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RESEARCH REPORT

Current pediatric pain practice in Nigeria, South Africa, Uganda, and Zambia: A prospective survey of anesthetists

Anisa Bhettay[1] | Rebecca Gray[1] | Ibironke Desalu[2] | Romy Parker[3] | Salome Maswime[4]

[1]Red Cross War Memorial Children's Hospital, Division of Paediatric Anaesthesia, Department of Anaesthesia and Perioperative Medicine, University of Cape Town, Cape Town, South Africa

[2]Department of Anaesthesia, University of Lagos, Lagos University Teaching Hospital, Lagos, Nigeria

[3]Department of Anaesthesia and Perioperative Medicine, Groote Schuur Hospital and University of Cape Town, Cape Town, South Africa

[4]Head of Division of Global Surgery, University of Cape Town, Cape Town, South Africa

Correspondence
Anisa Bhettay, Red Cross War Memorial Children's Hospital, Division of Paediatric Anaesthesia, Department of Anaesthesia and Perioperative Medicine, University of Cape Town, Cape Town, 7700, South Africa.
Email: anisabhettay@gmail.com

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Abstract

Background: Children in hospital experience significant pain, either inherent with their pathology, or caused by diagnostic/therapeutic procedures. Little is known about pediatric pain practices in sub-Saharan Africa. This survey aimed to gain insight into current pain management practices among specialist physician anesthetists in four sub-Saharan African countries.

Methods: A survey was sent to 365 specialist physician anesthetists in Nigeria, South Africa, Uganda and Zambia. Content analysis included descriptive information about the respondents and their work environment. Thematic analysis considered resources available for pediatric pain management, personal and institutional pain practices.

Results: One hundred and sixty-six responses were received (response rate 45.5%), with data from 141 analyzed; Nigeria (27), South Africa (52), Uganda (41) and Zambia (21). Most respondents (71.83%) worked at tertiary/national referral hospitals. The majority of respondents (130/141, 91.55%) had received teaching in pediatric pain management. Good availability was reported for simple analgesia, opioids, ketamine, and local anesthetics. Just over half always/often had access to nurses trained in pediatric care, and infusion pumps for continuous drug delivery. Catheters for regional anesthesia techniques and for patient-controlled analgesia were largely unavailable. Two thirds (94/141, 66.67%) did not have an institutional pediatric pain management guideline, but good pharmacological pain management practices were reported, in line with World Health Organization recommendations. Eighty-eight respondents (62.41%) indicated that they felt appropriate pain control in children was always/often achieved in their setting.

Conclusion: This survey provides insight into pediatric pain practices in these four countries. Good availability of a variety of analgesics, positive pain prescription practices, and utilization of some non-pharmacological pain management strategies are encouraging, and suggest that achieving good pain control despite limited resources is attainable. Areas for improvement include the development of institutional guidelines, routine utilization of pain assessment tools, and access to regional anesthesia and other advanced pain management techniques.

KEYWORDS
anesthetist, pain assessment, pain management, pediatric, sub-Saharan Africa

1 | INTRODUCTION

Children in hospital often experience pain as an inherent part of their pathology, and are exposed to a variety of painful diagnostic and therapeutic procedures. Immaturity or cognitive impairment may preclude the competent expression of pain during such experiences, making pain assessment challenging. In sub-Saharan Africa (SSA) diverse cultures, languages, and unique context-specific environmental factors further compound this challenge. Children in the region are thus vulnerable to poor pain control with attendant suffering.[1] Inadequate pain control has short and long-term consequences, with physiological, psychological, social, and economic ramifications.[2–4]

Despite the plethora of literature detailing evidence-based pediatric pain practices and the consequences of poor pain management, there is a significant practice gap even in high income countries (HICs).[3] A systematic review of outcomes by the pediatric perioperative outcomes group demonstrated that in children aged 1–12 years, the patient comfort domain, which included pain assessment and analgesic requirement, constituted 50% of outcomes captured. For adolescents over 13 years, pain assessment and analgesic requirements constituted 69% of outcomes captured.[5] Pain is thus the most researched perioperative outcome in children above the age of 1 year. However, there are few studies reporting on perioperative pain outcomes in SSA, and a paucity of data describing the burden of pain, or current pediatric pain practices in SSA for both individual countries, and the region as a whole.[1]

