



Post-operative Paediatric Pain Assessment and Management at a Tertiary Health Facility, Southern Nigeria: Surgeons' Perspectives and Practice

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Authors' contributions

This work was carried out in collaboration between both authors. Author GKE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author PEO managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Whereas advances in perioperative care of children continue to be made with increasing evidence-based practice for postoperative analgesia, inadequate relief of postoperative pain resulting in significant morbidity and mortality is still being reported.

Objective: To appraise surgeons' perspectives and practice of paediatric post-operative pain assessment and management at a tertiary health facility in southern Nigeria.

Methods: In this cross-sectional survey carried out between September and December 2019, a semi-structured and self-administered questionnaire was distributed to surgeons/trainees in departments/units where paediatric patients undergo both major and minor surgeries. Their perspectives and practice of postoperative pain assessment and management were analysed using SPSS version 20.0.

Results: Seventy-nine respondents completed the survey, including 19(24%) consultants, 32(40.5%) senior registrars, and 22(27.9%) junior registrars. Two-third of respondents (n=51, 64.6%) had more than 10 years working experience post-graduation. Involving parents/caregivers

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to assess postoperative pain was the most common strategy used by respondents (n=69, 87.3%), and most of them (n=67, 84.8%) do not make use of any pain assessment tools. Non-pharmacologic strategies for postoperative pain management were applied/prescribed sometimes (n=20, 25%) or rarely (n=20, 25%). Paracetamol and NSAIDs were the commonest non-opioid analgesics used while pentazocine was the commonly used opioid. Many respondents (n=66, 83.5%) had never prescribed morphine for postoperative analgesia in children. Seventeen percent of respondents do not prescribe postoperative analgesia to newborns.

Conclusion: Findings of this study show that the practice in our institution falls short of the recommended multimodal approach to paediatric postoperative pain care. Development of standard protocols and training of providers of postoperative care are recommended.

Keywords: Post-operative pain; paediatric; assessment; management; Southern Nigeria.

1. INTRODUCTION

All surgical procedures are associated with a certain level of postoperative pain, and the fear of it is one of the greatest concerns of patients undergoing surgery. Postsurgical pain, a typical example of acute pain, is a physiological response to tissue damage that should resolve with normal wound healing, and lasts less than 3 months. It has been reported to occur in more than 80% of patients despite pain medication, and less than half of patients who undergo surgery report adequate postoperative pain relief [1,2]. Evidence suggests that inadequate relief of postoperative pain results in harmful physiological and psychological consequences that eventually leads to significant morbidity and mortality [3].

High-quality postoperative pain management is a fundamental right of every child suffering from pain and a basic duty of any health care facility that treats these patients.[4] Yet, up to 40% of hospitalized children still experience moderate to severe pain despite advances in paediatric perioperative care [5].

According to current recommendations, a multimodal approach is believed to be the gold standard for postoperative pain treatment in children [2,4]. However, surgeons' approach to postoperative pain management in children has not been studied in our institution. Thus, this survey was conducted to appraise surgeons' perspectives and practice of paediatric postoperative pain assessment and management at a tertiary health facility in southern Nigeria. The information that will be generated from this study will be a starting point for targeted improvement efforts.

2. METHODS

The study was conducted at the University of Port Harcourt Teaching Hospital (UPTH), a

tertiary care facility located in the southern part of Nigeria, and a major referral centre for patients in Rivers State and its environs.

It was a cross-sectional survey carried out between September and December 2019. Participants of this study were surgeons/trainees in departments/units where paediatric patients undergo both major and minor surgeries, which include the various units in the Departments of Surgery, Orthopedics, Ear-Nose and Throat (ENT), Ophthalmology, Dentistry and Accident and Emergency. They included consultants, resident doctors (both senior and junior) and medical officers from the Accident & Emergency Department. Junior residents and medical officers mainly carry out minor surgeries.

At the UPTH, postoperative care is provided by the anaesthesia team at the intensive care unit for patients who require postoperative intensive care, while the surgical team provide care for patients who are transferred to surgical wards after recovery.

The instrument used to obtain information was a semi-structured and self-administered questionnaire, which was distributed during their various departmental activities. Respondents were asked to fill out the questionnaires at the end of their day's work and a 1-week period was established for the questionnaires to be returned.

