

## **Children's Nurses' Knowledge and Attitudes on Paediatric Pain: A Descriptive Cross-Sectional Survey in a Developing Country**

Evans Oduro<sup>1</sup>, Abigail Kusi-Amponsah Diji<sup>1</sup>, Grace Kusi<sup>1</sup>, Albert Amagyei<sup>1</sup>, Joana Kyei-Dompim<sup>1</sup>, Alberta Lomotey<sup>1</sup>, Edward Appiah Boateng<sup>1</sup>, Hayford Isaac Budu<sup>1</sup>

<sup>1</sup>*Department of Nursing, Faculty of Allied Health Sciences, Kwame Nkrumah University of Science and Technology, Ghana*

*Corresponding Author: Evans Oduro (kojoevans92@gmail.com)*

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### **ABSTRACT**

**Background:** Children's nurses' knowledge of pain affects their pain management practices. Even though poor knowledge and attitudes have been reported in several studies, most were carried out in developed settings. However, little has been reported on the management of paediatric pain by nurses in resource-limited settings such as in sub-Saharan Africa.

**Purpose:** This study sought to assess the knowledge and perceptions of children's nurses regarding paediatric pain in a Ghanaian context.

**Methodology:** A descriptive cross-sectional survey was carried out among 65 nurses at eight hospitals at various levels of healthcare in Ghana. Over three months, participants' demographic data and responses on the Pediatric Nurses Knowledge and Attitude Survey Regarding Pain (PNKAS) instrument were collected. Data were analyzed and presented using descriptive and inferential statistics.

**Results:** Participants' average (SD) knowledge and attitudes regarding paediatric pain was 36.7% (6.9%) and ranged from 21.4% to 57.1%. Pediatric pain knowledge and attitudes (PPKA) of the nurses differed based on working years in the children's unit and the hospital type they worked in ( $p < 0.05$ ). Nevertheless, the type of hospital facility was the only independent predictor of their PPKA ( $R^2 = 0.181$ ,  $p < 0.001$ ).

**Conclusion:** Children nurses in this setting generally had insufficient knowledge and attitudes on paediatric pain. They should be motivated to undertake self-directed learning and regular continuing professional education to update their knowledge, attitude and skills on evidence-based pediatric pain assessment and management.

**Keywords:** Knowledge and attitudes; nurse; pediatric pain

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## BACKGROUND

Globally, paediatric pain constitutes a major clinical challenge due to the complex interplay of developmental and psycho-social factors (Drendel, Kelly, & Ali, 2011; Jain, Yeluri, & Munshi, 2012; Taylor, Boyer, & Campbell, 2008). Unrelieved paediatric pain persists despite years of research and cost-effective methods of treating it (Kozlowski et al., 2014; Mathews, 2011). Previous research studies report that the prevalence rate of pain (acute or chronic) among hospitalized children ranges between 15% to 88% (Groenewald, Rabbitts, Schroeder, & Harrison, 2012; Haraldstad, Sørsum, Eide, Natvig, & Helseth, 2011; King et al., 2011; Linhares et al., 2012; Mathews, 2011). The percentage of undertreated pain might even be worse for children in developing countries due to poverty, conflict, the high illiteracy rate, among others. Research evidence has shown that untreated pain in the early stages of life can lead to devastating effects, which may be short or long term. These effects may be physiological, developmental, emotional, or behavioural and may persist into the later stages of life (Deere et al., 2012; Friedrichsdorf et al., 2015; Hasuo et al., 2017; King et al., 2011; Mathews, 2011). Untreated paediatric pain has been linked with functional disability, longer duration of hospitalization, poor life quality (Friedrichsdorf et al., 2015), and development of chronic pain (Sessle, 2011), which becomes burdensome to affected children, their families, and societies (Bushnell, Čeko, & Low, 2013; Dueñas, Ojeda, Salazar, Mico, & Failde, 2016).

