Niger J Paed 2015; 42 (1): 28 – 33

ORIGINAL

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Management of childhood pain and healthcare providers' willingness to use topical anaesthetic cream for minor procedural pain in Nigeria

DOI:http://dx.doi.org/10.4314/njp.v42i1.7

Accepted: 17th October 2014

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Abstract: *Objective:* To determine providers' willingness to use (WTU) topical anaesthetic cream (TAC) to alleviate childhood pain. This information will be useful for successful implementation of TAC in Nigeria.
Subjects and Methods: The study was undertaken in hospitals in southeast Nigeria. Interviewer-administered questionnaire was used to collect information: on the providers' preferred waiting time and their WTU TAC. Likert scale was used to assess the providers' level of uneasiness when performing painful procedures and their WTU the TAC. Multiple regression analyses were performed to measure the relationship of WTU with the different independent variables, after creating a binary option for some variables.
Results: Providers surveyed were 232. Majority (94.8%) wanted the pain alleviated and 87.9% had made some attempts to alleviate the pain. Only one respondent (1%) knew about TAC, but none had used it before. Over 94% of the respondents were WTU TAC. The mean maximum preferred waiting time was 37.03 minutes. Many (68.8%) were concerned about the prolonged waiting time required and 19.8% and 12.5% with its availability and affordability respectively. In linear multivariate analyses, WTU was not statistically associated with designation, age, average weekly procedure and scale-rating of the childhood pain ($p > 0.05$).
Conclusion: The WTU TAC was high, but the mean time willing to wait was lesser than mean recommended time of 45 minutes. If this latter limitation is circumvented, it may aid implementing the use of TAC in routine pediatric care.

Key words: Nigeria; Willingness to Use; Topical Anaesthetic Cream; Providers.

Introduction

Painful procedures are experienced by millions of children worldwide[1]. In the developed countries, it is a common practice to use topical anaesthetic cream (TAC) to alleviate pain amongst children attended to in health facilities[2]. But the situation is different for children in middle and low income countries, where pain have gone on unattended.

According to the framework developed by the World Health Organization for the assessment of performance of health system, quality of health, fair-financing, and responsiveness are the main components[3]. Amongst these three goals, the latter has continually been overlooked. It is one of the expectations of mothers that the providers handling their children should live up to their responsibility of effective management of the pain their children suffer[4]. Although most mothers in a study by Parvez et al were unaware that TAC can be used to alleviate pain, but they were confident that their healthcare providers' practice was in the best interest of their children[5]. These caregivers were willing to comply with any management plan without any doubt on the completeness of such treatment plan[5].With regards to management of childhood pain, most healthcare providers practicing in resource poor countries have continued to fail in this aspect, essentially due to the limited option available to choose from with regards to management of childhood pain. Those that have attempted to do so relied on the use of less effective non-pharmacologic strategies, such as distraction or pacifying.

In the recent past years, many new introduction that can achieve anaesthesia of skin principally by applying a topical anaesthetics have been introduced. The commonest among them is the Eutectic Mixture of Local Anaesthetic (EMLA), which is suitable for usage in both adults and children, with proven safety and efficacy[6]. The EMLA cream contains 5% pure mixture of two anaesthetics, lidocaine 2.5% and prilocaine 2.5%. When applied on the skin, it achieves anaesthetic on the portion of the skin applied to in about 30 minutes[7,8] and it is widely used in developed countries. This has been found to be effective.

Despite increasing evidence on the efficacy of TAC in reduction of pain associated with minor procedures,[9,10] and its safety,[11]its knowledge, as well as its usage in most sub-Saharan countries such as Nigeria was poor. These gaps in both knowledge and practice need to be obliterated. Since reduction in the incidence of pain children suffer from planned procedures, will both improve the report of illness by children, and also reduce the anxiety healthcare providers suffer when discharging their duties.