The questionnaire was organized to provide a profile of personal and professional data from respondents, their attitude towards and practice of postoperative pain management for children, satisfaction with the current postoperative pain management, and availability of established protocols/guidelines. Respondents could tick more than one option per question, where applicable. A pilot study was first carried out with the questionnaire to ensure validity and clarity of included questions.

Data were entered into a Microsoft Excel Spread Sheet and analysed using SPSS version 20.0. The responses of consultants and senior residents were compared. Chi-square test was used to test for significance. $P < 0.05$ was considered statistically significant. Results are presented using tables and texts.

3. RESULTS

Out of 100 questionnaires distributed, 79 (79% response rate) were returned. Among respondents were senior registrars (n=32, 40.5%), junior registrars (n=22, 27.9%) and consultants who constituted a quarter of them (n=19, 24.1%) (Table 1). Two-third of respondents (n=51, 64.6%) had more than 10 years working experience post-graduation and consultants constituted 72% of those with more than 15 years working experience. Post graduate training was the source of knowledge of pain management in children for 66 (83.5%) respondents, while 5(6.3%) had attended technical courses. Sixty-five (82.3%) respondents did not have an established protocol for postoperative pain management in their departments/units.

In the first 24 hours following surgery, 39 (49.5%) respondents would assessed pain often, while 30 (38%) would assessed it when the patient complained or when he/she was seen to be having pain (n=5, 6.3%) (Table 2). Involving parents/caregivers to assess postoperative pain was the most common strategy used by respondents (n=69, 87.3%), followed by consideration of the child's behaviour (n=62, 78.5%), while a third of them (n=27, 34.2%) based their assessment on physiologic parameters. Most respondents (n=67, 84.8%) do not make use of any pain assessment tools.

Forty-seven (59.5%) respondents always prescribed postoperative analgesics for their paediatric patients and 22 (27.8%) did so often (Fig. 1). Non-pharmacologic strategies for postoperative pain management were applied/prescribed sometimes by 20 (25%) respondents, and 20 (25%) did so rarely. Many respondents (n=66, 83.5%) had never prescribed morphine for postoperative analgesia to children while 11(13.9%) rarely prescribed it.

Half of the respondents (n=39, 49.5%) do not apply/ prescribe any non-pharmacological

Table 1. Characteristics of the study population

Characteristics	Frequency	Percentage
Rank/Designation		
Consultant	19	24.1
Senior Registrar	32	40.5
Registrar	22	27.9
Medical Officers	4	5
No answer	2	2.5
Total	79	100
Years of work experience		
< 5 years	8	10.1
5-9 years	20	25.3
10-14 years	33	41.8
≥ 15 years	18	22.8
Total	79	100.0
Source of knowledge of paediatric pain management		
Post graduate training	66	83.5
Self-development	33	41.8
Undergraduate training	32	40.5
In-service training	9	11.4
Technical course	5	6.3
Others, included seminars	1	1.3
Availability of an established protocol for postoperative pain management in the departments/units		
Yes	13	16.5
No	65	82.3
I don't know	1	1.2
Total	79	100

Table 2. Respondents’ practice of postoperative pain assessment for children

Characteristics	Frequency	Percentage
Frequency of assessment of pain in postoperative first 24 hours		
Often	39	49.4
At patient's complaint	30	38
When patient is seen to be having pain	5	6.3
Rarely	2	2.5
Not usually assessed	3	3.8
Total	79	100
Strategies used to assess postoperative pain in children		
Involve parents/caregivers to find out if child is in pain	69	87.3
Take child's behaviour into consideration	62	78.5
Use of physiologic parameters	27	34.2
Developmentally appropriate self-report pain tools	13	16.5
Commonly used tools to assess postoperative pain in children in last 3 months preceding the survey		
None	67	84.8
Visual analogue pain rating scale	5	6.3
FLACC	4	5.1
Faces pain scale	2	2.5
Numerical pain rating scale	2	2.5

