and management.

So, the findings of this study suggest that pediatrics, pediatrics surgical and ACCPM residents need further education and training regarding pediatric pain assessment and management. In order to enhance residents' practice of pain evaluation and management in pediatric quality care, this study will also be beneficial for putting multidisciplinary pediatric pain management programs into place.

8. Recommendation

In this study the knowledge and attitude of the study participants on pain management were 63% and 55% respectively, while its practice was too low. So, to improve knowledge, attitude, and practices (KAP) regarding pediatric pain assessment and management among residents require a multifaceted approach that addresses educational gaps, promotes positive attitudes, and encourages evidence-based practices. Therefore, the recommendation goes to

- Comprehensive Education and Training: - Develop and implement structured educational programs specifically focused on pediatric pain assessment and management, incorporating principles of child development, age-appropriate pain assessment tools, pharmacological and non-pharmacological interventions, and procedural pain management techniques.
- Promotion of Positive Attitudes: - Raise awareness about the importance of addressing pediatric pain as a priority healthcare issue and the potential impact of untreated or undertreated pain on children's physical, emotional, and developmental well-being.
- Integration of Evidence-Based Practices: - Promote the use of evidence-based guidelines, clinical practice recommendations, and standardized pain assessment tools in pediatric pain management. Encourage residents to critically appraise scientific literature, stay updated on emerging research findings, and apply evidence-based practices in their clinical decision-making processes.

9. Declaration

I, the undersigned, hereby undertake full responsibility for the project's ethical and scientific conduct. I promise to give my advisor regular updates on my research endeavors and to ask for their guidance and consent as needed. I will promptly notify my advisor and all other parties concerned.

Name of the resident: Dr. Tesfamariam Aragaw (MD, ACCPM Resident)

Signature: _____

Date: _____

Approval of the First Advisor:

Name of the advisor: _____

Signature: _____

Date: _____

Approval of the Second Advisor:

Name of the advisor: _____

Signature: _____

Date: _____

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Annexes

Annex 1: Information Sheet

Addis Ababa University, school of public health, from specialty program. A questionnaire for assessing the knowledge, attitude and practice towards children's pain assessment and management among ACCPM, Pediatrics and Pediatrics surgical residents at Tikur Anbessa Specialized Hospital, AAU, ETHIOPIA.

Good morning/good afternoon. My name----------; we come from Addis Ababa University. Working with Dr. Tesfamariam Aragaw, an investigator, we are completing his thesis in order to partially meet the requirements for a specialty certificate in anesthesiology, critical care, and pain medicine. We are assessing the knowledge, attitude and practice towards children's pain assessment and management among ACCPM, Pediatrics and Pediatrics surgical residents. You'll be asked a few questions that shouldn't be too tough to respond to. I promise that none of the information you are going to give me will ever include your name or be written in this format. You are not required to answer any question that you do not want to answer and you may terminate this questionnaire at any time you want to. However, your truthful responses to these inquiries will enable us to determine the level of understanding, perspective, and practice regarding the assessment and management of children's pain, as well as assist in resolving any issues that may arise in the future in order to prevent and manage it. This interview will only take about twenty minutes, and we would welcome your assistance in answering these questions.

Name: Dr. TESFAMARIAM ARAGAW

Tel- +251-988523408

Email- tesfamariamaragaw30@gmail.com

TASH, ADDIS ABABA, ETHIOPIA

Annex 2: Informed consent sheet

You have requested me to participate in the study. According to the information given by the principal investigator, I understand that I do not need to write my name, that the information I give her/him will not be used for any other purpose, and that the information I provide will help identify the knowledge, attitude, and practice regarding the assessment and management of children's pain. It also helps to solve the problems that have been identified in order to prevent and manage the pain in the future.

So, I consent to taking part in the study.

