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ARTICLE

Assessment of nurses' knowledge and practice regarding the use of gum chewing during Pediatric intravenous cannulation.

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Abstract

Background: Children who undergo pediatric intravenous (IV) cannulation frequently experience severe pain and anxiety. Gum chewing is one non-pharmacological strategy that has drawn interest due of its ability to lessen procedural pain and discomfort. When it comes to using such straightforward, economical methods, nurses are essential. The purpose of this study was to evaluate nurses' understanding and application of gum chewing during pediatric IV cannulation. *Subject and methodology:* A descriptive study strategy was used. Over the course of four months, the study was carried out in the general pediatric units connected to Al-Habobi Hospital in the Dhi-Qar Governorate of Iraq. Fifty nurses were chosen as a convenience sample. A structured interview questionnaire measuring nurses' awareness of gum chewing and an observational checklist measuring nurses' usage of gum chewing as a non-pharmacological pain treatment technique were the two instruments used to gather data. The Chi-square test, Fisher Exact Test, and descriptive statistics were used in the analysis of the data using SPSS version 25.0. A statistically significant p-value was defined as <0.05. Results: The results showed that, regarding chewing gum, 56% of nurses had average knowledge, 24% had extensive knowledge, and 20% had poor understanding. Most nurses reported limited use of chewing gum during intravenous cannulation (60%), while 28% demonstrated moderate practice and only 12% demonstrated good practice. Knowledge was positively associated with practice ($r = 0.42$, $p = 0.002$) and was significantly influenced by age, education, and previous training ($p < 0.05$). *Conclusion:* Nurses' knowledge and use of chewing gum techniques during intravenous cannulation were insufficient and require improvement. *Recommendations:* It is recommended to integrate chewing gum into routine nursing care and provide ongoing training to improve nurses' skills in pediatric intravenous cannulation.

Keywords: Intravenous cannulation, Chewing gum, Pediatrics, Assessment, Nursing knowledge and practice.

1. Introduction

Intravenous (IV) cannulation is a routine, but destabilizing, procedure in the pediatric setting, mainly due to the pain, movement, and pain sensitivity of children. In addition to technical skill, effective channeling requires the use of helping strategies that facilitate a more fluid and cooperative experience for both the child and the health professional [1].

In recent years, chewing gum has been introduced as a simple and inexpensive distraction method during pediatric procedures, including intravenous cannulation. Involving the child in an active and enjoyable activity, such as chewing gum, can reduce anxiety and improve cooperation, which in turn can help the nursing staff to complete the procedure more easily and with fewer interruptions [2].

The effective use of these support strategies depends largely on the training of nursing staff and their familiarity with evidence-based practices. Since nursing staff are often the first healthcare professionals to interact with children during invasive procedures, their knowledge of innovative techniques, such as the use of chewing gum, plays a crucial role in improving procedural outcomes and the overall patient experience [3].

Therefore, understanding the scope of nursing knowledge and practice is essential to identify existing gaps and challenges that may hinder the routine use of these simple yet effective methods. Previous research has shown that lack of awareness, limited training, and lack of institutional protocols often hinder the adoption of non-traditional techniques, even when nurses recognize their potential benefits [4].

Therefore, this study aimed to examine nurses' knowledge and actual use of gum chewing techniques during pediatric intravenous cannulation. Emphasizing the importance of continuing education and hands-on training may help integrate these child-friendly approaches into standard nursing practice, thereby improving the quality and success of pediatric procedures [5].

1.1 Significance of the Study:

Intravenous (IV) cannulation is widely performed in pediatric care, yet it remains challenging and demands not only technical proficiency but also the use of supportive, child-focused strategies to ensure success [6]. Although gum chewing is recognized as a simple, low-cost, and effective distraction technique that can ease the cannulation process, its use in everyday clinical practice remains limited. This is largely attributed to variations in nurses' practices and insufficient awareness of its benefits [7].