Nurses form a considerable part of the health provider team and spend almost all their time on the ward with children in pain and their families during hospitalization (Abazari & Namnabati, 2017; Latchman, 2014). They are, therefore, well-positioned and contribute significantly to the assessment and treatment of paediatric pain during hospitalization (Kingsnorth, Joachimides, Krog, Davies, & Higuchi, 2015; Sweet, Shusterman, Nedeljkovic, & Solodiuk, 2018; Van Hulle Vincent, Wilkie, & Wang, 2011; Ziyaeifard et al., 2018). The nurse must possess adequate knowledge and fitting attitudes as these impact on their paediatric pain management capabilities.

However, current studies have reported that children's nurses do not possess sufficient knowledge and also have poor attitudes regarding paediatric pain. Alotaibi, Higgins, and Chan (2019), in a survey among Saudi-Arabian nurses, reported that the nurses in that setting had poor knowledge and attitudes with a mean score of 45.2%. Similarly, Ekim and Ocakcı (2013) reported that low levels of knowledge and attitudes (Mean = 38.2%) among paediatric nurses in Turkey. Other studies have been conducted in various countries such as China (Hua et al., 2019), Mexico (Ortiz et al., 2015), Norway (Smeland, Twycross, Lundeberg, & Rustøen, 2018), and the United States of America (Stanley & Pollard, 2013). All these studies reported that paediatric nurses possessed sub-optimal levels of knowledge and attitudes on paediatric pain management.

Even though the brief review of earlier literature shows that these studies are widely distributed across the world, it also shows that there are a few of them carried out in developing countries, especially in Africa where most of the countries are still developing. Speculatively, a dynamic of factors such as poverty, conflict, the proliferation of diseases, and sub-optimal healthcare systems may lead to worse results than what has been recorded in studies in developed countries. Considering the socio-

politico-economic differences that exist between these developing countries and developed countries of the world, the limited attention given to nurses' paediatric pain knowledge and attitudes in these developing countries presents a worrying gap. In this regard, in a quest to bridge this gap and contribute to the pain management among hospitalized children in under-resourced settings, an evaluation of the knowledge and attitudes of children's nurses in Ghana on paediatric pain was carried out.

## **PURPOSE**

The current study sought to evaluate the knowledge and attitudes of Ghanaian children's nurses on paediatric pain. Additionally, this study examined the independent socio-demographic predictors of nurses' paediatric pain knowledge and attitudes.

## **METHODS**

### **Study design, setting, and participants**

A descriptive cross-sectional survey was carried out at eight hospitals located in the Ashanti region of Ghana, West Africa. These hospitals were selected as they served as the primary point of healthcare for sick children and their families. Apart from the location of these hospitals in urban, peri-urban and rural areas, they were managed by government and private employees. Three of them were Specialist Children's Hospitals, whereas the remaining five were General Hospitals with children's department or directorate within their structure.

The in-patient units of the pediatric care settings were managed by nurses who worked during three (morning, afternoon and evening) shifts to assure a 24-hour continual healthcare service provision. At each shift, an average of two registered nurses was available to cater to 10-15 hospitalized children and their parents or guardians. Nursing activities within the units included patient and family initial and continuing assessment, planning of care, implementation of interventions, and evaluation of nursing care. The regular assessment and interventions for pain in admitted children are considered as an integral aspect of nursing care within the in-patient pediatric care settings.

Registered clinical nurses were considered to meet the eligibility for participation in this study if they were working in the pediatric units or wards of the included hospitals. Nurses who were on maternity, study or casual leave during the study period were excluded from participation. With the help of a sample size calculator by Select Statistical Consultants (2020) and assuming a 5% margin of error, a sample proportion of 60% and a 95% confidence level, 59 nurses were deemed as sufficient in powering the conclusions of the study with a high level of precision. During the recruitment period of the study, 70 registered nurses were working in the in-patient pediatric care settings of all eight hospitals. All 70 nurses in the eight hospitals were approached, out of which 65 agreed to partake in the current study, yielding a response rate of 93%.

