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# Analgesia for procedural pain: Current practice among Nigerian paediatricians

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## Abstract

**Background:** Minor procedures such as venepuncture and lumbar puncture among others are routinely performed in the neonatal intensive care units (NICUs) and paediatric wards. These procedures are accompanied by varying degrees of pain which, if not addressed, can lead to undesirable physiological, cardiovascular, respiratory, hormonal, metabolic and behavioural responses. This study evaluated the current strategies for reducing procedural pain in children in Nigeria.

**Methods:** This was a questionnaire-based, cross-sectional random survey of the current practice of analgesic techniques for procedural pain among 240 respondents out of 700 consultant paediatricians and residents who attended the annual Paediatric Association of Nigeria Conference in 2018.

**Results:** The male-to-female ratio was 1:1.3, the mean age of the respondents was  $38.28 \pm 7.36$  years and the median year of practice was 10 years. Of the surveyed respondents, consultants and trainees constituted 40.8% and 59.2%, respectively, whereas 46.2% and 51.3% of them assessed pain and routinely administered analgesia to treat procedural pain, respectively. Breastfeeding and topical analgesic agent were prescribed by 18.3% and 12.9% of the respondents, respectively. Pain of venous access and lumbar puncture were treated by 38.8% and 19.6% of the respondents, respectively. Only 13.3% of the respondents have institutional guidelines for pain assessment and treatment in their practice locations.

**Conclusion:** The survey showed that, even though a sizeable proportion of paediatricians do assess pain and provide some form of analgesia for procedural pain, there is a lack of institutional pain treatment guidelines in most hospitals attending to the medical needs of children in Nigeria.

**Keywords:** Children, minor procedures, Nigeria, paediatricians, pain, pain reduction strategies

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## INTRODUCTION

Minor procedures are routinely performed in neonatal intensive care units (NICUs) and paediatric wards for drug administration, fluid infusion, blood transfusion or to collect

samples (blood, bone marrow aspirate, cerebrospinal fluid and peritoneal fluid) for laboratory investigations. A study has estimated that sick and preterm neonates could be subjected to an average of  $14 \pm 4$  procedures per day

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in the NICUs;<sup>1</sup> such procedures are usually painful and discomforting to the young patients, especially in the setting of serious illnesses. This scenario constitutes a significant pain burden to the patients and adversely affects the immediate and future well-being of the children. Untreated noxious stimuli in neonates and infants have been observed to cause negative physiological, cardiovascular, respiratory, hormonal, metabolic and behavioural effects.<sup>2-4</sup> Reports had conclusively corroborated the existence of fully developed basic somatosensory pathways and anatomical, physiological and neurochemical structures necessary for pain perception weeks before birth in viable preterm neonates.<sup>5,6</sup> Evidence from clinical and animal studies supports the presence of a matured peripheral, spinal and supraspinal afferent pain transmission by 29 weeks of gestation.<sup>3,4</sup>

Given the high number of procedures, neonates and children are subjected to in NICUs and paediatric wards; offering pre-emptive analgesia may avoid the deleterious effects of procedural pain. For decades, many of the surveys that were conducted to determine the frequency of the use of pain assessment tools and pain reduction techniques in different countries revealed little adherence to evidence-based strategies of reducing procedural pain in neonates and infants.<sup>7-10</sup> In recent years, however, improved adherence to pain treatment guidelines has been reported in France,<sup>11</sup> Italy<sup>12</sup> and Sweden.<sup>13</sup> Conversely, procedural analgesia is not routinely practiced in most emergency paediatric (EP) and NICUs in most resource-challenged countries due to lack of national policy/guidelines on pain assessment and management in neonates and children.

This survey evaluated the current strategies of attenuating procedural pain in the EP and NICUs in Nigeria. Factors that hindered provision of pain relief for procedural pain in children were also highlighted, and recommendations on measures to improve pain reduction methods for procedural pain in Nigeria were suggested.