In order to ensure a successful and adept introduction of TAC in paediatric practice in these areas, there is need to determine what providers feel about the pain children experience and their willingness to use the topical cream. This study was conducted to assess health care providers' willingness to use (WTU) TAC for minor painful procedures on children in Nigeria. Such data will be helpful in the design of an appropriate health policy with regards to childhood palliative care in Nigeria.

Materials and Methods

Study sites

The study took place in the University of Nigeria Teaching Hospital (UNTH) Enugu, Enugu State and Federal Medical Centre, Umuahia (FMCU) also referred to as Queen Elizabeth Specialist Hospital (QEH), Abia State. The Departments of Paediatrics of the two hospitals are well developed and have healthcare providers of all cadres. In both UNTH and QEH, pediatric related health care services are available throughout the week. Children seen at clinics that require venipuncture for blood for laboratory investigations are often attended to at the clinic areas by intern doctors or at the laboratory by phlebotomist/laboratory technicians. Those that are to receive intramuscular injections are attended to by the nurse either in the clinic or in the wards.

Study design and sampling

This study was a cross-sectional study of the healthcare providers who carry out any of these procedures: intravenous cannula insertion, venipuncture for blood sample, and any other form of therapeutic needle skin piercing procedures like intramuscular injections at least once in a week. The identified providers were assigned numbers and the number was use to comply a list. The providers that participated in the study were randomly selected from the list. The sample size of 220was calculated using Epi Info version 7 software. Based on using the power of 80%, 95% confidence level and the pilot survey that suggested a prevalence of 50% of the health care providers perform any of the stated painful procedures.

Data collection

A pre-tested semi-structured interviewer administered questionnaire was used to obtain data from providers over a period of four months, from February to May 2013. Data was collected about the providers' demographic characteristics, years of practice, and number of painful procedures performed in a week. The respondents were requested to subjectively rate their assessment of: the children's painful experiences, and their own feeling of uneasiness. Also data was collected on their attitudes on need to alleviate needle stick associated pain, their pain control strategies, knowledge of TAC, and their suggested time of action of the topical cream. They were then informed about the recommended time range of 30 – 60 minutes required for the cream to achieve local analgesia. They were asked to state the maximum time they can afford to wait between application of the cream and performing the procedure. After their knowledge of the time requirement, their willingness to use TAC was re-evaluated as well as their willingness to recommend the topical cream. TheLikert scale was used to evaluate their assessment of the pain experienced by these children, unease while performing painful procedures and their level of willingness to use the cream. The 5-point Likert scale was used to grade the level of pain experienced by these children into 5 ="very severe pain", 4 = "severe pain", 3 ="moderate pain", 2 ="mild pain", and 1 ="no pain". The 4-point Likert scale was used to grade the uneasiness into; 4 ="always", 3 = "usually", 2 ="sometimes" and 1= "never". The 5-point Likert scale was used for their willingness to use topical anesthetic cream into 1= "strongly not willing", 2 = "not willing", 3= "don't know", 4 = "willing" and 5 ="strongly willing". The open-ended questions were on their pain management strategies, reasons for rejecting TAC, and their comments on the topical cream.

Data analysis

The data was analyzed using SPSS version 20. The mean WTU was computed. In addition, the link of elicited WTU with different cadre of health care providers was examined. All the qualitative variables has option of "yes" or "no", which was entered as "1" for "yes" and "0' for 'no". The questionnaires were reviewed; thematic responses given to different qualitative open-ended questions were obtained, and entered as a binary response "1" if such response was given by a respondent and "0" if no such response was given." The unease variable was collapsed into a binary scale of "yes" or "no". (Yesunease: "always' and "usually"; not unease: "never" and "sometimes").The 5-Likert scale for pain

was collapsed into binary variables (painful: "very severe pain" "severe pain", and "moderate pain"; not painful: "mild pain" and "no pain"). A binary variable was obtained from their responses to the willingness to use TAC by grouping "strongly not willing" and "not willing" as unwilling; and "willing" and "strongly willing" as willing. In overall, the average score for the LIkert scale scores for rating of pains, level of uneasiness, and WTU TAC were obtained. Multivariate logistic regression analyses were performed to measure the effect: years of practice, perceived degree or severity of pain experienced by the children, degree of uneasiness, average number of painful procedures performed weekly, and their cadre: doctor, nurse and laboratory technician/ phlebotomist, as a health care provider on WTU TAC.