This survey aimed to gain insight into current perioperative and peri-procedural pediatric pain management practices from the perspective of the specialist physician provider in Nigeria, South Africa, Uganda and Zambia. Nigeria, Uganda, and Zambia are the sites of the inaugural Pediatric Anesthesia Training in Africa (PATA) Pediatric Anesthesia Fellowship initiative which has established one site in each country as a training hub for pediatric anesthesia at fellowship level. We hope that the results of this survey will inform the ongoing development of a curriculum and supporting teaching materials for PATA.[6] The curriculum is intended to be both realistic using available modalities, as well as aspirational, encouraging advocacy for feasible modalities, materials and practices that may not currently be available locally.

2 | METHODS

This research was approved by the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (reference number 635/202). All respondents who completed the survey consented to participate. Specialist physician anesthetists from these countries were targeted for participation in this survey. The survey was conducted as part of background research to inform the development of a context-appropriate pediatric pain management curriculum for SSA pediatric anesthesia fellows. The 19-question survey constructed in Survey Monkey®, included four demographic questions about the respondent, five questions about resources for pediatric pain management, six questions about personal and institutional practices and four questions to gauge the respondent's opinion on quality of pain management and on learning needs. Questions about resources covered available pain services and trained nursing staff, institutional guidelines, access to medicines, and availability of equipment. Questions about practice covered the use of pain scoring tools for pain assessment and adherence to the World Health Organization's principles for acute and chronic pain management. The final four questions included the respondent's opinion on the adequacy of pediatric pain management in their institution, and related to willingness to engage in future training opportunities, allowing respondents to suggest topics for inclusion in training programs. Face validity was established by inviting feedback from two experienced anesthetists including an education expert, ensuring that the questions would allow the aims of the study to be met. Suggestions were incorporated and multiple edits made. The survey was then piloted with four anesthetists from different countries in SSA, and suggestions incorporated into the final survey. The pilot data were not included in the final results.

A link to the survey was distributed via country fellowship directors for the PATA Fellowship Program in Nigeria, Uganda and Zambia to WhatsApp Messenger groups for pediatric anesthesia societies/practitioners in October 2022. In South Africa the survey link was emailed to members of the Paediatric Anaesthesia Community of South Africa (PACSA) by the society secretary in February 2023. Four reminders were sent via country leads. The survey was closed in May 2023. No identifying data were shared by country leads with the investigators, and no identifying data were collected in Survey Monkey®.

3 | RESULTS

One hundred and sixty-six anesthetists responded to the survey (response rate = 45.5%) with responses from 141 analyzed (Figure 1).

3.1 | Theme 1: Respondent profiles

Table 1 provides information relating to respondent countries, with the response rate for that country.

The majority of respondents (102/141, 71.83%) provided anesthesia in tertiary/national referral hospitals. Few (17/141, 12%) provided services at district/provincial/secondary hospitals, and 22/141 (15.6%) provided anesthesia either in the private sector, at specialist day hospitals, at quaternary level, or across multiple hospitals/sectors.

The majority of respondents (130/141, 91.55%) reported receiving teaching in pediatric pain management. Most teaching occurred during anesthesia training (123/131, 93.89%). Fifty respondents (50/131, 38.17%) had attended a short course/lecture/workshop/webinar. Only 30/131 (22.90%) received specific teaching during undergraduate medical training. Three (3/131, 2.29%) respondents had undertaken diploma studies specific to pain. 'Other' responses (8/131, 6.11%) included pain teaching during pediatric anesthesia fellowship training.

3.2 | Theme 2: Resources for pediatric pain management

Two thirds of respondents (94/141, 66.67%) did not have access to a departmental/institutional guideline for pediatric pain management, while 33/141 (23.4%) did. Fourteen (9.93%) were unsure.

Dedicated acute pediatric pain services were accessible for 29/138 (21%). Just under half of respondents (60/137, 43.8%) reported having access to a procedural sedation and analgesia service. Seventeen of 135 respondents (12.59%) had access to a chronic pain clinic.

