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Original Research Article

Exploring Pediatric Procedural Pain Assessment Practices, Knowledge, and Attitude among Nurses in a Tertiary Health Facility in Ghana

Etonam Ayivi[1], John Akortiakumah[2], Benjamin Abaidoo[3*], Fynn E. Abowie[4]

[1]Child Health Department, Korle Bu Teaching Hospital, Accra
[2]Department of Nursing, University of Health and Allied Sciences
[3]Ophthalmology Unit, Department of Surgery, University of Ghana Medical School, University of Ghana, Accra
[4]Berkwai, Municipal Hospital

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Abstract: ***Background*:** Effective management of procedural pain is important for general patient care and quality of life. The study aimed at exploring paediatric procedural pain assessment practices, knowledge, and attitude among nurses at the Korle-Bu Teaching Hospital. ***Methods*:** An exploratory qualitative design was used in the study. This research was conducted among nurses at the Child Health Department of the Korle-Bu Teaching Hospital. Purposive sampling technique was used to select participants until data saturation was reached. The qualitative data was collected using a semi-structured interview guide via direct interviews and tape recorded. Data was transcribed and analysed manually using thematic content analysis. ***Findings*:** Data saturation was achieved after the interview with the 20th respondent in the study hence a total of twenty nurses participated in this study. Most 17 (85.0%) of the nurses were females. Majority 8 (40.0%) were aged between 31-40 years. The mean age of the participants was 35.2±7.5 years. Three themes emerged out of the study namely; knowledge and attitude towards procedural pain, assessment of procedural pain, and interventions for lessening procedural pain. ***Conclusion*:** Nurses in this study had limited knowledge about procedural pain management and assessment. Nevertheless, most of the nurses expressed positive attitude and willingness to be trained in procedural pain management.

Keywords: Procedural pain, knowledge, attitude, practice, pain management among children.

INTRODUCTION

Pain is one of the most prevalent complaints among patients in clinical settings (Ahmadi *et al*., 2016). It is an unpleasant sensory and emotional experience, added to a tissue injury that is real, potential, or spoken regarding such injury (Raja *et al*., 2020). Infant procedural pain includes acute and chronic pain induced and experienced because of named procedures (Khoza, 2014). Procedural pain may occur because of unavoidable nursing, medical and paramedical procedures. These procedures may either be invasive or non-invasive with various degrees of pain. The prevalence of pain in children varies with age, sex, race, and the condition of the child (Kozlowski, 2014).

Inadequate knowledge in procedural pain management is associated with long term effects such as anxiety, fear, and behaviour changes (Curtis, 2012). Children experience heightened pain intensity due to the immaturity of the dorsal horn which leads to poorly localized pain (Baulch, 2010).

Despite growing knowledge about pain assessment and intervention, much attention has not been given to pain in children. It is well established that the consequences of poorly managed pain are deleterious and may lead to a number of complications in post-operative periods (Hossain, 2010). To minimize these consequences and complications, up-to-date knowledge and positive attitudes of nurses are essential for pain management.

At the Child Health Department of the Korle Bu Teaching Hospital, children on admission are exposed to various invasive and non-invasive medical procedures that are associated with pain. This pain may occur on

***Corresponding Author:** Benjamin Abaidoo
Ophthalmology Unit, Department of Surgery, University of Ghana Medical School, University of Ghana, Accra

daily, weekly or monthly basis at the wards or at the OPD (Stevens *et al.*, 2011). Repetition of these painful procedures without any analgesics or diversional therapy due to previously failed attempts may result in increased pain, anxiety and fear among these children (Carbajal, 2008). We therefore sought to explore the nursing management of procedural pain in children at the Department of Child Health, Korle-Bu Teaching Hospital. The study will contribute to literature on procedural pain management and provide insight for directing future decisions, programs and actions aimed at improving the quality of procedural pain management.

METHODS

The study applied the exploratory qualitative study design to explore the knowledge, attitude and practises of nurses in the management of procedural pain in children at the Korle-Bu Teaching Hospital. The study was conducted at the Child Health Department of the Korle-Bu Teaching Hospital of Ghana. The Department of Child Health (DCH) with a bed capacity of 180 serves as a tertiary referring Centre for other health facilities in the southern sector of Accra. The target population was nurses working at the child health department of the Korle Bu Teaching Hospital. Permanent nurses working in the department of child health, Korle Bu Teaching Hospital over two years were are included in this study. Nurses on rotation, attachment, and student nurses were excluded.

The principle of data saturation was employed in determining the sample size for the study. A total of 20 nurses were finally enrolled into the study. The researchers interviewed participants to collect data until there was no new information emerging after the 20th participant was interviewed and saturation was reached and the interviews were concluded. Study participants were selected by purposive sampling method after they have given written informed consent to participate. The first participant was recruited voluntarily and subsequent participants were recruited using the same approach.