## METHODS

Following the institutional ethical approval, this descriptive cross-sectional survey was carried out at the annual Paediatricians Association of Nigeria Conference held in January 2018. Out of the 700 paediatricians and residents who attended the conference, 240 practitioners consented to participate in the study. The sample size was far in excess of the 100 originally calculated. A self-administered questionnaire, based on previous surveys<sup>8,14</sup> carried out in Australia and Italy, was adapted according to the national guidelines for pain management<sup>15</sup> and distributed to be

filled by all the 240 participants at the paediatric conference. Ethical approval was obtained for the study from the University of Ilorin Teaching Hospital's Ethical Review Committee. Anonymity of all the enrolled attendees was maintained, and completion of the questionnaire by the participants was taken as consent to participate in the study. Information obtained included sociodemographic characteristics and location of practice. Respondents also provided answers to questions on the availability of NICU at their centres, assessment of pain severity in their patients and the pain assessment tools they use routinely. The frequency of application (always, often, occasionally and never) of analgesic techniques during the following procedures, namely venepuncture, intravenous, intramuscular or subcutaneous injections and lumbar puncture, was also recorded. Responses on the use of oral sweet solution, non-nutritive sucking (NNS), a combination of sweet solution and NNS, breastfeeding, topical anaesthetic agent and 'others' by the attendees were also sought. Availability of policy guidelines on pain management at the locations of practice of conference attendees was also requested.

Data were analysed by the Statistical Package for the Social Sciences software version 20.0 (SPSS Inc., Chicago, IL, USA). The results were presented as numbers and percentages.

Associations between categorical variables were determined by Fisher's exact test, and calculation of means and standard deviation for continuous variables was performed. All reported *P* values were two sided and significant for *P* < 0.05.

## RESULTS

A total of 240 paediatricians of different cadres and experience working in paediatric units from all the six geopolitical zones of Nigeria participated in the study. The male-to-female ratio was 1:1.3, the mean age of the respondents was  $38.28 \pm 7.36$  years and the mean year of practice was  $11.22 \pm 7.45$  with a median of 10 years. Of all the surveyed respondents, consultants constituted 40.8%, whereas the trainees (residents) constituted 59.2%. North-Central (NC) geopolitical zone was the practice location of the majority (56.7%) of the surveyed physicians [Table 1]. Ninety-five per cent of the surveyed physicians had NICU and paediatric wards in their practice locations, with only 5% without NICU [Table 1].

Only 46.2% of the respondents reported using pain assessment tools for painful ward procedures. The two most

frequently used pain scales were Wong-Baker FACES® pain rating scale (17.5%) and FLACC scale (15.8%). FLACC scale is a validated scale that assesses the following parameters: Face, Legs, Activity, Cry and Consolability, whereas FACES scale relies on the observed varying facial grimacing and crying tone to pain stimulus. Venepuncture, lumbar puncture and intramuscular injections were procedures in which pain scales were most frequently used at 14%, 12% and 8%, respectively. Out of the surveyed respondents, 39 consultants (39.8%) and 71 residents (50.7%) reported routine assessment of pain in children. The study revealed that 44 out of 104 (42.3%) male respondents and 68 out of 136 (50%) female respondents always, often or occasionally assess pain in this study. Similarly, 48 out of 111 (42.3%) respondents of >10 years of practice and 64 out of 129 (49.6%) respondents of <10 years of practice assessed pain in children. Of the 98 consultants and 140 residents that participated in the survey, 50 (51%) and 60 (42.9%) reported use of analgesic interventions for painful ward procedures in children, respectively,  $P = 0.25$ . Fifty-five out of 111 (49.6%) respondents of >10 years of practice and 56 out of 129 (43.4%) respondents who were of <10 years of practice used analgesia for painful ward procedures,  $P = 0.47$ . There was no institutional policy on analgesics for painful ward procedures in the practice locations of 86.7% of the respondents.