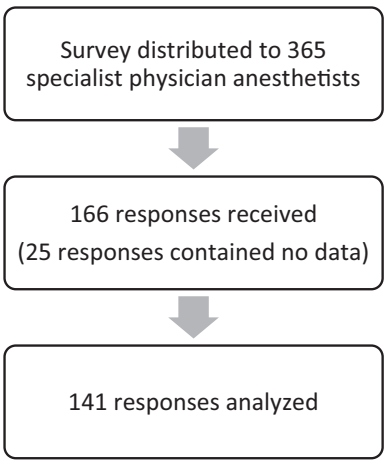

FIGURE 1 Study flow chart.

Simple analgesics such as paracetamol, (acetaminophen), NSAIDs, ketamine, strong opioids, and local anesthetic agents were available to most respondents always/often (Table 2). Access to weaker opioids was good, with 100/141 (70.92%) reporting that these medicines are always/often available. Access to alpha-agonists, gabapentinoids, inhaled analgesics for analgosedation, and topical local anesthetic creams was more limited, with more than half of respondents indicating that they seldom/never had access to these agents.

Other medicines used for pain management in children, entered on the survey as free text, included codeine combination preparations, magnesium, pentazocine, dexamethasone, and amitriptyline.

Access to child-appropriate resources for pain management is shown in Table 3. Just over half of respondents always/often have access to nurses trained in pediatric care, and infusion pumps. 'Newer' devices such as nerve plexus and wound infusion catheters, nasal mucosal atomizers, and devices used to facilitate patient-controlled analgesic management are less available. Respondents were able to indicate if the resource was not relevant for their clinical practice.

3.3 | Theme 3: Personal and institutional pain practices

Respondents were asked to share their experiences in achieving institutional adherence to pain management guidelines where these existed. There were a range of responses, with many reporting good adherence and positive implementation experiences. Some reported challenges to adherence, listing opiophobia, staff turnover, and drug unavailability as barriers. Despite these challenges, many respondents (88/141, 62.41%) believed that an appropriate level of pain management for children was always/often achieved in their setting.

3.4 | Quotes from free text

> It has taken time to get buy-in: (1) it requires passionate clinicians (2) it requires nursing to eventually see the benefit of the intervention (3) it has required clinicians (whoever is driving the process) to ensure that the guideline is followed diligently.

TABLE 1 Respondent profiles.

Respondent country	Number of respondents	Country response rate (%)	Number of respondents working in Secondary Hospitals	Number of respondents working in Tertiary Hospitals	Number of responders working in other settings
Nigeria	27	64.3	1 (3.7%)	26 (96.3%)	0 (0%)
South Africa	52	34.7	3 (6%)	32 (64%)	16 (32%)
Uganda	41	26.6	7 (17%)	30 (73%)	2 (4.88%)
Zambia	21	84	3 (14.3%)	14 (66.7%)	4 (19%)
Total	141		14	102	22

TABLE 2 Availability of analgesic and local anesthetic medications.

Pharmacological agent	Always available percent (number)	Often available	Seldom available	Never available	Total
Topical local anesthetics e.g. EMLA®	21.27% (30)	12.06% (17)	24.11% (34)	43.26% (61)	141
Local anesthetics—bupivacaine, ropivacaine, lignocaine	80.85% (114)	19.14% (27)	0.71% (1)	0% (0)	141
Paracetamol	82.27% (116)	15.6% (22)	2.84% (4)	0% (0)	141
NSAIDs—ibuprofen, diclofenac, ketorolac, parecoxib	67.37% (95)	23.4% (33)	9.92% (14)	0% (0)	141
Strong Opioids—fentanyl, morphine, pethidine	69.29% (97)	30.71% (43)	0.71% (1)	0% (0)	140[a]
Weak Opioids—tramadol, tilidine	42.55% (60)	28.37% (40)	21.98% (31)	7.8% (11)	141
Ketamine	87.94% (124)	12.76% (18)	0% (0)	0% (0)	141
Alpha agonists—dexmedetomidine, clonidine	26.24% (37)	13.47% (19)	30.5% (43)	30.5% (43)	141
Gabapentinoids—gabapentin, pregabalin	22.69% (32)	14.89% (21)	26.95% (38)	35.17% (51)	141
Inhaled analgosedation agents e.g. nitrous oxide, methoxyflurane	18.44% (26)	9.92% (14)	16.31% (23)	56.03% (79)	141

[a]One respondent did not answer the question regarding strong opioids leaving a total of 140 responses.