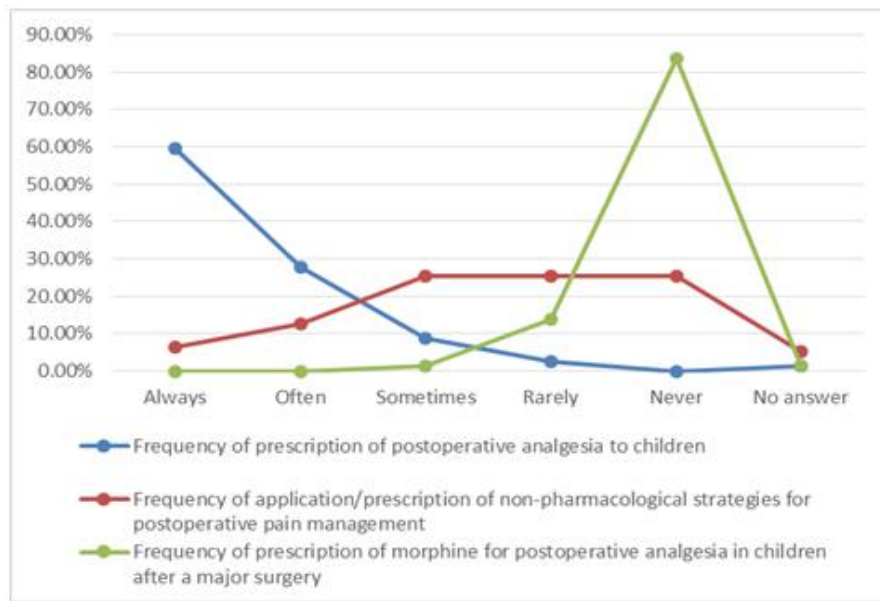


Fig. 1. Attitude towards postoperative pain management for children

methods of pain management for postoperative pain in children. However, commonly applied ones include massage (n=13, 16.5%), soothing food (n=12, 15.1%), positioning (n=9, 11.4%), distraction (n=9, 11.4%) and psychotherapy (n=9, 11.4%) (Table 3).

Paracetamol was the most common analgesic drug prescribed for postoperative pain in all age groups, followed by diclofenac and pentazocine,

for the younger age groups. For older children, paracetamol was followed by pentazocine than diclofenac (Table 4). Fourteen (17.7%) respondents do not prescribe postoperative analgesia to newborns.

Commonly used analgesics after major surgery for neonates were paracetamol- intravenous (IV) was the preferred route, diclofenac-suppository was preferred and pentazocine- intramuscular

(IM) route was preferred to IV. More senior registrars prescribed no analgesia for postoperative pain in newborns than consultants, though the difference was not statistically significant. However, consultants significantly used IM pentazocine compared to senior registrars ($P= .01$) (Table 5).

Compared to consultants, senior registrars were significantly not satisfied with the current postoperative management of pain in children ($P= .02$) (Fig. 2).

4. DISCUSSION

Certain factors have been recognised as possible reasons for the inadequate postoperative pain management in children, which include among others reluctance to address this issue, belief that children do not feel or tolerate pain better than adults, or noncompliance with the available guidelines for the treatment of postoperative pain [4,6]. The present study showed a lack of an established protocol in many units/ departments surveyed.

This is similar to a previous report in Nigeria, in which paediatric surgeons from several institutions in the country were respondents [7].

The provision of optimal pain management requires accurate and ongoing reassessments using appropriate tools to determine the adequacy of pain relief and detect adverse events early [2]. The gold standard for assessment of pain remains self-report which unfortunately, can only be applied in children with sufficient cognitive and communication ability [2,8,9]. In this study, most respondents reported that they do not use any pain tools to assess postoperative pain in children, which has also been reported previously, despite existing guidelines recommending that clinicians use a validated pain rating tool to track responses to postoperative pain treatments and adjust treatment plans accordingly [2,9]. Respondents in this study rather involved parents to ascertain if the child is in pain, which is commendable as parents' involvement is a recognised important step in assessment of pain in children, or they based their judgement on the child's behaviour, a

Table 3. Commonly applied/prescribed non-pharmacological methods of pain management for children

Non-pharmacological methods	Frequency	Percentage
None	39	49.3
Massage/cuddling/parental comfort	13	16.5
Soothing food: soft diet, ice cream	12	15.1
Positioning	9	11.4
Distraction	9	11.4
Psychotherapy	9	11.4
Cold compress	7	8.8
Breastfeeding	6	7.6
Warm compress	4	5
Pacifier / glucose	3	3.8
Relaxation	2	2.5

Table 4. Commonly prescribed postoperative analgesia for major surgery for different age groups