In Iraq, as in many other countries, there is a notable shortage of structured training programs designed to enhance nurses' knowledge and implementation of such non-pharmacological approaches, which further contributes to their inconsistent use [8]. Opportunities to increase procedural success and kid collaboration are frequently lost in the absence of appropriate training. In order to close current gaps and lay the groundwork for evidence-based nursing interventions that can raise the standard of pediatric nursing care, the goal of this study is to assess nurses' knowledge and practice of gum chewing during pediatric IV cannulation.

1.2 Aim of the Study

The purpose of the current study was to assess nurses' understanding and application of gum chewing during pediatric IV cannulation.

1.3 Hypothesis

What are the levels of nurses' knowledge and practice concerning gum chewing use during pediatric IV cannulation?

2. Materials and Methods / Methodology

2.1 Design:

This study used a descriptive research design.

2.2 Study settings:

The general pediatric units affiliated to Al-Habobi Hospital, Dhi-Qar Governorate, Iraq, served as the study's site.

2.3 Study Subjects:

A convenience sample of all nurses (50) employed in the aforementioned study location, irrespective of their years of experience, age, or qualifications, was included in the study. and who were available and willing to participate in all sessions and assessments. The study was, recruited for 4 months' period

2.4 Data collection tools:

Tool 1: A structured interview questionnaire sheet for nurses.

After reading the relevant literature, the researchers created it in plain Arabic. It consists of 41 multiple-choice questions that the researcher gathered from nurses interviewed to gauge their familiarity with the non-pharmacological gum chewing technique. It was divided into the following two sections:

Part 1: Research nurses' characteristics, including age, sex, education, years of experience in general pediatric units, and prior participation in a gum chewing intervention training program.

Part 2: What the nurse knows about chewing gum is a concern. There were 41 multiple-choice questions in all, covering the following topics:

- The definition of gum chewing and the locations where it should be used
- the significance of gum chewing for kids; the impact of gum chewing on cognitive functioning

- common kinds of gum pieces; risks or issues associated with children's chewing
- the definition of IV cannulation
- the reasons why kids refuse to have their IVs cannulated
- the detrimental effects of minor medical procedural pain (IV cannulation) on kids; and the levels or categories of minor medical procedural pain resulting from (IV)
- Pre-discharge guidance on non-pharmacological pain management techniques, such as chewing gum

2.5 Scoring system:

In accordance with [9], the questionnaire's scoring methodology assigned a score of two for a correct complete response, one for a correct incomplete response, and zero for an inaccurate, missed, or unknown response. A percentage score of less than 60% indicated low knowledge, a score between 60% and 80% indicated average knowledge, and a score between 80% and 100% indicated strong or good knowledge.

Tool II: Nurses' observational checklists for administering gum chewing:

It was taken from [10] and translated into plain Arabic by the researcher to assess nurses' performance in terms of gum chewing as a non-pharmacological approach to treating children's pain. Among them were:

It consisted of the following four major sub-items:

- Chewing positions (e.g., repositioning the patient in the fowler or semi-fowler posture);
- Mouth examination (e.g., making sure the oral cavity is free of issues or chewing-related issues);
- Gum administration (e.g., giving youngsters sweetened and unsweetened gum).
- The duration of gum chewing (e.g., the amount of time the child was asked to chew until the IV cannulation procedure was finished)

Scoring system

According to [9], the observation checklist's score methodology classified each checklist step as either fully completed, partially completed, or not completed. The nurses' level of practice was classified as low if the percent score was > 60%, moderate if the percent score was between 60% and 80%, and high if the percent score was between 80% and 100%. Each fully completed choice received a score of (2), incompletely completed choices received a score of (1), and the not done item received a score of (0).

2.6 Validity & reliability of tools

Three pediatric nursing specialists served on the jury that reviewed the constructed tool to determine its content validity in terms of clarity, content, item order, and relevance or irrelevance. The appropriate changes were made in response to their feedback. The Alpha Cronbach's coefficient was used to measure the internal consistency of the instruments' items in order to assess their reliability. The three tools' alpha reliability was as follows: tool 1 had a reliability of r = 0.776, whereas tool II had a reliability of r = 0.976.

