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Nursing and Midwifery Students' Knowledge and Attitudes Regarding Children's Pain

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Abstract

Background: The knowledge and attitudes of nurses and midwives, as well as nursing and midwifery students on pediatric pain are crucial in the management of hospitalized children's pain. However, few studies have addressed the preparedness of nursing and midwifery students to manage children's pain based on their knowledge and attitudes. This study therefore assessed nursing and midwifery students' knowledge and attitudes pertaining to children's pain management.

Methods: This descriptive cross-sectional study was conducted on 554 nursing and midwifery students who were in their last year at four nursing and midwifery training institutions in city Ghana in 2018-2019. Data were collected over a three-month period using the Pediatric Nurses' Knowledge and Attitudes Survey regarding pain (PNKAS). Data analyzed by the SPSS version 25 and presented using descriptive statistics and independent T test and one-way ANOVA.

Results: Participants had an average PNKAS score of 42.1% (range: 21.4% to 81.0%). The nursing and midwifery students in either public (44.1%±7.9%) or private (43.7%±9.6%) university had significantly higher scores than those in a public nursing and midwifery training college (40.3%±6.9%) (p<.001).

Conclusion: Nursing and midwifery students in the study generally had insufficient knowledge and attitudes toward children's pain. There is an urgent need to intensify education in this area so as to adequately prepare these students to cater to the pain needs of vulnerable children and their families. Future studies should focus on how student's theoretical knowledge and attitudes are linked to their pediatric pain assessment and management practices.

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Introduction

Despite the existence of guidelines on pain assessment and management, children continue to experience unrelieved pain during hospitalization (1-3). Inadequate pain management in children is a global health concern due to difficulties encountered in assessing and managing pain in this vulnerable group (4). Infants and young children may not be able to describe their pain, its nature, location and severity depending on their age and cognitive development (5). Hence, nurses forming the majority of healthcare providers may be required to use appropriate strategies to assess and manage children's pain based on their level of cognitive development and pain typology (6).

The consequences of unrelieved and mismanaged pediatric pain is not limited to sensations of discomfort and unpleasantness but incorporates further insidious body system malfunctioning (7, 8). These include hyperglycemia, increased inflammatory responses, gastrointestinal obstruction, immunosuppression, chronic pain among others (9-11). Furthermore, it poses financial burden for affected families and healthcare systems due to delayed recovery time and its associated increased cost of healthcare (12). Unrelieved pain has been noted to significantly affect children's school attendance, performance, their ability to play and socialize (13-16).

Considering the effects of unrelieved pain on children's health, it is not surprising that effective pain management has been recognized as a fundamental human right of every child (17). Efficient pain management, however, partly relies on sufficient knowledge and appropriate attitudes of health care providers particularly nurses, who spend most of their time with hospitalized children and their families. As members of the healthcare team, nurses play a vital role in the management and control of pain through accurate assessment, planning, implementation and evaluation of pain relief measures (18). In order for nurses to perform their pain assessment and management roles efficiently and effectively, they need to be adequately prepared during their training period. Nursing students ought to have a solid knowledge base of pediatric pain and its management during the undergraduate nursing program as this impact on their practice post-qualification (18).

There is limited literature on nursing and midwifery students' knowledge and attitudes regarding children's pain, especially in the sub-Saharan Africa sub-region. Results of earlier cross-sectional studies in Jordan, Egypt and Mexico revealed insufficient knowledge and attitudes regarding children's pain among nursing students (19-21). The current study aimed at assessing nursing and midwifery students' knowledge and attitudes toward children's pain management in Ghana. Additionally, we examined the sociodemographic factors that influence their pediatric pain knowledge and attitudes.