	Newborns (%)	1-12 months (%)	2-5 years (%)	6- 10 years (%)	11-15 years (%)
None	14 (17.7)	7 (8.8)	2 (2.5)	2 (2.5)	2 (2.5)
Paracetamol	51 (64.5)	52 (65.8)	52 (65.8)	51 (64.5)	45 (57)
Ibuprofen	1 (1.3)	6 (7.6)	7 (8.8)	7 (8.8)	9 (11.3)
Diclofenac	13 (16.5)	18 (22.7)	31 (39.2)	38 (48)	41 (51.8)
Pentazocine	11 (14)	18 (22.7)	35 (44.3)	41 (51.8)	45 (57)
Tramadol	1 (1.3)	1 (1.3)	1 (1.3)	1 (1.3)	1 (1.3)
Codeine	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.3)
Barbiturate	1 (1.3)	1 (1.3)	0 (0)	0 (0)	0 (0)
Morphine	1 (1.3)	1 (1.3)	2 (2.5)	3 (3.8)	2 (2.5)
Local wound infiltration	1 (1.3)	1 (1.3)	1 (1.3)	0 (0)	0 (0)
No answer	15 (19)	15 (19)	15 (19)	15 (19)	15(19)

Table 5. Commonly used postoperative analgesics for newborns

	Consultants (n=19)	Senior registrars (n=32)	Chi-square (p-value)
None	2 (10.5)	8 (25)	1.58 (0.2081)
Paracetamol, PO	7 (36.8)	3 (9.3)	5.70 (0.0169)*
Paracetamol, im	4 (21)	3 (9.3)	1.37 (0.2413)
Paracetamol, iv	8 (42)	12 (37.5)	0.10 (0.7446)
Paracetamol, supp	1 (5.3)	0 (0)	1.71 (0.1899)
Ibuprofen, PO	0 (0)	1 (3)	0.60 (0.4364)
Diclofenac, sup	4 (21)	6 (18.7)	0.04 (0.8412)
Diclofenac, im	2 (10.5)	2 (6.2)	0.30 (0.5828)
Pentazocine, im	5 (26.3)	1 (3)	6.17 (0.0129)*
Pentazocine, iv	0 (0)	3 (9.3)	1.89 (0.1689)
Tramadol, im	1 (5.3)	0 (0)	1.71 (0.1899)
Morphine, iv	1 (5.3)	0 (0)	1.71 (0.1899)

*Responses are statistically significant

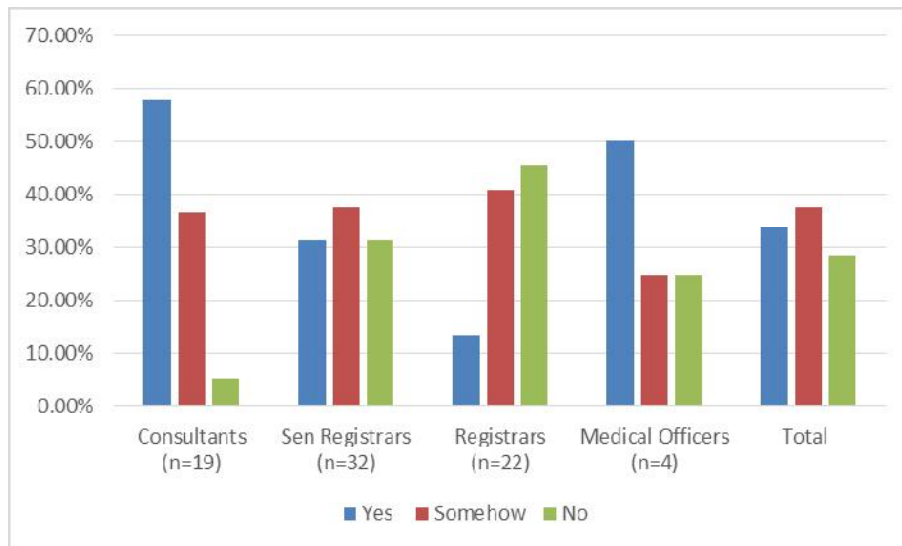


Fig. 2. Satisfaction with current postoperative pain management for children

subjective means of assessing pain. In Pakistan, Shamim *et al* evaluated four behavioural pain rating scales for assessing postoperative pain in children aged between 3 and 7 years and recommended the use by parents, nurses, and doctors of the Face, Legs, Activity, Cry, Consolability (FLACC) scale, which assesses pain in non- or preverbal children, and incorporates five categories of behaviours [8]. Also in Togo, Sama *et al*, used three pain rating scales according to the age of patient including: Visual analogue scale (VAS), verbal rating scale (VRS) and comfort behaviour scale (CBS), and found that pain assessment during first 48 hours post-operatively is more important for children aged below 7 years than those aged 7-15 years [10]. It is possible that respondents in the present

survey are not aware of commonly used tools for assessing pain in children, or they are yet to appreciate their usefulness. However, no single pain assessment tools/method is perfect, thus a multifaceted approach inclusive of various methods has been recommended [1,11].