### **Data collection procedure**

After securing administrative sanctions from the respective hospitals and the ethics committee, the researchers contacted the nurses at their workplaces and explained the study's objective and procedures. Participants who willingly gave their informed consent completed the data collection tool within 20 to 30 minutes. Over a three-month

study period from February 2019 to April 2019, participants' demographic data and responses on the Pediatric Nurses Knowledge and Attitude Survey Regarding Pain (PNKAS) instrument (Manworren, 2001) were collected.

### **Data collection instrument**

The Pediatric Nurses Knowledge and Attitude Survey regarding pain (PNKAS) instrument consists of 40 items, which are presented as 42 individual questions. Twenty-two (22) of the items are binary statements (true or false responses), while sixteen (16) of the questions are multiple-choice questions (MCQs) followed by two case scenarios, which have been expanded into four questions.

A correctly answered question by the participant on the PNKAS instrument was scored a point, whereas an incorrectly answered one was scored a zero. The least and highest attainable scores on the 42-question instrument are zero (0) and 42 respectively. To ensure standardization of the results, each participant's total correct score was changed into a percentage by multiplying by 100, the fraction of their total score out of 42. Participants who scored 80% and above were regarded as having an appropriate degree of knowledge and attitude regarding paediatric pain.

Reliability and validity of the PNKAS instrument have been established in Manworren's study (Manworren, 2001). Five pain management experts have assessed the content validity of the tool to be appropriate in measuring paediatric nurses' attitudes and knowledge about paediatric pain. A test-retest reliability coefficient of 0.67 has been recorded among 12 healthcare professionals, signifying an acceptable level of instrument stability. Data obtained from two independent groups of pediatric nurses revealed Cronbach's alpha values of 0.72 and 0.77, signifying an appreciable level of internal homogeneity. Prior to the use of the instrument in the current study, the tool's face validity was established by an eleven-member group consisting of children's clinical nurses, nurse-educators, and paediatricians in Ghana.

### **Statistical analysis**

Utilizing the Statistical Package for Social Sciences (SPSS) software version 25, the data were analyzed and presented using descriptive and inferential statistics. Continuous variables were presented as means, standard deviations (SDs), medians and ranges. Categorical variables, on the other hand, were illustrated as frequencies and percentages. Differences in mean (SD) of the PNKAS scores between two groups were analyzed using the independent sample t-test analysis. Variations in the observations in three or more groups were evaluated using the analysis of variance (ANOVA) analysis.

### **Ethical considerations**

Approvals from the eight hospitals that were considered for the study were acquired before the commencement of the study. Ethical approval with approval number CHRPE/AP/574/18 was acquired from the Committee on Human Research, Publications and Ethics (CHRPE). After explaining the study aim and procedures to the nurses, verbal consent of participation, and the completion and submission of the data collection tool was considered as evidence for their informed consent. Participants took

part in the study out of their free will, and participants were assured of anonymity and confidentiality of their responses.

## RESULTS

### Participant's demographic characteristics

As illustrated in Table 1, a majority of the participants were between the ages of 23 and 30 years (63.1%). Many of them were females (81.5%) and had obtained a Diploma in Nursing as their highest educational qualification (64.6%). Over three-fifths of the participants had worked as nurses for up to five years (63.1%) and in the children's unit for up to three years (76.9%). In the period of this study, nearly two-thirds of the sampled nurses (66.2%) worked in general hospitals which had pediatric departments within them.

Table 1: Stratification of participants by PNKAS scores (n=65)