Ethics

The study received ethical approval from the Ethical Committee of University of Nigeria Teaching Hospital, Enugu. Informed written consent was collected from all the respondents.

Results

Respondents' demographic characteristics

Table 1 shows that out of 232 respondents, 41.4% (96/232) were doctors, 41.4% (96/232) were nurses and 17.2% (40/232) were laboratory scientists/technicians. The mean year of practice was 10.9 years. On average, 46.3 painful procedures were carried out by the providers weekly. About 91% (212) felt that the children experienced pain during the procedure. Majority (82.7%) of the respondents accepted to feeling uneasy while performing painful procedure.94.8% (220) were of the opinion that pain should be alleviated, while 87.9 (204) had made attempt in the past to alleviate such pain. The mean perceived pain experienced by these children was 2.9. Intramuscular injection (IM), venipuncture, and intravenous cannula insertion were the main procedures performed. Majority was of the opinion that pain should be alleviated; likewise, most did adopt some manoeuver to alleviate the pain.

Table 2 shows that amongst the things done by the respondents to alleviate the pains, counseling, petting, and distraction were the commonest. Only one (1/232) of the respondents knew about TAC. Majority of the respondents stated positive willingness to use the TAC. Amongst those that showed Willingness to Use (WTU) the TAC, 78.3% (n= 220) ranked their level of willingness high. The knowledge of the waiting time of 45 minutes did not cause much change to their willingness to use TAC.

The mean waiting time suggested by the respondents was 5.1 minutes. With knowledge of the waiting time of 45 minutes and 60 minutes, 58.6% (112/192) and 43.1% (82/192) were willing to wait for 45 minutes and 60 minutes respectively. The mean time they were willing to wait was 37.03 minutes.

Table 1: Demographic characteristics of the respondents and their disposition towards alleviation of pain.

Characteristics	Years	N= 232 (%)
Cadre		
Doctors		96 (41.4)
Nurses		96 (41.4)
Laboratory Scientists/Technician		40 (17.2)
Age: Mean (SD)		
20 – 29	35.96 (9.82)	
30 - 39		68 (29.3)
40 – 49		92 (39.6)
≥50		44 (19.0)
Years Practicing:		28 (12.1)
Mean (SD)	10.92 (10.51)	
Median	6.5	
Mode	1	
Range	1-34	
Procedures performed (n=262)*		
Intramuscular injection		164 (31.3)
Venipuncture		152 (29.0)
Intravenous cannula insertion		140 (26.7)
Immunization		68 (13.0)

*Some respondents gave more than one options.

Table 2: Modes of pain control by providers, their knowledge and willingness to use topical anaesthetic cream.

Characteristics	N = 232 (%)
What was done to alleviate the pain?	
Counseling	96 (41.2)
Petting	86 (37.3)
Cause distraction	78 (33.3)
Use only prominent vein	42 (17.6)
Massage the site	28 (11.9)
Use small needle	19 (7.9)
Analgesic (Acetaminophen)	10 (3.9)
Allow to breastfeed	4 (2.0)
Puncture very fast	4 (2.0)
Do you know about any Topical Anaesthetic cream? (*Yes*)	1 (1.0)
Will you be willing to Use Topical Anaesthetic cream? (*Yes*)	220 (94.8)
Will you be willing to use Topical Anaesthetic Cream? (*Before being informed that average time of action is 45 minutes*). [n= 220] (*Yes*)	172 (78.3)
Are you still willing to use Topical anaesthetic cream? (*After being informed that average time of action is 45 minutes*). [n=192] (*Yes*)	124 (64.6)
Doctors (43/124)	43 (34.7)
Nurses (57/124)	57(46.0)
Laboratory Scientists/Technicians (24/124)	24(19.3)