Multimodal analgesia, or the use of a variety of analgesic medications and techniques, including regional analgesia, combined with non-pharmacological interventions, has been recommended for effective postoperative analgesia in children [2,4,12,13]. The addition of non-pharmacological interventions which are generally considered to be safe, might result in additional effects consistent with the biopsychosocial model of pain. They include

among others physical modalities (acupuncture and related interventions, massage, cold therapy, localized heat, immobilization or bracing, etc), and cognitive-behavioural modalities (guided imagery and other relaxation methods, hypnosis, music, etc) [2].

Multimodal approach to care of paediatric postoperative pain has been documented in previous reports in Nigeria, Mali and Niger [9,14,15]. In the present survey, postoperative analgesia was always (60%) or often (30%) prescribed, while non-pharmacological strategies were less often applied, with massage/cuddling/parental comfort as the commonest modalities.

This is at disparity with the report of Nasir *et al* who found that most institutions in Nigeria practiced multimodal approach to postoperative pain therapy. Systemic analgesia with local wound infiltration (73%) and non-pharmacological interventions was commonly used with sucking/ breastfeeding as the commonest measures(73%) [7]. Bridging these gaps in knowledge and practice would require training of healthcare providers on best practices of postoperative pain care.

Opioids are the most effective analgesics in paediatric care, and morphine is the most widely used one for the treatment of paediatric postoperative pain, though there are concerns about adverse effects, respiratory depression in particular [2,4]. In this study pentazocine, a synthetic opioid with an analgesic efficacy of 25-50% of that of morphine, was the opioids mostly used, with IM route preferred over the IV, while local wound infiltration was minimal. The use of IM route for administration of analgesics to manage postoperative pain in children is discouraged. It causes pain, is associated with unreliable absorption resulting in inconsistent postoperative analgesia, and has no clearly shown advantages over other routes of drug administration, IV route is considered the most reliable [2,4]. Though also an opioid and widely used in our country for treatment of severe pain, pentazocine is not among the recommended drugs for the treatment of acute pain in children [7,14]. It is noteworthy that most respondents (83.5%) had never prescribed morphine for postoperative analgesia to children while 13.9% did so rarely. This has been reported in previous studies and may be due to the fear of side effects which can be reduced with appropriate monitoring [7,9,14,16].

It has been documented that preterm neonates feel more pain than older children, and have increased morbidity and mortality when their pain is poorly controlled [9,17]. In developed countries, most (84%) neonates receive opioid analgesia; only 35% receive non-opioid analgesics following major surgery [18]. In the present study, it is noteworthy that 17% of respondents do not prescribe postoperative analgesia to newborns, thereby exposing them to various complications of unrelieved acute pain.⁴ Despite its availability, morphine is minimally or not used for routine postoperative analgesia in neonates, similar to the report of Nasir *et al* [7]. It is possible the belief that newborns do not feel pain and fear of side effects guided this practice. However paracetamol, the most widely used non-opioid analgesic, can be used in intravenous and rectal forms in newborns' postoperative care.

In this study, senior registrars who are trainees, were significantly not satisfied with the current postoperative management of pain in children compared to consultants, their trainers ($P= .02$). This is of concern as dissatisfaction is a strong drive for change. Whereas Nasir *et al* reported a higher proportion of respondents who were not satisfied [7].

5. CONCLUSIONS

This study revealed gaps in assessment and treatment of postoperative pain in children, including lack of use of non-pharmacologic modalities. These findings show that the practice in our institution falls short of the recommended multimodal approach to paediatric postoperative pain care. This information will be used as baseline data and a first step in the drive for practice change in our institution. Subsequent steps include among others, development of standard protocols for our institution, which is already on-going, provision of necessary tools and training on their usage and a post intervention study to appraise compliance with the recommended protocols. Institutional commitment is essential to ensure quality improvement in paediatric post-operative care.

CONSENT AND ETHICAL APPROVAL

Approval for the study was obtained from the Ethics Committee of the hospital and consent for participation was sought and obtained from the respondents.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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