As regards methods of providing pain relief, 123 out of the 240 (51.3%) respondents used some form of pain reduction strategies for procedural pain in children. Breastfeeding and application of topical analgesic agent were the most frequently used pain reduction strategies for procedural pain by the respondents i.e., 44 out of the 240 (18.3%) and 31 out of the 240 (12.9%), respectively [Table 2]. Analgesic technique was mostly provided for venous access by the respondents (38.8%). This was followed by lumbar puncture and intramuscular injections by 19.6% and 10.8% of the respondents, respectively. However, the answers were 'always' or 'often' in 12.6%, 6.6% and 3.8% of the respondents for venepuncture, lumbar puncture and intramuscular injections, respectively [Table 3].

Breastfeeding was the most preferred method to pacify the patients for venous access and intramuscular injections at 14.2% and 4.6%, respectively, whereas application of topical anaesthesia was the most used pain reduction intervention for lumbar puncture at 7.5%. Even though breastfeeding can be regarded as a simple and natural form of analgesic intervention to relief pain during minor procedures in children, abysmally low 9.6%, 5.4% and 3.3% of the respondents used it on an occasional basis for venous access, lumbar puncture and intramuscular

**Table 1: Sociodemographics and baseline characteristics of the respondents**

Characteristics	Subgroups	Frequency (%)
Age (years), mean±SD		38.3±7.4
Sex	Male	103 (42.9)
	Female	137 (57.1)
Cadre of respondents	Consultants	98 (40.8)
	Residents	142 (59.2)
Years of practice	<10	129 (53.75)
	>10	111 (46.25)
Mean (median) years of practice		11.2±7.45 (10)
Practice locations	NC	136 (56.7)
	NW	22 (9.2)
	NE	13 (5.4)
	SE	20 (8.3)
	SW	28 (11.7)
	SS	21 (8.75)
Pain policy guidelines available	Yes	208 (86.7)
	No	32 (13.3)
Pain assessment tools used	WBFS	42 (17.5)
	FLACC	38 (15.8)
	NRS	3 (1.25)
	VRS	5 (2.1)
	Others	31 (12.9)

\*FLACC: Face, Legs, Activity, Cry, Consolability, WBFS: Wong-Baker FACES® Scale, NRS: Numeric Rating Scale, VRS: Verbal Rating Scale, NC: North-Central geopolitical zone, NW: North-West geopolitical zone, NE: North-East geopolitical zone, SE: South-East geopolitical zone, SW: South-West geopolitical zone, SS: South-South geopolitical zone, SD: Standard deviation

**Table 2: Analgesic techniques used for minor procedures by paediatricians in Nigeria**

Analgesic techniques	Number of respondents (%)
STS	12 (5.0)
Non-nutritive solution	11 (4.6)
Combined STS and NNS	11 (4.6)
BF	44 (18.3)
TA	31 (12.9)
Others	14 (5.8)
No analgesia	117 (48.75)
Total	240 (100)

\*STS: Sweet-tasting solution, NNS: Non-nutritive sucking, BF: Breastfeeding, TA: Topical agent

injections, respectively. Oral glucose solution was the least used method for pacifying children by the respondents during venous access, intramuscular injection and lumbar puncture at 1.25%, 1.25% and 4.6%, respectively. Apart from breastfeeding and topical analgesic agents, NNS was used as a form of analgesic intervention occasionally for intramuscular injection, lumbar puncture and venous access by 1.25%, 2.9% and 5.4% of respondents, respectively. Few physicians administered combinations of oral glucose solution and NNS for intramuscular injection, lumbar puncture and venous access at 0.4%, 1.25% and 2.1%, respectively [Table 3].

On the factors that hindered the provision of analgesia for procedural pain in children, unavailability of analgesic techniques (by 48 respondents), misconception that analgesia was not necessary (by 37 respondents) and fear of