Variable	f (%)	% Mean (SD)	% Range	p-value
Age (years)				
23 – 30	41 (63.1)	35.8 (7.6)	21.4 – 57.1	0.164*
31 – 38	24 (36.9)	38.3 (5.2)	28.6 – 47.6	
Gender				
Male	12 (18.5)	37.5 (7.3)	23.8 – 47.6	0.674*
Female	53 (81.5)	36.6 (6.8)	21.4 – 57.1	
Educational level				
Certificate	13 (20.0)	35.7 (9.6)	21.4 – 57.1	0.798#
Diploma	42 (64.6)	36.8 (6.4)	23.8 – 50.0	
Degree	10 (15.4)	37.6 (4.9)	31.0 – 47.6	
Years in nursing				
Up to 5 years	41 (63.1)	37.0 (6.6)	28.6 – 57.1	0.638*
Above 5 years	24 (36.9)	36.2 (7.4)	21.4 – 50.0	
Years in children's unit				
Up to 3 years	50 (76.9)	37.8 (6.9)	23.8 – 57.1	0.021*
Above 3 years	15 (23.1)	33.2 (5.7)	21.4 – 45.2	
Hospital				
Specialist	22 (33.8)	32.7 (4.5)	21.4 – 40.5	<0.001*
General	43 (66.2)	38.8 (7.0)	23.8 – 57.1	
PNKAS scores (%)		36.7 (6.9)	21.4 – 57.1	

Note: PNKAS – Pediatric Nurses' Knowledge and Attitudes Regarding Pain; f – Frequency; % – Percentage; SD – Standard deviation; \* - Independent samples t-test analysis; # - One-way analysis of variance (ANOVA) analysis

### Nurses' knowledge and attitudes regarding pediatric pain

The mean percentage of correct scores on the PNKAS instrument for the participants was 36.7%; a range of 21.4% to 57.1% (Table 1). Tables 2 and 3 provides the top 10 correct and incorrectly answered questions that were provided by participants. Areas where participants showed good knowledge and attitudes were related to items that focused on the individualized essence of the pediatric pain experience and its management, non-pharmacological interventions, and pharmacological methods of managing pain as well as the influence of culture on paediatric pain (Table 2). The areas where unsatisfactory knowledge and attitudes were recorded centred on

pharmacokinetics (drug, administration, distribution, metabolism and excretion), pain assessment and pain perception (Table 3).

Table 2. Most correctly answered areas (n=65)

Item contents (correct answer)	f (%) Correct
Combination of analgesics and non-drug therapies may result in a better level of analgesia with fewer side effects than in the case of a single analgesic agent	48 (73.8)
Following initial prescribed dose of opioid analgesic, the individual's response must be taken into consideration to make adjustments	47 (72.3)
To prevent anticipatory anxiety, children should be highest pain and anxiety treatment before the first procedure if the procedure is going to be repeated	45 (69.2)
Children/adolescents should not be made to endure pain too much pain before administering opioids.	43 (66.2)
Similar stimuli do not illicit the same level of pain intensity in different people.	41 (63.1)
Parents should be allowed to be present when painful procedures are carried out on their children.	40 (61.5)
Ibuprofen and other NSAIDS provide effective analgesia for pain in bone malignancies	39 (60.0)
Benzodiazepines are not effective in increasing the effect of opioids if the pain is not related to muscle spasms.	39 (60.0)
Children less than two years do not reduce pain sensitivity or limited pain memory because their nervous system is not developed.	38 (58.5)
Children should be individually assessed to ascertain the influence of culture on their pain experience	36 (55.4)

### Relationship between socio-demographic characteristics and nurses' knowledge and attitudes on paediatric pain

An independent sample t-test and one-way analysis of variance (ANOVA) revealed that there were no statistically significant differences in the pediatric pain knowledge and attitudes (PPKA) scores based on participants' age ( $p=0.164$ ), gender ( $p=0.674$ ), educational level ( $p=0.798$ ) and years worked in the nursing profession ( $p=0.638$ ) (Table 1). Statistically significant differences were observed between the PPKA scores and nurses' working years in the children's unit as well as the hospital type they were presently working in ( $p<0.05$ ). Nurses who had worked in the children's unit for up to three years ( $M=37.8\%$ ,  $SD=6.9\%$ ) had significantly higher scores compared to their counterparts who had worked for more than three years ( $M=33.2\%$ ,  $SD=5.7\%$ );  $t(63)=2.38$ ,  $p=0.021$ . Scores were significantly higher among nurses who worked in general hospitals ( $M=38.8\%$ ,  $SD=7.0\%$ ) than nurses who worked in specialist pediatric hospitals ( $M=32.7\%$ ,  $SD=4.5\%$ );  $t(60)=-4.29$ ,  $p<0.001$ .