2.7 Pilot study

A pilot study was carried out 10% of the total sample size (5 nurses), to ascertain the feasibility, applicability and clarity of the tool. The results confirmed the appropriateness of the tools, and the pilot sample was excluded from the main study.

2.8 Methods

- After outlining the purpose of the study, a formal letter was submitted to the hospital's director and the head of each general pediatric unit in the specified setting requesting permission to perform the study. After analyzing the relevant literature., the researcher created the tools.
- The study's data collecting took place over the course of four months, from January 1, 2025, to April 31, 2025.
- At the start of the study, the researcher explained the objectives and procedures and provided a brief introduction to the nursing staff involved in pediatric intravenous cannulation.
- Each nurse participated in an individual interview using Parts 1 and 2 of Instrument I to collect background information and assess their knowledge of the non-pharmacological technique of chewing gum.
- The participating nurses were then divided into six groups of roughly eight to ten members. During the interviews, the researcher used a mix of questioning, discussion, brainstorming, and small-group activities to promote engagement and facilitate learning.

- All interviews were conducted in clear, straightforward English, and each session ended with a summary provided by the researcher. Nurses were encouraged to request clarification or further explanation on any points addressed during the discussion.

2.9 Ethical Considerations:

The study received ethical approval from the Faculty of Nursing's Research Ethics Committee. Each nurse was verbally informed of the study's purpose and agreed to participate. They were assured that their participation was voluntary, that they could withdraw at any time without consequences, and that all information collected would be kept anonymous and handled securely.

2.10 Analysis of Statistics

Data analysis was performed using IBM SPSS Statistics, version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the demographic characteristics of the participating nurses. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean ± standard deviation (SD). The chi-square (χ^2) test was used to examine associations between categorical variables, while Fisher's exact test was applied when the expected frequency in any cell was less than five. A p-value less than 0.05 was considered statistically significant.

3. Result

Table 1 outlines the demographic characteristics of the nurses who took part in the study. The age data showed that 36% were older than 30, while the largest proportion 40% fell between 25 and 30 years old. Women made up 90% of the participants, which aligns with the predominantly female nature of the nursing profession. In terms of education, 44% held a nursing diploma, 36% had a bachelor's degree, and 20% had completed a master's degree. Work experience varied, with 28% having less than five years of experience and 44% having worked between five and ten years. A notable finding was that 80% of the nurses had never received any formal training related to gum-chewing techniques.

Table 2 summarizes the nursing staff's overall knowledge regarding the use of chewing gum during pediatric IV cannulation. More than half (56%) displayed a moderate level of knowledge, whereas 20% showed limited understanding and 24% demonstrated a high level of awareness. These findings suggest that most nurses possess a basic grasp of the technique; however, additional structured training and evidence-based guidelines are still needed to further enhance their knowledge.

Table 3 highlights the overall level of practice among nurses in applying gum-chewing techniques during pediatric IV cannulation. The results show that 60% had a low level of practice, 28% demonstrated a moderate level, and only 12% showed a high level of practical application.

These results highlight a significant gap between knowledge and implementation, underscoring the need for continuing education programs and hands-on workshops to strengthen nursing staff skills in the use of chewing gum as a supportive intervention.

The relationship between nurses' sociodemographic traits and their knowledge levels is seen in table (4). regarding gum chewing during pediatric IV cannulation. Statistically significant associations were found between age ($p = 0.045$), educational level ($p = 0.032$), and previous training ($p = 0.013$) with knowledge levels. About 40% of younger nurses (<25 years) had poor knowledge, while good knowledge was more frequent among those >30 years (58.3%)

Also, 50% of nurses with a bachelor's degree had good knowledge compared to 33.3% of diploma holders. Previous training significantly improved knowledge, as 25% of trained nurses had good knowledge versus 10% among untrained ones. However, no significant relationship was detected between sex or years of experience and knowledge levels.