A face-to-face interview was undertaken and recorded in English Language. The interview was conducted with the aid of a semi-structured interview guide with open-ended and probing questions. Interviews were audio recorded after permission has been sought from the participants. Notes were taken during the interview to record gestures and other non-verbal cues of the interviewees. For each participant the face-to-face interview lasted between 30 and 45 minutes. Recordings were transcribed immediately after the interview, read thoroughly before the next interview was done so as to identify the areas to explore further.

The interview guide was pre-tested with 5 participants at the Family Medicine Department of the Korle-Bu Teaching Hospital to ensure possible amendments before the final copy of the guide was printed for use in the main study.

Data collection was done with an audio recorder by the principal investigator and saved with password. All data collected were transcribed and protected with password accessible to only the investigators. All the information taken were treated with confidentiality. Identities of respondents were not included but codes were used in identifying participants' responses.

Methodological rigour was ensured to prevent possible biases which can influence the outcomes of the study. In doing this, the authors thoroughly checked and ensured that the views of the respondents were truly captured and documented before arriving at conclusions. Verbatim responses were also used as direct quotations for a true reflection of the narrations by respondents. The interview guide was designed according to the objectives of the study.

Demographic data including sex, age and educational level were captured and analysed with Microsoft Excel 2015. Age of participants was presented and the mean age and standard deviation of the ages of the participants were determined. Categorical data (sex, educational level) were presented as counts and percentages. The qualitative data collected was transcribed and analysed thematically using NVivo software. The data from the participants were analysed to identify themes and sub-themes within the narratives provided by the participants. This was done from the beginning of the data collection and continued throughout the data collection process. After everyday interview session, the researchers transcribed the data for the day before another interview session. After the transcription, each transcribed interview was read thoroughly while listening to the corresponding tape to ensure that the exact information of the participant was captured in the transcript. This was done to ensure that all the information given by the participants were captured verbatim in the transcription.

Essential phrases, sentences or paragraphs which were very important were highlighted and assigned labels or codes. This process was done repeatedly until all the data were coded. The coded passages were looked at and compared to form sub-themes under the main themes. The themes and their supporting passages were continually revised during the transcription process of the data. All the coded data were scrutinized to ascertain their suitability within the assigned theme. Ethical approval for the study was sought from the Institutional Review Board of the Korle Bu Teaching Hospital with the ethical clearance number KBTH-IRB00038/2021.

RESULTS

A total of twenty nurses from the Department of Child Health, Korle-Bu Teaching Hospital participated in this study. Most (17, 85.0%) of the nurses were females. Majority (8, 40.0%) were between 31-40 years. The mean age of the nurses was 35.2±7.5 years.

Minimum and maximum ages were 25 years and 52 years respectively. The average number of years of work experience was 7.0±7.0 years. Minimum and maximum years of experience was 2 and 15 years respectively. Most (7, 35.0%) of the nurses were "staff nurses" and "senior nursing officers" respectively. Twelve (12, 60.0%) were married and majority (19, 95.0%) were Christians. Tables 1 and 2 describes the demographic characteristics of the nurses in the study.

Table 1: Demographic characteristics of the nurses in the study

Demographic characteristics	Number	Percentage (%)
Age		
18-30	7	35.0
31-40	8	40.0
41-50	3	15.0
51-60	2	10.0
Sex		
Male	3	15.0
Female	17	85.0
Total	20	100.0
Number of years of experience		
<5years	7	35.0
5-10 years	12	60.0
>10 years	1	5.0
Rank		
Staff Nurse	7	35.0
Senior Staff Nurse	3	15.0
Nursing Officer	2	10.0
Senior Nursing Officer	7	35.0
Principal Nursing Officer	1	5.0
Marital status		
Married	12	60.0
Single	8	40.0
Religion		
Christianity	19	95.0
Islam	1	5.0

Mean age = 35.2±7.5 years. Minimum and maximum ages = 25 and 52 years respectively. Mean years of experience = 7.0±7.0 years. Minimum and maximum years of experience = 2 and 15 respectively.

Table 2: General profile of the nurses in the study

Id	Age	Age group	Sex	Years of experience		Rank	Marital status	Religion
1	38	31-40	F	8	5-10yrs	SSN	Married	Christian
2	38	31-40	F	8	5-10yrs	SSN	Married	Christian
3	25	18-30	F	3	<5yrs	SN	Single	Christian
4	30	18-30	F	5	5-10yrs	SN	Single	Christian
5	27	18-30	F	2	<5yrs	SN	Single	Christian
6	41	41-50	F	10	5-10yrs	SNO	Married	Christian
7	32	31-40	F	5	5-10yrs	SNO	Married	Christian
8	36	31-40	F	8	5-10yrs	SNO	Married	Christian
9	38	31-40	F	10	5-10yrs	SNO	Married	Christian
10	51	51-60	F	10	5-10yrs	SNO	Married	Christian
11	35	31-40	F	10	5-10yrs	SNO	Married	Christian
12	30	18-30	F	3	<5yrs	SN	Single	Christian
13	36	31-40	M	8	5-10yrs	NO	Married	Christian
14	25	18-30	M	3	<5yrs	SN	Single	Christian
15	41	41-50	M	9	5-10yrs	NO	Married	Christian
16	31	31-40	F	4	<5yrs	SSN	Single	Christian
17	41	41-50	F	10	5-10yrs	SNO	Married	Muslim
18	52	51-60	F	15	>10yrs	PNO	Married	Christian
19	27	18-30	F	4	<5yrs	SN	Single	Christian
20	29	18-30	F	4	<5yrs	SN	Single	Christian