> It has been a positive experience, but definitely with room for improvement.
>
> We had little practice in regional pain management due to lack of drugs and required equipment plus consumables.
>
> Good. Sometimes the protocols need to be adjusted depending on the experience of nursing care available to help with the nursing of patients with advanced pain management strategy.
>
> … health providers are not comfortable using opioids in children especially after Operating Theatre.
>
> Just challenges with consumables on regular basis, this hinders adherence to guidelines.

Respondents were asked to report on the regularity of use of pain scoring tools for pain assessment, both personally and within various units in their institution (Table 4). Approximately 50% of respondents indicated that such tools are rarely/never used across clinical areas both in personal practice and institutionally.

Respondents reported that the majority of children benefited from treatment strategies that were always/often (80.14%, 133) tailored to their individual needs. Most children received analgesia via the most appropriate route always/often (133/141, 94.33%). 86.52% (122/141) reported scheduled/regular analgesia was always/often prescribed as opposed to on an "as needed/*pro re nata*" (PRN) basis. A 2- or 3-step analgesic strategy was commonly employed, with 65.94% (91/138) indicating that they/their institution always/often follow this World Health Organization (WHO) recommendation.[7]

Five evidence-informed non-pharmacological pain management strategies were provided, and respondents asked to indicate how frequently these were utilized in their setting. Most children were accompanied by carers at the bedside (86.52%, 122/141, always/often), and education, counseling and reassurance was provided always/often (68.79%, 97/141). Distraction techniques such as reading, videos/play (60.29%, 85/141), aromatherapy (95.72%, 134/140) and music therapy (85.82%, 121/141) were seldom/rarely/never used.

There were only 48 responses to the question relating to the principles of chronic pain management. Nineteen (39.58%) respondents reported using a biopsychosocial approach, 21/48 (44.68%) reported centering the child and family, 17/48 (35.42%) indicated that interdisciplinary care was employed, 29/48 (60.42%) reported appropriate assessment and management of comorbid diseases. Nineteen (40.43%) reported that assessment was conducted by skilled chronic pain providers, while 28/48 (59.57%) reported that this was seldom/rarely/never done.

4 | DISCUSSION

To our knowledge, this is the first survey on pediatric pain practices among anesthesia providers in SSA countries.

TABLE 3 Access to child-appropriate pain management resources.

Resource	Always	Often	Seldom	Rarely	Never	Not relevant	Total
O_2 saturation monitors in postoperative destinations	63.83% (90)	24.82% (35)	9.92% (14)	0.71% (1)	1.42% (2)	0% (0)	141
Nurses trained in pediatric care	26.24% (37)	34.04% (48)	17.02% (24)	12.06% (17)	11.35% (16)	0% (0)	141
Infusion pumps for drug infusions	37.14% (52)	26.42% (37)	15% (21)	15.71% (22)	6.42% (9)	0% (0)	140[b]
Wound infusion catheters	9.29% (13)	11.42% (16)	8.57% (12)	12.14% (17)	50.71% (71)	8.57% (12)	140[b]
Epidural catheters	23.40% (33)	17.02% (24)	21.28% (30)	17.02% (24)	18.44% (26)	3.55% (5)	141
Nasal mucosal atomizer devices	7.86% (11)	11.43% (16)	9.29% (13)	16.43% (23)	54.26% (76)	1.43% (2)	140[b]
PCA[a] devices	22.86% (32)	10.71% (15)	3.57% (5)	6.43% (9)	52.14% (73)	5% (7)	140[b]
Nerve plexus catheters	3.59% (5)	10.07% (14)	8.63% (12)	9.35% (13)	61.87% (86)	7.19% (10)	139[c]

[a]Patient controlled analgesia.