Table 3 shows that the most common reasons given by respondents that stated negative willingness to use TAC were: time wasting, and the pain experienced is mild. The major comments made by the respondents were:"there is need to reduce the time of onset of action", "the cream should be made availability", and "the cream should be made affordability".

Table 4 shows the regression analysis using the WTU TAC of the respondents as the dependent variable, that different cadre of health care provider, age and presence of uneasiness had negative coefficients. All the independent variables: cadre of profession, age, years of practice, average weekly procedures, perception of childhood pain, presence of uneasiness, were not statistically significant ($P > 0.05$).

Table 3: The respondents comment about topical anaesthetic cream

Characteristics	N (%)
*Reasons for not wanting to use Topical anaesthetic cream. [n = 28]**	
Time wasting	18 (64.3)
Pain is not much	12 (42.9)
Extra cost on patients	2 (7.1)
Suggestions made by the providers on Topical anaesthetic cream. [n = 192]	
Reduce the time of action.	132 (68.8)
Make topical cream available	38 (19.8)
Make it affordable	24 (12.5)
Create awareness	18 (9.4)
It is not necessary	16 (8.3)
Support its usage	12 (6.3)
Ensure sustainability	8 (4.2)

*Some gave more than one responses

Table 4: Ordinary regression analyses of WTU *vs.* independent variables

Variables	Measurement	*Coefficient.*	*P*-value
Doctors	1= Doctor 0 = if otherwise	-0.260	0.62
Nurses	1 = Nurse 0 = if otherwise	-0.170	0.72
Laboratory Scientist	1 = Lab. Scientist/Technician 0 = if otherwise	-0.042	1.00
Age (Child's age in years)	(< 1 years and ≥ 2 years).	-0.622	0.54
Years of Practice by the Provider.	(≤ 5years and ≥ 6 years)	0.157	0.88
Average weekly painful procedures.	(≤ 14 procedures and ≥ 15 procedures)	0.161	0.35
Perceived intensive of pain	(Painful and not painful)	0.023	0.88
Presence of uneasiness	(Unease and not unease)	-0.036	0.82

$P < 0.05$

Discussion

Children that sought care from healthcare facilities have continued to experience painful procedures. Intramuscular injection, venipuncture and intra venous cannula insertion were the commonest procedures. This is similar to what Wong *et al* reported in their study[12]. Apart from the pain of the illness that brought the child to the hospital, the pain of IV cannula insertion, venipuncture and IM injection is the next[13]. Interestingly, children that will undergo these minor painful procedures can be predicted according to Fein *et al*[14]. Therefore, implementation of any prior measure that has the capacity of alleviating these pains is practicable.

It was very insightful to find out that majority of the providers that perform these minor painful procedures felt some form of uneasiness, although the mean level of the uneasiness was relatively low. Nonetheless, the finding of this uneasiness amongst providers is a possible indicator that they are concerned about the pain these children go through. It has been shown that performing these minor procedures on children are always go hand-in-hand with non-cooperation and restiveness from these children warranting physical restraining[15] which these providers did not find too comfortable doing. Studies have shown both reduction in providers distress following educational intervention[16], as well as reduction in the duration taken to secure a venous access and increase in success rate amongst those that used TAC prior to the minor painful procedures[17]. This means that if the pain experienced by these children is alleviated, the practice of securing IV access or venipuncture for blood sample for investigations will be more successful and cause minimal distress to the providers. This is further confirmed by the high attestation from the providers on the need to alleviate the pain as reported in this study. Interestingly, the quest for alleviation of the pain is within reach. Studies have demonstrated that TAC can reduce the pain associated with intramuscular injection, intravenous cannula insertion and venipuncture[18,19,20].