### Predictors of nurses' pediatric pain knowledge and attitudes

An analysis by multiple linear regression was conducted to ascertain if the number of working years in the children's unit and the type of hospital facility could independently predict nurses' pediatric pain knowledge and attitudes (PPKA). Results indicated that the number of working years in the children's unit was not a significant predictor, hence, a simple linear regression model was run with the type of hospital facility as the only independent variable. The analysis showed that the type of hospital facility

(pediatric specialist or general) significantly explains 18.1% of the variability within the PPKA in the model with the following formula: Nurses' PPKA=26.553 + (6.131\* type of hospital facility),  $R=0.426$ ,  $R^2=0.181$  ( $p<0.001$ ).

Table 3. Top 10 areas least performed in by participants (n=65)

Item contents (correct answer)	f (%) Correct
Two hours after a child named Robert was given morphine 2 mg IV, he consistently rated his pain as moderate to severe and reported no untoward side effects. The physician's prescription for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." The best action to take at this time is to administer morphine 3 mg IV now.	0 (0.0)
The usual time before the best effects for traditional oral analgesics is 30 minutes	0 (0.0)
5 mg of IV Morphine would be the same in potency as 15 mg of oral morphine	0 (0.0)
Only 10% of patients over-report the intensity of their pain.	3 (4.6)
Assessment of the pain of a child who interacts and socializes with visitors but reports pain intensity of 8 will be recorded as pain intensity of 8.	5 (7.7)
If a child complains of moderate to severe pain two hours after initial administration of Morphine upon physician's order of "morphine IV 1-3 mg q1h PRN pain relief." the best course of action to take is to administer Morphine 3 mg IV immediately.	6 (9.2)
Postoperatively, initial analgesics for pain should be given constantly on fixed schedules.	6 (9.2)
Likelihood of an opioid addiction occurring due to pain treatment with opioid analgesics is <1%.	8 (12.3)
A 15-year-old Robert is lying quietly and grimaces on the bed on the first postoperative day. He self-reports his pain as 8 on a scale of 0 to 10 where 0 means no pain and 10 signifies worst pain. His pain be should be recorded as 8	10 (15.4)
Analgesia for chronic cancer pain should be given constantly.	10 (15.4)

Note: IV – Intravenous; mg – Milligram; q1h – Hourly; PRN – When necessary

## DISCUSSION

The current study sought to assess nurses' knowledge and attitudes about paediatric pain at eight selected healthcare facilities in the Ashanti region of Ghana. Additionally, we were interested in examining the independent socio-demographic predictors of nurses' pediatric pain knowledge and attitudes (PPKA). It was revealed from our findings that the sampled nurses generally had insufficient knowledge and poor attitudes toward paediatric pain. This was shown in their average score of less than 40%. This is consistent with earlier findings in America (Ortiz et al., 2015; Stanley & Pollard, 2013), Europe (Smeland et al., 2018), Asia (Hua et al., 2019) and Middle East (Alotaibi et al., 2019; Ekim & Ocakci, 2013) regions; reiterating the widespread nature of this problem. These findings may explain the persistence of untreated paediatric pain despite research advances and cost-effective treatment approaches (Kozlowski et al., 2014; Mathews, 2011). Nurses should be encouraged to be self-directed in their learning, especially in areas where they perceive care deficiencies. Continual professional education on paediatric pain assessment and management practices should be organized at regular intervals to update the knowledge, attitude and skills of practising nurses.