Methods

This descriptive cross-sectional study was conducted at four nursing and

midwifery training institutions in Ghana in 2018-2019. Two of the educational institutions were training colleges (one private, one public) whereas the other two were universities (one private, one public). The duration of nursing and midwifery education in the training colleges is three years whilst that of the universities is four years. The educational institutions admit both regular and matured applicants (those above 25 years) for their nursing and midwifery programs. Some of the matured applicants in the universities are registered nurses who already have diploma qualifications and are in the process of upgrading them to Bachelor's degree. During the period of the study, there were 1100 final year nursing and midwifery students based on the institutions' registry. A minimum of 293 participants were required based on the Yamane's formula for calculating sample size for cross-sectional studies (22). The probability of making a type I error was estimated to be 5% with a 95% confidence interval. 10% non-response rate was added to the required sample size of 293, thereby increasing the target sample size to 322. After obtaining the requisite approvals from the institutions and the ethics committee, the researchers approached 900 final year nursing and midwifery students during their recess times in between lectures or some other school activity. Their class representatives were contacted for their assistance in getting as many students as possible to be present for the briefing sessions. The aims and nature of the study were explained to the participants before obtaining their informed consent. Five hundred and fifty-four (554) students agreed to participate in the current study providing a response rate of 61.6%. Over a three-month period in the first semester of the 2018-2019 academic year, research data were collected from all four schools using the Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain (PNKAS) (23).

Data were gathered using Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain (PNKAS) instrument which comprises of 40 items which have been expanded into 42 individual questions. The first 22 items are statements requiring a true or false response; the next 16 items are multiple choice questions (MCQs) followed by two case studies which have been protracted into four questions. A correctly answered question on the PNKAS instrument was scored one point, whereas an incorrectly answered item was given a zero score. The total score of this 42-item instrument was converted into percentages for standardization purposes. Consistent with earlier studies, (24, 25) a student who attained 80% of the total score was considered as having satisfactory knowledge and attitudes regarding children's pain.

The psychometric properties of the PNKAS instrument has been evaluated and reported by Manworren in the United States of America where five national pain management experts have validated the content to be appropriate (23). She further tested the stability of the instrument through a test-retest reliability among 6 nurses and 6 child life specialists with a correlation coefficient of 0.67. The internal consistency of the instrument has also been tested among two different

groups of pediatric nurses with Cronbach's alpha reliability coefficients of 0.72 to 0.73, respectively (23).

Windows, version 25 (IBM Corp., Armonk, N.Y., USA. Continuous variables were presented as means, standard deviations (SDs), medians and ranges. Categorical variables were illustrated as frequencies and percentages. Differences in means (SDs) of the PNKAS scores between two groups were analyzed using the independent sample t-test analysis. Differences between three or more groups were evaluated using the one-way analysis of variance (ANOVA) analysis.

Ethical considerations

Permission to gain access to potential final year nursing and midwifery students was secured from the management of the participating institutions. The Committee for Human Research, Publications and Ethics (CHRPE), School of Medical Sciences (SMS), Kwame Nkrumah University of Science and Technology (KNUST) ethically approved the study (CHRPE/AP/574/18). After explaining the study protocol to the students, the completion and submission of the questionnaire served as evidence for their informed consent. Participation in the current study was voluntary, and students were assured of anonymity and confidentiality of their responses.

Results

Participants' mean age was $24 \pm (4)$ years ranging from 16 to 47 years. Majority of them were aged less than 25 years (72.7%) and were females (81.5%) (Table 1). More than half of the participants were from nursing and midwifery training college (NMTC) institutions and were pursuing the Nursing program.

Participants had a mean PNKAS score of 42.1% (8.0%), with a minimum score of 21.4% and a maximum score of 81.0%. As shown on Table 2, the top 10 items most often answered correctly by the participants centered on: the subjective and multidimensional nature of the pain experience and its treatment, the benefits of pre-emptive and multimodal analgesia, the role of parental presence during painful procedures, pain perceptions, useful pain medications and drug interactions. The top 10 items most often answered incorrectly by the participating students focused on cancer-related pain medications, pharmacokinetics (metabolism and elimination), pain assessment, usefulness of placebo and no pharmacological pain management interventions (Table 3).

There were no statistically significant differences in the mean PNKAS scores on the basis of participants' age group, gender and program of study ($p > .05$) (Table 1).

There was a statistically significant difference in the mean PNKAS scores of at least one group comparison; $F(3, 550) = 7.47, p < .001$ (Table 1). Post-hoc test with Bonferroni correction revealed that there was a statistically significant difference in the PNKAS scores between two pairwise comparisons ($p < .05$) (Table 4). The greatest mean difference of 3.8% was observed between a public university ($44.1\% \pm 7.9\%$) and a public NMTC ($40.3\% \pm 6.9\%$) ($p = .001$). The lowest mean difference was 0.3% that no significant difference between a public university ($44.1\% \pm 7.9\%$) and a private university ($43.7\% \pm 9.6\%$) ($p > .999$).