**Table 3: Pain reduction practices of Nigerian paediatricians**

	STS	NNS	STS/NNS	BF	TA	Total (%)
Intravenous injection						
Always	0	0	0	2	1	3 (1.25)
Often	0	5	2	9	5	21 (8.75)
Occasional	6	0	5	6	12	291 (2.1)
Total (%)	6 (2.5)	5 (2.1)	7 (2.9)	17 (7.1)	18 (7.5)	53 (22.1)
Lumbar puncture						
Always	0	0	0	0	0	0 (0)
Often	0	2	1	3	4	10 (4.2)
Occasional	3	1	2	13	1	20 (8.3)
Total (%)	3 (1.25)	3 (1.25)	3 (1.25)	16 (6.67)	5 (2.1)	30 (12.5)
Intramuscular injection						
Always	0	0	0	2	0	2 (0.83)
Often	0	1	0	1	0	2 (0.83)
Occasional	3	2	1	8	8	22 (9.2)
Total (%)	3 (1.25)	3 (1.25)	1 (0.42)	11 (4.6)	8 (3.3)	26 (10.8)

\*STS: Sweet-tasting solution, NNS: Non-nutritive sucking (pacifier), BF: Breastfeeding, TA: Topical agent

adding to the cost of care (by 18 respondents) were among the reasons for respondents' non-use of analgesia for minor procedures. Others have varied reasons for non-use of pain-relieving interventions [Table 4]. Non-use of analgesic strategies was noticed to be higher among younger respondents, residents and physicians with <10 years of practice and among male respondents, but the differences were not statistically significant ( $P = 0.29$ ,  $P = 0.25$ ,  $P = 0.47$  and  $0.29$ , respectively) [Table 4].

## DISCUSSION

This study showed that less than half (46.2%) of the respondents routinely assessed pain in children and about half (51.25%) utilised one form of pain-relieving strategies or the other for procedural pain in children. However, majority (86.7%) of the participants had no institutional guidelines on pain management in their practice locations. The practice of pain assessment in neonates and children by the respondents in this study agrees with the evidence-based recommendations of other researchers;<sup>15-17</sup> they proposed that neonatal pain should be assessed with standardised and validated pain assessment scales. The use of validated tools for assessment of pain by 46% of the participants is lower than 68% reported by Gharavi *et al.*<sup>18</sup> who surveyed the analgesic techniques for procedural pains in NICUs across Switzerland, Austria and Germany. However, our finding is substantially higher than 6% and 33% reported in Australia<sup>8</sup> and Italy, respectively.<sup>14</sup> It is highly probable that our modestly high percentage may not be unconnected with the recent nationwide workshop (Pain-Free Hospital Initiative) on pain management in Nigeria brought about by the Treat the Pain programme of the American Cancer Society.

A report recommended that all hospitals that provide care to neonates should manage all types of pain in

**Table 4: Hindrance and predictors of use of analgesic interventions by respondents**

Variables	Frequency of occurrence	Percentage/P
Hindrance to use	Frequency (n=240)	Percentage
Non-availability	48	20
Not necessary	37	15.4
Extra cost	18	7.5
Pain is bearable	11	4.6
Unknown benefit	4	1.7
Promoters of use	Percentage compared	P
Females versus males	48.5 versus 42.3	0.29
Residents versus consultants	57.1 versus 49	0.25
<10 versus >10 years of practice	56.6 versus 50.4	0.47

newborns (procedural or otherwise) based on written guidelines and protocols.<sup>15</sup> This is to improve the guaranteed clinical care of neonates and prevent the negative effects of pain on long-term development and behaviours in newborns. However, only 13.3% of our respondents manage pain with reference to any form of institutional pain treatment protocol in their practice locations. This agrees with the findings of previous surveys of 15% in Australia,<sup>8</sup> 25% in Italy<sup>12</sup> and 43% in Austria, Germany and Switzerland.<sup>18</sup> Some other surveys reported even higher rates of availability of institutional pain management protocols.<sup>11,13,14</sup> Unlike in the other cited studies above, where pain assessment practices were proportional to the availability of pain management protocols, we observed a disproportional association between a relatively high pain assessment practice (46.2% of the respondents) and the very low rate of availability of institutional pain treatment protocol (13.3%) in our study. The low availability of pain management protocols in most of the practice locations in this study could be probably attributed to the lack of institutional will to accord pain management at a pivotal position in the clinical care of patients.