The nurses in this study had high pediatric pain knowledge and comparatively positive attitudes on items that assessed the individualized nature of the pediatric pain experience and its management, drug and non-drug pain management interventions as well as the influence of culture on paediatric pain. This suggests that participants had a good understanding of the subjective, complex and multi-dimensional nature of the pain experience (Peirce, Corkish, Lane, & Wilson, 2018) and its treatment modalities (Kahsay, 2017). They further reported good PPKA on drug and non-drug pain management interventions. The use of drug and non-drug pain management approaches has an added advantage of minimizing the amount of analgesic consumption and its associated side effect while providing maximal pain relief (Wren et al., 2019). Additionally, participants appreciated the influence of culture on pain perception and its management. For instance, among many cultures in developing countries including Ghana, exhibiting pain may be seen as a sign of weakness and hence children might be taught to concede their pain. This can, therefore, pose a challenge for nurses in effectively managing the pain experienced by children.

Participants had poor PPKA on items that centred on pharmacokinetics, pain assessment and pain perceptions. Pharmacokinetics has been recognised in previous studies as an area of deficiency for nurses (Meechan, Mason, & Catling, 2011; Ndosi & Newell, 2009; Ortiz et al., 2015) and reiterates the need for more intense education on this subject during and after nursing training. Pain assessment inadequacies and misconception on paediatric pain have been identified among nurses in previous studies (Ortiz et al., 2015; Smeland et al., 2018; Zisk-Rony, Lev, & Haviv, 2015). Educational strategies that have the potential to improve nurses' knowledge and attitudes should be employed to enhance pain care received by affected children and their family caregivers. Such educational strategies should also include pain management protocols to serve as guidelines for nurses in their assessment and management of pain in children. In line with findings from previous studies (Alotaibi et al., 2019; Hua et al., 2019; Ortiz et al., 2015; Smeland et al., 2018), a significant number of the items of poor PPKA centred on the two case studies which required application of participants' knowledge of pediatric pain assessment and management. Case studies should be used during educational offerings on this subject to assist nurses to critically apply the knowledge gained.

Our study findings also showed that pediatric pain attitudes and knowledge differed based on nurses' working years in the children's units and departments and the type of hospital facility (general or specialist) they worked in. Nevertheless, the type of hospital facility was the only independent predictor of their PPKA. This finding differs from those of previous research studies whereby they identified personal pain experience (Kiekkas et al., 2015) and the higher level of education (Kiekkas et al., 2015) as significant predictors of nurses' knowledge and attitudes regarding pain. Our current study finding can be attributed to the fact that the majority of the general hospitals with pediatric departments were government-owned and employed highly skilled nurses relative to the pediatric specialist hospital, which had majority being privately-owned. Due to the high cost of healthcare financing, privately-owned facilities are unable to hire high skilled professional nurses in their facilities as they lack the capacity to pay them. The government of Ghana should support privately-owned hospitals so that they



can employ and pay a high calibre of healthcare professionals to deliver good quality universal healthcare access to the general populace including children and their family caregivers.

This study has strengths and limitations. The inclusion of nurses from eight different study sites contributes to the reliability of the findings. All nurses who qualified for inclusion in the present study were approached thereby reducing selection bias. We did not sample nurses who were working at referral hospitals and suggests this as an area for further research exploration. The sampled nursing participants were relatively younger than the nursing population that caters for children admitted in hospitals and their families; outcomes of the study should be interpreted cognizant of this fact. Despite these shortfalls, the current study provides insights into nurses' knowledge and attitudes regarding paediatric pain in Ghana.

## CONCLUSION

Nurses in this context had insufficient knowledge and poor attitudes with regards to paediatric pain. Consideration should be given to sections of both high and substandard pediatric pain knowledge and attitudes when developing and implementing educational strategies on this subject. The type of hospital facility (pediatric specialist or general hospital with a pediatric department) could independently predict the pediatric pain attitudes and knowledge of the nurses. To enhance good quality universal access to healthcare, the Government of Ghana should support privately-owned healthcare facilities to hire and pay highly-skilled healthcare professionals including nurses to tackle the pain management needs of hospitalized children and their families. Nurses should be motivated to engage in self-directed learning to improve areas of deficiencies. Periodic educational programs should be organised to update them on evidence-based pediatric pain assessment and management techniques. Future studies should assess the attitudes and knowledge of nurses on pediatric pain working at referral hospitals.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interests

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