Table 1. Stratification of participants by PNKAS scores (n=554)

Variable	Catagories	N (%)	Mean (SD)	Min. – Max.	P value
Age (years)	≤ 25	403 (72.7)	41.9 (7.6)	21.4 – 64.3	.311*
	>25	151 (27.3)	42.7 (9.0)	23.8 – 81.0	
Gender	Male	136 (24.5)	43.0 (7.2)	26.2 – 61.9	.158*
	Female	418 (75.5)	41.8 (8.3)	21.4 – 81.0	
Institutions	Public NMTC	218 (39.4)	40.3 (6.9)	21.4 – 57.1	<.001#
	Private NMTC	137 (24.7)	42.5 (7.7)	26.2 – 61.9	
	Public University	82 (14.8)	44.1 (7.9)	28.6 – 64.3	
	Private University	117 (21.1)	43.7 (9.6)	23.8 – 81.0	
Program of Study	Nursing	347 (62.6)	42.6 (7.9)	23.8 – 71.4	.097*
	Midwifery	207 (37.4)	41.4 (8.2)	21.4 – 81.0	

Note: Independent samples t-test analysis; # – One-way analysis of variance (ANOVA) analysis.

Table 2. Top 10 items most often answered correctly by participants (n=554)

Item contents (correct answer)	N (%) Correct
Comparable stimuli in different people produce the same intensity of pain (F)	434 (78.3)
Children who will require repeated painful procedures should receive maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures (T)	433 (78.2)
Combining analgesics and non-drug therapies that work by different mechanisms may result in better pain control with fewer side effects than using a single analgesic agent (T)	386 (69.7)
After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response (T)	384 (69.3)
Parents should not be present during painful procedures (F)	374 (67.5)
Spiritual beliefs may lead a child/adolescent to think that pain and suffering are necessary (T)	317 (57.2)
Ibuprofen and other non-steroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases (F)	316 (57.0)
Because their nervous system is underdeveloped, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences (F)	310 (56.0)
Pediatric patients who can be distracted from pain this usually do not have severe pain (F)	309 (55.8)
Benzodiazepines do not reliably potentiate the analgesia of opioids' unless the pain is related to muscle spasms (T)	308 (55.6)

Note: T – True; F – False

Table 3. Top 10 Items most frequently missed by participants (n=554)

Item contents (<i>correct answer</i>)	N (%)
Which of the following drugs are potentially useful for treatment of children's cancer pain? (<i>All of the above</i>)	5 (.9%)
The likelihood of narcotic addiction in children who are being treated with opioids is: (<1%)	38 (5.1%)
Two hours after a 15-year-old Andrew received morphine 2 mg IV, his pain ratings consistently ranged from moderate to severe and he had no clinically significant side effects. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." The action you will take at this time is to: (<i>Administer morphine 3 mg IV now</i>)	43 (7.8%)
Andrew is 15 years old and this is his first day following abdominal surgery. As you enter his room, he smiles at you and continues talking and joking with his visitor. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort), he rates his pain as 8. Circle the number that represents your assessment of Andrew's pain: (8)	81 (14.6)
The percentage of patients who over report the amount of pain they have is: (0 or 10)	98 (17.7)
Observable changes in vital signs must be relied upon to verify a child's statement that he/she has severe pain (F)	104 (18.8)
Robert is 15 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort), he rates his pain as 8. On the patient's record you must mark his pain on the scale as: (8)	127 (22.9)
An equivalent of 15 mg of oral morphine is: (<i>Morphine 5 mg IV</i>)	135 (24.4)
Giving children sterile water by injection (placebo) is often a useful test to determine if the pain is real (F)	163 (29.4)
Non-drug interventions are very effective for mild-moderate pain control but are rarely helpful for severe pain (F)	163 (29.4)