Main Themes and Sub-Themes Generated from the Interviews

From the face-to-face interviews conducted, three themes emerged from the study namely; knowledge and attitude towards procedural pain, assessment of procedural pain, and interventions for lessening procedural pain. From each of the main themes derived, subthemes emerged. Table 3 below presents the themes and subthemes obtained from the study.

Table 3: Main themes and sub-themes generated from the interviews

No.	Main themes	Sub-themes
1	Knowledge and attitude towards procedural pain.	1. Knowledge about procedural pain. 2. Types of procedural pain. 3. Attitude towards procedural pain.
2	Perception about procedural pain.	1.
3	Assessment of procedural pain.	1. Frequency of procedural pain assessment. 2. Response to procedural pain. 3. Expression of pain (verbal and non-verbal).

Knowledge and Attitude towards Procedural Pain

According to all the twenty nurses, procedural pain in children is a pain caused by any procedure done for the child. This pain they said is usually expressed by the child verbally or non-verbally. According to the nurses, the verbal form of expression of procedural pain in children occurs when the child complains as a result of the pain experienced during the procedure. The non-verbal form of expression of pain comes in the form of the child crying, shouting and struggling with the nurses and their parents and holding some parts of the body. The subthemes derived were; knowledge about procedural pain, types of procedural pain, perception of nurses about procedural pain, attitude towards procedural pain.

Knowledge about Procedural Pain

Participants demonstrated their knowledge on procedural pain as follows:

"A Procedural pain is a pain children go through when passing an intravenous line (IV) or a nasogastric intubation (NG tube) inside a vein through the arm or hand or urethral catheter"-RESP 2.

"Procedural pain occurs when a child is in pain because of a procedure which is been done for the child such as IV-line setting, blood sample taking or wound dressing or even cord dressing in babies"-RESP 15.

"I will say they are pain inflicted on children during the process of performing a procedure. I know most procedures in children are painful and not comfortable and these children turn to have memory of such experiences and it affect them any time they come to the hospital premises. Particularly children with chronic illness who often visit the hospital"-RESP-18.

Types of Procedural Pain

Two types of procedural pain were mentioned. These were; traumatising invasive procedural pain and non-traumatising invasive procedural pain respectively. Traumatising invasive procedural pain occurs when medical devices such as sharp needles are directly entered into blood vessels such as injections, intravenous puncturing, exchange transfusion and lumbar puncture. According to the nurses, procedures such as passing of a blunt material such as rubber tubes into organs and tissues in the body which included passing of nasogastric (NG) tubes, reduction of wound drains, and catheterization, passing of wound drains were described as non-traumatising invasive procedures. Below are some of the responses from the nurses concerning pain associated with traumatizing invasive procedures:

"When you take blood sample from the children, some of them end up struggling with you and screaming to express the pain they go through"- RESP 15.

"Almost all the children who go through lumbar puncturing procedure express some degree of pain which is associated with the procedure. It seems to be very traumatising for these children who will always look for ways to avoid this traumatic event occurring to them"- RESP 8.

"The use of sharp needles in the process of intravenous puncturing is quite traumatizing to most children. Most of them will even start struggling with you when they see the sharp needle approaching them"- RESP 13.

The non-invasive traumatic procedural pain described by the nurses were as follows:

"Non-invasive traumatic procedure can be very hurting. Children who go through non-invasive traumatic procedures such as catheterization would usually experience pain intense pain as a result of the introduction of a foreign body into their organs. It may be quite unbearable for the child who would usually like to avoid such procedures"- RESP 5.

"When I feel uncomfortable when I hear children screaming and crying during procedures like passing of nasogastric (NG) tubes. Even among the elderly. It is quite an uncomfortable procedure with associated painful events"- RESP 8.

In some instances, due to the uncontrollable nature of the child's screaming and struggling with the procedure, other people such as security personnel, parents of the child, other hospital staffs and other

parents who have also brought their children for care are brought in to assist with holding the child on a bed for some procedures to be done. The following responses describe this situation:

"I have had situations where I was assisted by a security personnel who was very helpful in assisting me to restrain the movement of the child for a smooth procedure"- RESP 9.

"There are times when other parents express their willingness to support me in a procedure when the going becomes tough and the child seems to be struggling with me and just trying to avoid the procedure."- RESP 14.