Unlike in the Codipietro *et al.*'s study<sup>14</sup> where NNS was the most used analgesic strategy for venepuncture (accounted for 7% of the forms of analgesia in neonatal units), our study showed that breastfeeding was the most frequently used analgesic intervention for venous access, intramuscular injection and lumbar puncture. However, NNS (pacifier) and use of topical agents were the most commonly used methods of achieving pain relief for venous access in this study, which is similar to the reported findings by Codipietro *et al.*

Although a study has established the pain-relieving effect of administration of a sweet-tasting solution 2 min before minor procedures,<sup>16</sup> none of the respondents used it for venous access, intramuscular injection or lumbar puncture procedure in our study. This contrasts with the finding from a study in which sweet-tasting solution constituted 23.3% of analgesic techniques used for minor procedures in some neonatal units.<sup>14</sup>

Despite a published literature<sup>19</sup> supporting the use of a combination of NNS (pacifier) and sweet-tasting solution as a more effective method for achieving venous access than NNS alone, intramuscular injection and lumbar puncture, very few paediatricians in our study used it.

A study<sup>20</sup> has shown that half of all emergency department visits are for painful conditions, with 78% of patients experiencing pain during their stay. Most of these patients are frequently treated with inadequate analgesia.<sup>21</sup> The reasons for this inadequacy have been attributed to fear of adverse reactions, difficulty in the recognition of pain, fear of opioid dependency, fear of overprescribing and misperception that neonates and young children do not experience pain as intense as adults.<sup>22,23</sup>

The World Health Organization and other multiple professional pain societies mandate that optimal pain management should be a fundamental human right.<sup>24,25</sup> This is to avoid the negative physical and psychological consequences of untreated pain in children.<sup>26</sup>

It has been reported that infants who were circumcised without analgesia experienced increased distress during routine immunisation at the age of 4–6 months when compared with uncircumcised infants or those who were pre-treated with topical local anaesthetics. Sedation and analgesia are components of standard care for procedural pain in today's practice of anaesthesia.<sup>3</sup> Pain control in paediatrics is generally inadequately addressed due to a number of different reasons such as fear of oversedation, alteration of physical findings or underestimation of

patient needs.<sup>27</sup> These are at variance with the reasons of unavailability of analgesic techniques, misconception that analgesia was not necessary and fear of additional cost of care observed in the present study. It is a fact that most of the drugs used for sedation and analgesia can depress the central nervous system or respiratory system. However, choice of appropriate drugs, correct dosages and their usage in the safe clinical setting will reduce some of these complications.

In 2001, the American Academy of Paediatrics developed the international evidence-based guidelines for the prevention and treatment of neonatal pain. The guidelines consist of pharmacological and non-pharmacological interventions for pain management in the NICUs such as the use of NNS (pacifiers), sweet-tasting solutions, mother's skin-to-skin contact, swaddling and containment in minor diagnostic performances.<sup>15,16</sup> Thus, paediatricians are mandated to prevent procedural pain in EP and NICUs by routine use of any of these methods to avert procedural pain and to ensure the delivery of quality care to paediatric patients. The findings from our study revealed huge inadequacies in pain assessment, fair use of pain reduction strategies and lack of institutional policy/guideline on pain management in paediatric practice in Nigeria.

The limitation of this study is that more than 50% of the respondents were from the NC geopolitical zone of the country, and this may affect the generalization of the results. However, the results can be assumed to be the true reflection of the current practice of analgesia for procedural pain in children given the fact that the survey was carried out at the nation's capital which is presumptively a melting pot for paediatricians of different ethnic backgrounds from across Nigeria.

## CONCLUSION

This study shows that only over half (51.3%) of the respondents used some forms of pain reduction strategies for procedural pain in children, with breastfeeding being the most commonly used method to pacify children during minor procedures. Moreover, less than half (46.2%) of the surveyed paediatricians used pain assessment tools in children during ward procedures.

We recommend the setting up of a national task force to formulate policy on paediatric pain management and regular workshop on pain assessment and treatment in all healthcare facilities that cater for the health of newborns and children in the country.

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## Conflicts of interest

There are no conflicts of interest.

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