Note: T – True; F – False

Table 4. Pairwise comparisons between the training institutions

Comparison	Mean Difference (%)	P value
Public University versus Public NMTC	3.8	.001
Public University versus Private NMTC	1.5	.963
Public University versus Private University	0.3	>.999
Private University versus Public NMTC	3.5	.001
Private University versus Private NMTC	1.2	>.999
Public NMTC versus Private NMTC	-2.3	.052

Note: NMTC: Nursing and Midwifery Training College

Discussion

The current study aimed at assessing final year nursing and midwifery students' knowledge and attitudes regarding children's pain at some selected training institutions in Ghana. Additionally, we were interested in examining the sociodemographic factors that influence their pediatric pain knowledge and attitudes. The overall goal of this study was to provide baseline information to guide the development and implementation of a pediatric pain educational program for nursing and midwifery students for improved pediatric pain assessment and management. The current study revealed that final year nursing and midwifery students' knowledge and attitudes regarding children's pain are far from the optimum. Our study finding is congruent with earlier studies where inadequate knowledge and attitudes regarding children's pain management was reported among nursing students (19–21). This suggests that nursing students are not adequately prepared during their training to assess and manage children's pain in practice. There is the urgent need to review the nature of education received by nursing students on children's pain assessment and management.

A major concern observed in the current study was the inadequacy of knowledge and attitudes related to pain assessment, analgesics and pharmacokinetics (drug administration, distribution, metabolism and Elimination), similar to previous studies (19–21). Greater emphasis should be placed on these areas during the development and implementation of educational interventions on pediatric pain. Consistent with earlier studies, (21,26,27) majority of the studied participants believed that the giving of placebo injection is a useful test for determining the veracity of patient's pain and equally perceived nonpharmacological interventions to be ineffective in managing severe pain. This suggests that the students did not believe in patients self-report of pain despite the evidence that it is the best way of assessing and evaluating a patient's pain (28). It also further demonstrates that, majority of nursing and midwifery students harbor misconceptions about the efficacy on nonpharmacological pain management interventions. Nonpharmacological interventions have been shown to reduce pain associated with diverse causes and procedures (29). The use of nonpharmacological interventions should therefore be encouraged as they reduce the amount of analgesic consumption needed in treating pain and associated side effects. (30–32).

Our study revealed a statistically significant mean difference between two pairs of the training institutions under study. The differences existed between a Public NMTC and a Public University as well as between a Public NMTC and a Private University. These findings suggest that, students trained in the Universities (either public or private) are likely to exhibit good knowledge and positive attitude regarding pediatric pain compared to those from the Public NMTC.

However, no statistically significant mean difference was observed among students from the NMTC and those trained in the Universities, making it difficult to attribute the differences to the curricula or number of years spent in school. This is because both private and public NMTCs use the same curricula, study for the same number of years (3years) with the public NMTC generally having nurse educators with relatively higher degrees and/or experience. What remains unknown is how the students' theoretical knowledge would be manifested in clinical practice.

Results from this study highlight the insufficiency of knowledge and attitudes of final year nursing and midwifery students when it comes to children's pain management at some selected training institutions in Ghana. The healthcare settings might benefit if students are well oriented on pain management in order to nurture positive attitude with regard to children's pain management among our future nurses. This could be achieved through the review of the nursing curricula in Ghana to devote a greater amount of time to the teaching of pain and if possible, in special population such as children. Nurse educators and clinical preceptors should be well equipped with the topic of pain themselves so that they can impart positively on students and also act as their role models.

The study looked at knowledge and attitude regarding pain in children among final year nursing students in training colleges and the Universities in order to carry out a number of analyses. Despite this strength, the following shortcomings needs to be considered. The study was cross-sectional and could only explain associations and not causality. The study was also limited to the use of a questionnaire survey; an observational study would have given us a different perspective of their actual pain assessment and management practices.

Conclusion

The study revealed that final year nursing and midwifery students at some selected training institutions in Ghana generally have insufficient knowledge and attitudes toward pain in children. There is the urgent need to promote education in this area so as to adequately prepare these students to cater for the pain needs of vulnerable children and their families. Future studies should focus on how student's theoretical knowledge and attitudes are linked to their pediatric pain assessment and management practices.

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