"Sometime I receive voluntary support from other staff of the hospital who may be passing by or who seems not to be comfortable with the cry and screaming from the child. Such persons are very helpful and shows some readiness to assist the procedure. It is a nice experience to have such people with you during a procedure. This limits the kind of stress and energy you need to exert during the procedure. It's nice to have support"-RESP 20.

Perception and Attitude of Nurses about Procedural Pain

Perceptions and attitude of nurses about procedural pain plays a major role in care delivery as sensory information is usually obtained, collated, and interpreted by the nurse to form an opinion. In this study, nurses were asked how they feel about procedural pain management and their attitude towards it. In some cases, the nurses saw pain in children more excruciating than adults. Responses from the interview were quoted directly as follows:

"I think children feel pain even more than adult and they do express it in different forms. For the older once I think they may have fear anytime they are going to do such procedures for them. Like a child who have experienced severe pain during IV cannulation, anytime you are going to do such a procedure for the child, the child will be afraid of the personnel who is going to do it. For the younger ones, they cannot really complain but they also have fear for previous painful procedures. Others may also refuse to come to the hospital because of previous pain from procedures. For the feeling about procedural pain management, some people do not really care about the pain the child goes through. Their aim at that moment is to get the procedure done no matter what pain the child is going through"- RESP 1.

"You have to reassure the child and the mother before the procedure. There was an instance when urethral catheter was passed to a child at the ward and she kept complaining about pain in the urethral. I went for night duty and what I did was that I let the mother get me warm water and I used warm compress around the affected area, and I explained to them the reasons why the catheter needs to be there and that it is also normal or expected to have pain or discomfort since it was introduction of foreign body. I later on gave paracetamol and child had a sound sleep that night"- RESP 3.

"It is inevitable for the child so we usually find ways to calm the child. During wound dressing I try to engage the patient as often as possible to distract the patient from the pain. Also, when setting IV line in children especially the infant, is difficult to get their line especially when their veins are collapsed, you end up pricking several times and they then to cry. The only management I could do is to reassure mothers and encourage them to breastfeed. I also secure the cannulation side to stop bleeding and secure the IV site so that it doesn't dislodge to re-fix it"- RESP 7.

In some cases, it is necessary for the nurse to give some level of assurance to the child. This reposes some confidence in the child which is very significance for the procedure to be carried out. This is what some of the nurses said:

"I think if we are able to manage child pain especially during IV line setting it gives the child some assurance that the nurse is not there to cause pain but to give care"- RESP 10.

"While performing a procedure and the mother is breastfeeding during produce it makes the whole thing easier. For the older once when you explain things to them some becomes calmer. This helps the child to have confidence in you as you perform the procedure"- RESP 16.

"For me, procedural pain management will depend on good assessment of the child even before the procedure, and counselling the child and parent about the need for the procedure will help manage the pain better. Talking to child about the procedure encourages the child with some assurance that we are there to help. This enables the child to corporate and also reassure the child of safety"-RESP 20.

Two other nurses had this to say about procedural pain management:

"Procedural pain management help the children not to fear a particular procedural, because they become reassured that even though the procedural is painful the nurse will make sure they don't go through much pain especially those with chronic illness like sickle cell disease that always come to the hospital and are familiar with some of the procedures."- RESP 10.

"Procedural pain management is an important aspect of child care. There was a child that we try several times to do lumbar puncture. The child was not crying but I could tell she was in pain, her vital signs had increase considerably after the procedure, so the physician asked us to give paracetamol which we did. But in our facility, a nurse cannot get up and give pain medication without prescription, and in my ward, there is nothing like give paracetamol after lumbar puncture. For me that has

*been my problem, If I did not check the vitals this child would have gone through this severe pain and will go unnoticed".*RESP *20.*

In some cases, both parents and nurses become emotional as the procedure goes on. This is what some nurses reported:
"I become emotional when these babies cry during procedures, some are so sick and cannot even cry but you can tell they are in pain, I think is necessary to manage their pain to prevent psychological trauma to these children in future".- RESP 19.

"While setting a line for a one-month-old baby, the mother was asked to hold the baby during the procedure but the mother could not stand the procedure as she started weeping. I also became emotional about this procedure. I suggest procedural pain should be properly managed to prevent emotional trauma to children and parent and even to some health workers".- RESP 16

Assessment of procedural pain

Procedural pain assessment is very crucial in revealing the prescribed management strategies to adopt when caring for a patient in procedural pain. The following subthemes were derived from the main theme "assessment of procedural pain"; frequency of procedural pain assessment, response to procedural pain management, and expression of pain (verbal and non-verbal).