[b]One respondent did not answer these questions leaving a total of 140 responses.

[c]Two respondents did not answer the question leaving a total of 139 responses.

TABLE 4 Use of pain scoring assessment tools in personal and hospital practice.

	Always	Often	Rarely	Never	I Do not Know	Total[a]
Personal practice	7.80% (11)	31.91% (45)	45.39% (64)	12.06% (17)	2.84% (4)	141
ICU	12.95% (18)	21.58% (30)	33.81% (47)	16.55% (23)	15.11% (21)	139
Emergency room	6.52% (9)	13.04% (18)	33.33% (46)	16.67% (23)	30.43% (42)	138
Ward	3.57% (5)	15.00% (21)	40.0% (56)	19.29% (27)	22.14% (31)	140

[a]Totals reflect the number of participants who answered the question.

Almost all respondents had received training in pediatric pain management, most commonly during anesthesia training. Few respondents reported being taught about pediatric pain management at medical school. This is congruent with a systematic review of pain medicine content in the curricula at medical schools in the UK, USA, Canada, Europe, and Australasia.[8]

4.1 | Resources

Nurses appropriately trained in pediatric care form the backbone of good pediatric pain practices.[2] It is encouraging then that access to this resource was available for more than half of respondents. Despite a lack of institutional guidance on pediatric pain management in 66.7% of respondents, most felt that children received good pain relief in their setting. While the presence of a guideline does not guarantee adherence, it is a useful tool when developed appropriately and regularly updated.[9] Children in these four countries appear to have limited access to dedicated pediatric pain services for acute, procedural and chronic pain. These specialist services, available almost routinely in HIC settings, facilitate advanced pain management strategies, often providing care for challenging patients including those with acute on chronic pain, neurodivergence, and severe neurological injury.[8]

4.2 | Medicines

Unreliable supply of medicines, lack of child-friendly formulations, and supply of near expired products are well described barriers to rendering a consistent standard of care in SSA.[1,4,10,11] In this survey local anesthetic agents, opioids, paracetamol and NSAIDs were regularly available. Ketamine remains a stalwart analgesic with excellent availability, which is encouraging with its re-emergence as an analgesic for a variety of indications.[12] A few respondents from Nigeria indicated that children in their setting still receive pentazocine, despite safety concerns in the pediatric population.[13,14] One respondent in South Africa indicated that children still receive codeine preparations in

their setting, which has also been flagged as a safety concern in children under 14 years of age.[15] These could present opportunities for advocacy, to improve access to safer analgesic options for managing moderate and severe pain. Alpha agonists are widely used in pediatric practice for a variety of indications including analgesia, anxiolysis, and as an adjunct for regional anesthesia,[16,17] however our survey confirms that these agents are not widely available in the settings surveyed. Dexmedetomidine remains prohibitively expensive in South Africa (50 times more expensive than morphine), and is not available in Zambia. Parenteral clonidine is unavailable in Zambia, and access in South Africa is restricted. Topical local anesthetic cream for managing pain and distress associated with skin puncturing procedures is largely unavailable. Available agents for managing neuropathic pain include ketamine and local anesthetics. Given the burden of neuropathic pain in SSA – related to burns, trauma, HIV/AIDS, and cancer[18,19] – this is an avenue for further study.

Access to infusion pumps for continuous drug delivery is good, allowing patients to benefit from a range of analgesic options. Our survey did not ask whether these pumps are available for use outside of the operating theater, which may be a limiting factor. Equipment for the delivery of more advanced pain management techniques is more limited. This possibly reflects a lag compared to adult practice, but further study is required to assess the availability of adult appropriate equipment for comparison. Indwelling regional anesthesia catheters allow for improved pain control and lower opioid requirements, with proven perioperative benefits in adults.[7] Patient controlled analgesic techniques are utilized to good effect by children as young as five, with superior pain control reported, and good patient and parent satisfaction.[7,20] Limited availability of these advanced analgesic techniques forces reliance on older, largely opioid-based techniques, with less favorable side effect profiles.