The utilization of these TAC if introduced in this locality will not be a problem, since majority of the providers' surveyed in this study showed high willingness to use it. This provider's willingness to use together with the high parental/caregivers willingness to pay and stay for "painless" intravenous catheter placement that has been reported by other studies, Walsh *et al*[21]and Ughasoro *et al*[22]. In the study by Ughasoro et al in Nigeria, the caregivers' willingness to pay for TAC was high[22]. This gave insight the value; pain relief, that parents anticipated from the use of TAC on their children. Nonetheless, one major obstacle to the smooth introduction of a TAC in this locality is the lack of knowledge of the existence of such medical innovation amongst health care providers. In this survey, only one provider; a doctor, acknowledged knowing about any form of TAC. What most do to alleviate pain is mainly cognitive, non-pharmacologic methods. This is similar to what Kozer *et al* reported in their study[9].

The providers' mean willingness to use TAC was slightly reduced after they were informed about the required time to achieve local anaesthetics compared to their prior mean willingness to use, though the marginal difference was not much. One major shortcoming of TAC is the relatively prolonged time required for effective anaesthesia to be achieved. Nonetheless, in spite of the providers' resentment towards the prolonged time requirement, 58.6% and 43.1% were still willing to wait for 45 minutes and 60 minutes respectively, with a mean of 37 minutes. But according to the study by Fein *et al*[14]which showed that nurses in emergency were able to predict children that will require IV insertion with relatively impressive sensitivity of 72% and this was further improved when combined with a consideration of the child's recent medical history[14]. Thus combination of both nursing prediction and the objective criteria upon which their prediction was based upon will reduce both time and product wastage. Therefore while research is ongoing on how to reduce the time of onset of action of TAC, judgment based on the power of prediction can be used to identify children that may require minor painful procedure and TAC applied way ahead of time. Interestingly, several advancements are available to shorten

onset of skin anaesthesia to 5 minutes or less; iontophoresis, ultrasonic pretreatment of skin and needle free jet injection of the local anaesthetics[23]. Although these protocols may not be easily applied in the sub-Saharan practices, but they offer hopes.

The hypothetic nature of this study is one major limitation. It would have been more appealing if objective the providers' willingness to use the TAC were also assessed after use of the TAC. Since what appears desirable ex-ante (hypothetical) may not be so ex-post. It is those who have used the product that will have a better understanding and more convinced in their decision. Therefore, prior to wide introduction of the TAC in Nigeria, an ex-post survey will be done. Therefore any difference observed between the two studies (ex-ante and ex-post) will represent to a larger extent the real value of the providers' willingness to use the TAC. Therefore the ex-ante study (this present study) represents the opinion of providers' naïve on use of TAC.

Conclusion

In contrast to previous belief that performance of painful procedures does not affect providers, virtually all providers agreed to feel some form of uneasiness. They rated the pain these children felt relatively high but only adopted non-pharmacologic strategies to deal with the pain experienced by these children. All but one of the providers did not know about TAC, and though have not used it. There was high willingness to use TAC by providers, if made available. But majority suggested that reduction in the time of action will improve its suitability and applicability in healthcare services. Thus reduction of pain and distress in these children and anxiety in the providers by the use of TAC will ensure immediate procedural success and other long term benefits. There is need for policy makers to consider a reform that will include the use of these agents during minor painful procedures especially in children.

Authors' Contribution
MDU conceptualized the study. MDU, BSU and OEO designed the study. MDU, NDU and CAI participated in data collection. BSU and OEO carried out the initial data analyses. MDU drafted the initial manuscript. All the authors reviewed the manuscript and approved the final manuscript.
Conflict of interest: None
Funding: None

Acknowledgements

A special thanks goes to all healthcare providers that participated in this study.

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