Frequency of Procedural Pain Assessment

Concerning the frequency of procedural pain assessment, this is what the nurses had to say:
"Oh, I do it often. I don't necessarily have to use the appropriate tool during procedure to tell a child is in severe pain, no even by looking at a child I can tell whether the child is severely in pain or not."- RESP19

"I assess procedural pain any time I do a procedure on a child"-RESP 18

"It should be 15 minutes to 1 hour after the procedure. Thirty (30) minutes for the next hour then 4 hourly."- RESP 15

In some cases, nurses feel procedural pain needs to be assessed when necessary. This is what was said by a nurse:
"We asses pain whenever necessary. We don't make it a routine and do assessment of pain on every patient going through a procedure, but depending on the behavior of the child, an assessment can be done to know whether the child is exaggerating or not."- RESP 14

Some nurses indicated that the number of babies in their department overwhelms them so they usually ignore the child going through pain.
"We assess procedural pain during and after the procedure, but honestly speaking I will say that due to under staff and the number of babies we have I something overlook it"-RESP 11.

"There are so many children to attend to in the unit so much that I sometimes become overwhelmed by the work load making it quite difficult to assess the pain."- RESP 3.

Response to Procedural Pain

These were the outcome of the interview with the nurses concerning their response to procedural pain.
"… I become so busy with the procedure I am performing that I usually overlook the pain aspect of the child. But if the pain is too much and it draws my attention, I call the mother to come and give support. Because I don't really assess the pain in the children, I may not be able to give the best of care, because even with the parent around or when I give them the blotted glove that looks like a balloon it does not really make much change in most cases. I think we need more knowledge on pain assessment that will help with the management of procedural pain in children". RESP 1

"When I am passing catheter, I use lubricant to reduce the pain. If is about passing of IV line you have to use that red light to avoid pricking the child several time. You can give paracetamol after painful procedures when the child still complains of pain"- RESP 2.

"We normally rape the back of the child, or drop 2mls of dextrose saline and drop it on the child tongue gradually. Also, after the procedure you give child to mother to pamper or breastfeed or sing for the child. Sometimes too they stop crying after the procedure"- RESP 17

Findings from the study shows that the response of the nurses to procedural pain depends on the age of the child and the severity of the pain as well. The following narrations describes the response from the nurses:
"Depending on the age of the child. Small children are put at breast after procedure and the older once are reassured and diversional therapies are usually used during and after procedures. We only give analgesic to the older once in case of severe pain such as wound dressing or after passage of central IV line"-RESP 6.

"The response usually depends on the severity of the pain. If it is just some normal cry, the mother is encouraged to breastfeed and carry child but where the cry seems to persist I gently massage the site of the pain and give pain relieve if the pain is persistent"- RESP 9.

"We have different ways of attending to procedural pain based on severity and age of the child. We ask the mother to breastfeed the young ones. For the older ones you can even ask them what they want. Some may be happy when you give them toys. Others may prefer balloons or drink or toffee"- RESP 14.

Communication with older children helps them to well appreciate the procedure and the pain they go through. This creates a better understanding to the child who then appreciate the care given. Thus, communication plays a vital role in responding to procedural pain. The following responses from the nurses explains communication with the children:
"Communicating with the children is very important because when they understand the reason for the pain they are going through and appreciate the importance of the procedure they turn to co-operate"- RESP 10.

"I believe we need to communicate as nurses to our patients for them to know what they are going through. Without it the child may even think you are punishing them or deliberately inflicting pains on them. Hence, they will not give their best corporation."- RESP 18.

"When a child is crying during a procedure and you engage the child in communication, they keep quiet for some time and respond to your answers which I think is a nice way of responding to their pain…"- RESP 12.

Expression of Procedural Pain

This subtheme "expression of procedural pain" basically varies from child to child and in terms of the age of the child involved. Pain was seen as decreasing when a child is aging. Thus, younger children tend to express their pains intensely than older children. Procedural pain could be expressed in verbal or non-verbal form which is basically dependent on the individual.

In some instances, some children expressed procedural pain verbally by screaming, shouting, blaming the nurse associated with the pain and even the mother, and sometimes rejecting the procedures to be done. This verbal form of expressing their pains usually aims at registering their displeasure for the on-going procedure. Nurses in the survey had this to say;
"I have observed that usually, younger children turn to express their pain through intense cry whereas older ones may say something to show that they are really in pain but may not cry, others will scream louder but with no tears to show that they are in pains"- RESP 11.

"There was an instance where a young child insulted all of us at the ward for the pains he was going through. He screamed foolish doctor!! Foolish doctor leave me alone!! He blamed us seriously and was unhappy with the mother for allowing us to do such a thing to him. Such children usually do not understand the essence of the procedure done for them. I think explaining the procedure to them before the procedure may help a lot to save us from insults and accusations from children going through procedural pains." - RESP 11.

In non-verbal form of expressing procedural pains, children would usually use their hands or feet to hit the ground or any object around. Some also turn to push the hands of the health personnel in an attempt to interrupt the painful procedure. Some may even kick the medication away with their foot. The following are reports by the nurses concerning non-verbal expression of procedural pain.
"There was an instance where a child I was attending to pushed my hand which caused the medication to spill-off. Depending on the part of the body they think you will be administering the procedure at, some children at the sight of the nurse will quickly hold that part of the body trying to prevent the procedure"- RESP 10.