The intranasal (IN) route of drug administration is gaining popularity in pediatrics as a fast acting and painless way of administering a range of medicines for anxiolysis and analgesia.[21] Respondents reported limited access to atomizers for administration of IN medications. The IN route may be utilized without the use of an atomizer, with varying reports on efficacy.[22,23]

4.3 | Practice

The use of validated pain scoring tools is a prerequisite for evidence-based pain management.[7] In preverbal, non-verbal or cognitively impaired children, composite tools using observed behavioral cues such as the r-FLACC should be used to facilitate an evidence-based approach to managing pain.[24] In our survey less than half of respondents reported consistent use of pain scoring tools, which would make interpretation of pain control subjective, and difficult to validate. Consistent use of pain scoring tools and other pain assessment practices could improve pediatric pain management in this setting.

The use of good prescription practices, adhering to the WHO prescription recommendations, is encouraging and a significant step to achieving optimal pain control.

Non-pharmacological pain management strategies are an important component of holistic pain management in children when used in conjunction with pharmacological strategies.[25,26] While presence of care giver and education/counseling and reassurance appeared to be well utilized, the use of distraction techniques could be increased, as these are generally inexpensive, translatable, and effective. Caregivers could be empowered to deliver these techniques, relieving clinicians of a potentially time-consuming burden.[27] Aromatherapy and music therapy appear to be rarely used modalities. However, it is possible that these modalities are utilized using different nomenclature. Exploring these potential practices could provide interesting information to inform future clinical and research work.

Only 48/141 (33.8%) respondents answered the question on managing chronic pain. These were too few to allow any meaningful conclusions to be drawn. The burden and prevalence of chronic pain conditions in children in SSA and for individual countries, as well as resources available for managing this burden and current practices require further study.

4.4 | Limitations

The limited response rate to this survey renders it open to non-response bias, but is on par with response rates from other surveys published. Only accessible specialist physician anesthetists known to work (even occasionally) with children under 18 years were sampled. These findings cannot be extrapolated to reflect country-wide practice given that most providers who responded worked in tertiary/referral hospitals. Data for the precise number of centers represented in the survey were not collected. Given that Africa is a diverse and non-homogenous region comprising many more countries than those surveyed, these results cannot be extrapolated to reflect practice in the whole of SSA.

Patients were not surveyed; thus the survey does not claim to represent the patient experience, but rather physician interpretation of the patient experience. The respondents are a select group of anesthesia providers who have had several years of advanced training in anesthesia culminating in a specialist qualification. Some respondents have also received fellowship training in pediatric anesthesia. It is acknowledged that these respondents do not necessarily represent the standard practice in their respective countries, nor do they represent the complete patient experience of pediatric pain management. In Uganda and Zambia anesthesia is provided mainly by non-physician anesthesia providers who rely on surgeons to prescribe analgesia and manage pain and these providers were not surveyed. There were some inconsistencies in the options provided on the Likert scales for medicine and equipment availability, and for the use of pain scoring tools. These may have influenced the answers provided. A definition was not provided for a sedation service. Despite these limitations, the responses to this survey tell us what is currently possible in the countries concerned, thus providing a basis from which to work in developing a curriculum and supportive teaching material.

5 | CONCLUSIONS

This survey provides insight into pediatric pain practices in Nigeria, South Africa, Uganda and Zambia. Medicine availability, positive pain prescription practices, and utilization of non-pharmacological pain management strategies are encouraging, and suggest that achieving good pain control despite limited resources is attainable. Areas for improvement include the development of institutional guidelines, routine utilization of pain assessment tools, and access to regional anesthesia and other advanced pain management techniques.

While the authors acknowledge that the results of this survey are not generalizable, they do provide insight into pediatric pain practices in these countries, and identify areas for intervention and further research. The results will also inform the development of the pediatric pain curriculum for fellows participating in the PATA program.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Permission to conduct this survey was granted by the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (approval number 635/202).

PARTICIPANT CONSENT

All participants consented to the survey, and for their anonymized information to be published in this article. No identifying data were collected. The authors declare that this work has not been published, nor is it being considered for publication elsewhere.

ORCID

Anisa Bhettay https://orcid.org/0000-0003-4835-1777
Rebecca Gray https://orcid.org/0000-0003-4704-3705

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