The association between the knowledge and practice of nurses about gum chewing during pediatric IV cannulation is shown in table (5). A positive connection that was statistically significant was discovered ($r = 0.42$, $p = 0.002$), indicating that higher knowledge scores were associated with better practice levels among the nurses.

Table 1. The sample's distribution of nurses based on their demographic information.

Characteristics	No.	(%)
Age (years)		
< 25	12	24.0
25 < 30	20	40.0
> 30	18	36.0
Sex		
Male	5	10.0
Female	45	90.0
Education		
Diploma Nursing	22	44.0
Bachelor Nursing	18	36.0

Postgraduate/Other	10	20.0
Years of Experience		
< 5 years	14	28.0
5 – 10 years	22	44.0
> 10 years	14	28.0
Previous Training on Gum Chewing		
Yes	10	20.0
No	40	80.0

Table 2. Total Nurses' Knowledge Levels regarding gum chewing during IV cannulation (n = 50)

Knowledge Level	Frequency (n)	Percentage (%)
Poor (<60%)	10	20%
Average (60–<80%)	28	56%
Good (80–100%)	12	24%

Table 3. Total Nurses' Practice Levels regarding gum chewing during IV cannulation (n = 50)

Practice Level	Frequency (n)	Percentage (%)
Low (<60%)	30	60%
Moderate (60–<80%)	14	28%
High (80–100%)	6	12%
Total	50	100%

Table 4. Relation Between Nurses' Demographic Data and Knowledge Levels (n = 50)

Demographic Data	Poor Knowledge (n=10)	Average Knowledge (n=28)	Good Knowledge (n=12)
Age (years)			
< 25	4 (40.0%)	6 (21.4%)	2 (16.7%)
25 – 30	3 (30.0%)	14 (50.0%)	3 (25.0%)
> 30	3 (30.0%)	8 (28.6%)	7 (58.3%)
χ^2 (p-value)		7.912 (0.045*)	
Sex			
Male	2 (20.0%)	2 (7.1%)	1 (8.3%)
Female	8 (80.0%)	26 (92.9%)	11 (91.7%)
χ^2 (p-value)		2.412 (0.220)	
Education Level			
Diploma Nursing	6 (60.0%)	12 (42.9%)	4 (33.3%)
Bachelor	2 (20.0%)	10 (35.7%)	6 (50.0%)
Postgraduate/Other	2 (20.0%)	6 (21.4%)	2 (16.7%)
χ^2 (p-value)		8.526 (0.032*)	
Years of Experience			
< 5 years	4 (40.0%)	8 (28.6%)	2 (16.7%)
5 – 10 years	4 (40.0%)	14 (50.0%)	4 (33.3%)
> 10 years	2 (20.0%)	6 (21.4%)	6 (50.0%)
χ^2 (p-value)		5.617 (0.060)	
Previous Training			
Yes	1 (10.0%)	6 (21.4%)	3 (25.0%)
No	9 (90.0%)	22 (78.6%)	9 (75.0%)
χ^2 (p-value)		6.214 (0.013*)	

FE: Fisher Exact χ^2: Chi square test MC: Monte Carlo

*: Statistically significant at $p \leq 0.05$

Table 5. Association for the knowledge and practice of nurses (n = 50)

Variables	(r)	P-Value
practices vs. the knowledge	0.423	0.0019*

*Statistical significance is defined as $p < 0.05$.

4. Discussion

Chewing gum is a simple supportive method to facilitate intravenous cannulation, a common, though often complex, procedure in pediatric care. The effective use of this technique depends largely on the knowledge and practical skills of nursing staff, highlighting the importance of improving their skills to ensure safe and efficient care of children [6].

The results of this study indicated that there were no significant variations in terms of nurses' age, education level, years of experience, or previous training in gum chewing techniques. The majority of nurses had five to ten years of work experience, were between the ages of 25 and 30, and had a nursing diploma, while most of them were females and had not received any prior training on gum chewing interventions. These findings are in agreement with [11], who studied "Nurses' knowledge and practice regarding non-pharmacological methods during pediatric intravenous procedures" and reported that most participants were females, aged in their twenties, and had diploma-level education with limited exposure to formal training programs. From the perspective of the researcher, it was indicated that, the demographic profile of the nurses indicates that limited training and moderate experience may contribute to gaps in their knowledge and practice regarding gum chewing interventions.