"Some children resort kick or knocking their foot against surrounding objects in a quest to express the pains associated with the procedure"- RESP 13.

"When I am performing a procedure on a child sometimes their facial expression will tell you they are in pain some too will be moving their limbs and crying"- RESP 5.

Interventions for Reducing Procedural Pain

Findings from the study revealed various interventions for ameliorating procedural pain. These could be classified as pharmacological and non-pharmacological interventions respectively. The pharmacological interventions mentioned in the study were basically the use of analgesics, anaesthesia, and others in reducing the extent of procedural pain children encounter. The non-pharmacological interventions identified from the study includes the use of play toys, balloons, singing, laughing, breast feeding, communication and parental support to lessen the degree of pains children go through during medical procedure.

Pharmacological Interventions

This is what the respondents had to say about the use of pharmacological interventions such as the use of analgesics, local/topical anaesthesia creams, etc. in reducing procedural pains among children:
"When I am passing catheter, I have to use lubricant to reduce the pain. In passing an IV line, you can use an indicator to avoid pricking the child several time. You can also give paracetamol after painful procedures when the child still complains of pain."- RESP 2

The age of the child may also help in planning the intervention to be adopted in ameliorating the pain.
"It also depends on the age of the child. Younger children breastfed after procedure and the older once are reassured and diversional therapies are usually used during and after procedures. We only give analgesic to the older once in case of severe pain such as wound dressing or after passage of central IV line"- RESP 6

"On the ward for instance when setting IV line for children we drop 2mls of dextrose saline on their tongue and it calm them down a little. When we do that, the child usually swallows it and stop crying"- RESP 12

Non-Pharmacological Interventions

Non-pharmacological interventions for reducing procedural pain such as the use of balloons, watching of cartoons, music, breast feeding, etc. were mentioned as follows:

"Sometimes when the mothers are present it helps like the older children who prefer the presence of their parent around them than to have only nurses around them. Breast feeding the younger ones also help to get their co-operation. Sometimes we also blow balloons with gloves and put one finger of balloon into their mouth to suck" – RESP 1

"Example when setting IV line in children especially the infant it is difficult to get their line especially when their veins are collapsed, you end up pricking several times and they then to cry. The only management I could do is to reassure mothers and encourage them to breastfeed." -RESP 4

In an attempt to reduced procedural pain encountered by children, nurses tend to pamper, sing lullaby and sometime say something nice to the child which calms the child.

"Well, I feel for them so whenever I am doing a procedure, I take some time to pamper the child and sing for the child. I have to say something that will calm the child for me to continue with the procedure"- RESP 5.

"Usually after the procedure I give the child to the mother to breastfeed or sing for the child. Sometimes too the child may stop crying after the procedure. The use of warm compress and allowing mothers to breastfeed help a lot" RESP 5.

"Showing cartoons to children during procedures and engaging them in conversations helps in reducing the intensity of procedural pain among children. Sometimes when performing a procedure, the mother may be asked to breastfeed during the process which makes it easier. For older children, after explaining the procedure to them they become calm"- RESP 8

DISCUSSION

Knowledge and Attitude towards Procedural Pain

Nurses' knowledge and attitude towards procedural pain play a major role in the management of procedural pain. This is supported by the findings of the study by Hossain, (2010) which stated that knowledge is an essential virtue for practicing effective pain management in children. Additionally, Hall, (2005), found that a knowledgeable nurse has the ability to improve the care provided to patients when the nurse is well-informed about the best or current evidence in health care delivery to solve contemporary health challenges. Thus, the ability to acquire knowledge potentially increases the level of awareness of personal and professional accountability and the dilemmas of nursing practice (Hall, 2005). Hall, (2005) further stated that gaining knowledge in nursing turns to increase the knowledge base of the nurse and the clinical skills needed to care for patients.

In caring for children with procedural pain, there is the need for nurses to have special knowledge and understanding about the physiological and behavioural responses of children to pain and relevant interventions needed to relieve procedural pain in children. Nurses working in paediatric clinics are required to have in depth knowledge and understanding of procedural pain, its characteristics, assessment and management respectively (Rao, 2006).

Anand, (2011) explained that lack of knowledge about the management of procedural pain in children among nurses has resulted in deleterious consequences and complications. Anand, (2011) stated further that up-to-date knowledge and positive attitudes of nurses are essential precursors in their clinical practice of pain management for children.

Findings from this study shows that nurses have knowledge about pain management but this knowledge was inadequate according to the nurses. The study revealed knowledge gaps in pain management which to some extent shows some level of deficiencies in procedural pain management education given to nurses and non-availability of pain scales. This finding from the current study aligns with the findings from several studies which have also indicated inadequacy of nurses' knowledge in procedural pain management (Hossain, 2010; Young *et al*., 2008; Schultz *et al*., 2014; Cong, 2013; Nadin, 2016). Anim-Boamah, (2015) in a study of nurses' perspectives on invasive procedural pain among paediatric patients at a regional hospital in Ghana also reported inadequate knowledge of pain management and pharmacological interventional strategies for pain relieving among nurses.