1. Yes……. 2. No……

If yes go to next section. If no go to next participant

Questioner code ----------

Signature----------

Annex 3: Questionnaire

PART 1	
1.1 Department	A) Anesthesiology Resident B) Pediatrics Resident C) Pediatrics surgical resident
1.2 Residency Year	A) R1 B) R2 C) R3 D) R4 E) R5
1.3 Have you received any formal Training before?	A) Yes B) No
PART 2	
2.1 The patient is the most accurate judge of the intensity of the patient's pain	A) True B) False
2.2. For children who can communicate, it's recommended to regularly assess and document pain	A) True B) False
2.3 For children who are not able to communicate, it's important to routinely assess and document pain	A) True B) False
2.4. When giving opioid analgesics to children experiencing acute, severe pain with an abrupt onset (such as pain following surgery or trauma), the intramuscular route is the recommended method	A) True B) False
2.5. Giving opioids on a regular schedule is better versus as required (PRN)schedule for continuous pain	A) True B) False
2.6. Children don't have pain if they don't express or show it	A) True B) False

2.7. Pain perception can be reduced by diversion, such as listening to music or practicing relaxation	A) True B) False
2.8. A patient's increasing need for analgesics is an indication that they are developing a drug addiction	A) True B) False
2.9. Compared to patients with acute pain, people with severe chronic pain frequently require larger dosages of analgesics	A) True B) False
2.10. when asked if family/patient claims he/she has reduced pain following administration of narcotics, you should provide lower amount of the narcotics dosage for the next time	A) True B) False
2.11. Children should not be given opioids due to the possibility of respiratory depression	A) True B) False
2.12. Psychological problems later in life is one of the effects of chronic, untreated pain in children	A) True B) False
2.13. Administering analgesics to patients who exhibit decreased facial expression is crucial	A) True B) False
2.14. A patient should experience discomfort prior to giving the next dose of pain meds	A) True B) False
2.15. Combining analgesics with distinct mechanisms of action may lead to reduced side effects and improved pain management compared to the use of a single analgesics	A) True B) False
2.16. A patient's vital signs may indicate how severe their pain is	A) True B) False
PART 3	
3.1. Do you assess pain for children able to communicate?	A) Yes B) No

3.2. If yes, how often do you employ a pediatric patient pain assessment tool?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.3. In your practice, do you evaluate children's pain using the Visual Analogue Score (VAS)?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.4. In your practice, do you assess children's pain using the Face Scale?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.5. How often do you reassess children's pain after giving analgesics in order to evaluate the effectiveness of the pain medication?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.6. Following the administration of opioid analgesics, how often you examine for skin rash, headache, vomiting, and elevated heart rate?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.7. How often is the topic of pain management and scores discussed throughout rounds?	A) Seldom (1-25%) B) Sometimes (26-50%) C) Often (51-75%) D) Routinely (>75%)
3.8. When managing pain in children, how frequently do you employ nonpharmacological intervention?	A) Seldom (1-25%) B) Sometimes(26-50%) C) Often (51-75%) D) Routinely(>75%)
3.9. If you use non pharmacological interventions Thick (√) the methods you use for pain management in children	A) Diversion B) Music C) Hot/Cold compression

	D) Play room E) Pressure F) Acupuncture
Part 4	
4.1. Children tolerate pain better than adults do	A) Agree B) Disagree C) Neutral
4.2. Postoperative pain in children should be eliminated	A) Agree B) Disagree C) Neutral
4.3. Parents should be present during painful procedures	A) Agree B) Disagree C) Neutral
4.4. In the treatment of children, pain relief and management are the priorities	A) Agree B) Disagree C) Neutral
4.5. Children should be able to have their pain appropriately assessed and managed	A) Agree B) Disagree C) Neutral
4.6. The physician can discuss with the child's parents to better assess the child's pain	A) Agree B) Disagree C) Neutral
4.7. Improving the assessment and management of a child's pain results in improved parent satisfaction	A) Agree B) Disagree C) Neutral
4.8. The pain score should be recorded, just like other vital signs	A) Agree B) Disagree C) Neutral

4.9. To ensure patient's comfort and pain relief is one of the most important tasks of residents	A) Agree B) Disagree C) Neutral
4.10. Available techniques for measuring of pain are the best for determining pain intensity in children	A) Agree B) Disagree C) Neutral
4.11. It is possible to influence the healing process and shorten hospital stays by measuring and managing a child's pain	A) Agree B) Disagree C) Neutral