However, Wuni *et al*., (2020) in a study conducted in Northern Ghana demonstrated good knowledge with regard to paediatric pain management among nurses which was also supported by others studies reporting good knowledge in paediatric pain management among nurses from various geographical regions globally (Hossain *et al*., 2010; Akuma & Jordan, 2012; Zeb *et al*., 2019).

Although nurses in this current study reported inadequate knowledge in procedural pain management among children, all of them had prior education in pain management during their professional nursing training. However, several factors might have contributed to the low retention of this knowledge. For example, the training they acquired might have been regarded as a requirement for the fulfilment of the desire for academic knowledge or achievement. Also, such trainings are usually designed to cover only some areas of nursing care thereby neglecting other areas. Howell *et al*., (2000) explained that education in pain management is crucial

in improving nurses' knowledge and practices only for a short duration and turns to declines with time if the education is not sustained.

In this study, the types of procedural pain mentioned by the nurses were; immunisations, intravenous cannulation, wound dressing, venepuncture, finger prick for blood samples in laboratory investigations, lumbar puncture, among others. These procedures are associated to some level of pain depending on the type of procedure. Studies have shown that poorly managed pain from venepuncture and IV-line insertion procedures can result in anxiety, fear, and behaviour changes (Curtis, 2012).

Perception and attitude of nurses towards procedural pain in children is also an important area which was examined in this study. Findings from this study shows that the nurses believe procedural pain in children is quite hurting than pain among adults. Some of the nurses expressed their emotions and empathy they have for children going through painful procedures in the hospital. They perceived pain to be real and not exaggerated by the children. These findings agree with the report from Walco *et al.*, (2010) who mentioned that children also experience pain and that even from the beginning of the second trimester, a foetus develops pain perceptions. Some nurses perceive that, children can easily be addicted to narcotic analgesics which are meant for pain relieving. This perception among some nurses is wrong since modern research has not identified any characteristic of childhood development that shows increased risk of physiologic or psychological dependence as actual risk of addiction is rare among children. These misconceptions and perception turn to impede pain management practice among paediatric care nurses.

A study has shown that nurses with adequate knowledge and a positive attitude, towards pain management may foster effective procedural pain management (Jarrett, 2013). Thus, nurses with positive attitude towards the pain of their patients and consider ways to relieve their patients from such pain always focuses on pain management programs with the objective and motivation to give the best of care to their patients.

Assessment of Procedural Pain

Pain assessment is a vital area underpinning the management of procedural pain. Procedural pain management remains a significant responsibility of nurses requiring the use of appropriate tools for assessing a particular pain in question. In this study, the examination of the frequency of procedural pain assessment by the nurses revealed that most nurses did not assess procedural pain frequently. Infrequent assessment and management of pain among hospitalized children has been reported by Carbajal *et al*., (2008) and Yamada *et al.*, (2008). Other studies have also documented the same phenomenon (Albertyn *et al*., 2009; Latimer *et al.*, 2009). This situation of not assessing procedural pain frequently may imply that the children may not be receiving the appropriate treatment in accordance with the severity of the pain. Children in such situations may have prolonged stay at the hospital and possibilities of long-term psychological manifestations (Mitchell *et al*., 2002; Latimer *et al*., 2009).

Pain assessment scales play a major role in the management of pain. However, nurses in this survey did not have adequate knowledge about pain assessment scales. Despite the significance of pain assessment scales, available literature on pain assessment scales have been inconclusive. Hockenberry-Eaton *et al.*, (1999) and Hossain *et al*., (2010) attributed the infrequent use of pain assessment tools to its unavailability in some health facilities. Yet Wickistrom, (2008) reported no significance difference in pain assessment practices in the presence of pain scales. While Polkki and colleagues, (2010) reported frequent pain assessment practices even when they were not having pain assessment scales. These reported contradictions in the use of pain assessment scales calls for the need to educate and encourage nurses to utilise these scales for better management of children with procedural pain.

The response of nurses in this study to procedural pain assessment was positive and quite encouraging as most of these nurses expressed empathy and readiness to help children in pain. Similarly, Taylor & Stanbury, (2009) also mentioned that nurses have positive attitude towards pain assessment and management. Kholowa *et al*., (2017) in a study of nurses' knowledge and attitudes towards pain management in children admitted in the paediatric department of Queen Elizabeth Central Hospital, in Malawi also reported positive attitudes towards pain, pain assessment and treatment in children. Melhuish & Payne, (2006) and Da Cruz, (2010) also reported similar findings elsewhere in the United Kingdom and Brazil.

Contrary to this finding, Adams, *et al*., (2020) also reveal that nurses had negative attitude towards pain assessment and management. The findings of Basak, (2010) and Issa *et al.*, (2017) also revealed reported negative attitude of nurses towards postoperative pain management.

Positive attitude towards procedural pain management is a good quality. However, this may not always show in practice as some of the nurses in this survey were found to express their fear for side effect of using certain medications to manage pain in children (Melhuish & Payne, 2006; Size *et al*., 2007). This fear may delay effective management of pain and cause some children to experience undue pain. Studies have however shown that side effects of drugs such as addiction is not

likely to occur among children who are given oral morphine drug (Namukwaya *et al*., 2011; Gielen *et al*., 2011). Another study has demonstrated the safety of morphine use in children (Kart, 1997). This fear may be attributed to a knowledge deficit about the use of some of these drugs for management of pain.

The manner in which children communicate the agony of painful procedures is also important in the assessment of painful procedures. Findings from the study revealed that children expressed their pain in verbal and non-verbal forms and that the expression of the pain varies from child to child and depends on the age of the child as well. The verbal form of expressing pain includes; screaming, shouting, and blaming the nurse and even their parents, and sometimes rejecting the procedures to be done. The non-verbal form occurs when children use their hands or feet to hit the ground or any object around and also try to push the hands of the nurse to interrupt the procedure. This finding is similar to the findings from Aziato & Adejumo, (2014a) who also mentioned various ways of communicating pain among children. Similarly, other studies have reported that while some children cried and become aggressive and even hid from the nurses, others showed little aggression during painful invasive procedures (Anim-Boamah, 2015; Nimbalkar *et al.*, 2014; Pichardo, 2010; Taddio *et al*., 2010).

The concept of age affecting the expression of pain with younger children showing more pains than older ones is also supported by studies by Baulch, (2010) and Sclenz *et al.*, (2012).

Interventions for Reducing Procedural Pain

Findings from the study shows that the nurses have knowledge of pharmacological and non-pharmacological interventions. Pharmacological interventions mentioned by the nurses in this study included the use of topical local anaesthetic creams or gels and the use of analgesics such as paracetamol. Non-pharmacological interventions identified by the nurses included; the use of toys, balloons, singing, laughing, breast feeding, and parental support to lessen procedural pain. This finding suggests that effective management of procedural pain requires an application of a multimodal approach which utilises both pharmacological and non-pharmacological techniques to maximise analgesic efficacy and procedure tolerance, while minimising adverse side effects and other complications.

Findings from this study regarding the use of non-pharmacological techniques such as support from both patient and parents was also reported as a significant intervention by Christensen and Fatchett, (2002) and Dahlquist, (2002), who also acknowledged the involvement of both patient and family as a pleasant partnership that creates a sense of control by the family promoting calmness and improvement of satisfaction in care delivery. However, the presence of a family member may not be needed in some instances according to Blount, (1991). It is therefore important to evaluate the family member involved and support them before the procedure (Kleiber, 2001).

Other studies have also reported diversion or distraction which is a form of psychological intervention during potentially painful procedures as a low-cost, easily implemented intervention (Kleiber, 1999). According to Windich- Biermeier, (2007), involvement of distracting mechanisms as interventions to reduce pain should be age appropriate, engaging to the child and where possible, children should be encouraged to self-select their distraction method for the child to feel empowered in their coping (Windich-Biermeier, 2007). A review of studies relating to psychological interventions for needle related procedural pain concluded that psychological interventions were effective in reducing procedural pain (Uman *et al*., 2006).

A review of systematic reviews on acute procedural pain in children in the hospital setting by Yamada *et al*., (2008) reported the efficacy of music on procedural pain among some children and neonates, but the findings in the systematic reviews were not conclusive as others also reported conflicting results in the same study.

Some nurses in the study administered paracetamol, some gave sweetened solution and others instructed the mother to breast feed the child to enable procedures to be carried out. These were all helpful in reducing the severity of pain.

Several studies have endorsed the use of pharmacological interventions such as topical anaesthesia creams, local anaesthetic lubricant gels, vapo-coolant sprays, among others as effective in the management of procedural pain among children (Lander *et al*., 2006; Brunette *et al*., 2011; Wilson-Smith, 2011). Such interventions may either be used as a single therapy or by combination with other techniques for an effective outcome. Some of these drugs works in a mechanism providing temporary numbness by evaporative cooling which is appropriate for procedures lasting less than 60 seconds, with good efficacy particularly for venepuncture and immunisations (Wilson-Smith, 2011).

This study has demonstrated some significant findings which are very crucial in nursing education and practice of procedural pain management. Recommendations to improve the education in procedural pain management in the curricula of nursing training institutions have been outlined. Findings from this study will support the need for the enhancement of knowledge and skills in procedural pain management among nurses and other health professionals. Findings will also add to the body of literature on procedural pain management among children to support further research

in nursing. This study will also underscore the need for the development of protocols for procedural pain management among children.

CONCLUSION

Nurses in this study have knowledge about procedural pain management but this knowledge was not adequate. There is the need for a teamwork, and for guidelines and policies to be developed for an effective management of procedural pain among children.

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