The current study's findings about the nurses' overall knowledge levels showed that over half of them had an average level of knowledge, while a smaller percentage had good knowledge and a significant number had inadequate knowledge. These results are in line with those of [4], who investigated the "Effect of structured training program on nurses' performance regarding pediatric intravenous cannulation" and found that, as a result of inadequate training and little exposure to evidence-based practices, most nurses knew only a moderate amount about pediatric IV procedures.

On the other hand, these findings contradict those of [12], who carried out research on the topic of " gum chewing' effect on pain & anxiety in Turkish children during intravenous' cannulation: A randomized controlled study." and found that, higher knowledge levels among most of nurses following specialized workshops and continuous education on innovative interventions like gum chewing. This current result may be attributed to the limited availability of structured training programs and the lack of emphasis on non-pharmacological interventions such as gum chewing in routine nursing curricula

Concerning the overall practice levels of nurses, the present results indicated that the majority exhibited low practice regarding the use of gum chewing during pediatric IV cannulation. This gap may be due to a lack of hands-on training, absence of clear clinical protocols, and limited exposure to non-pharmacological methods in daily practice. These findings are in agreement with [11], who studied " Nurses' practice regarding non-pharmacological pain management during pediatric procedures" and emphasized that the higher proportion of nurses often underperform in applying supportive interventions by using gum chewing due to insufficient practical training.

Regarding the association between nurses' sociodemographic traits and their knowledge levels, the present study found that knowledge about gum chewing during pediatric IV cannulation was significantly correlated with age, educational attainment, and prior training, with a highly statistically significant difference at $p < 0.001$. These results are in line with those of a study called "Effect of educational programs on nurses' knowledge and performance regarding non-pharmacological pain relief techniques in pediatrics" [13] and reported that higher education and specific training significantly enhanced nurses' knowledge of non-pharmacological interventions.

In contrast, the results differ from [14], who studied "Factors affecting nurses' knowledge and application of pediatric IV procedures in clinical settings" and found no significant correlation between age and knowledge, suggesting that continuous professional development could compensate for age-related differences. The observed significant association can be explained by the fact that nurses with higher education and prior training are more likely to be exposed to updated evidence-based practices, while older nurses may gain deeper understanding through accumulated clinical experience. On the other hand, younger or less experienced nurses might not have had enough exposure to cutting-edge non-pharmacological techniques like gum chewing, which could result in lower knowledge levels.

The current study found a statistically significant favorable link between nurses' knowledge and practice regarding gum chewing during pediatric IV cannulation. These findings are in line with [11], who conducted study about " Nurses' practice regarding non-pharmacological pain management during pediatric procedures" and reported that improved knowledge through targeted education significantly enhanced nurses' procedural practices.

On the other hand, the same current findings differ from [15], who studied "link between nurses' knowledge and practice regarding pediatric intravenous interventions" and discovered that knowledge and practice did not significantly correlate, suggesting that practical training and organizational support might sometimes outweigh theoretical knowledge in improving performance. The current result illustrated that, the positive correlation between nurses' knowledge and practice can be explained by the fact that well-informed nurses are more capable of translating theoretical understanding into effective clinical actions. Adequate knowledge enhances confidence, decision-making, and adherence to evidence-based techniques, which directly improves the quality and accuracy of their practice.

5. Conclusions

It was concluded that nurses' knowledge and practice on gum chewing during IV cannulation are insufficient as evidenced by the majority of nurses had an average knowledge level and low practice level regarding gum chewing during IV cannulation and require improvement through targeted training and evidence-based guidelines.

Recommendation

It is recommended to integrate gum chewing interventions into routine nursing care and to implement continuous educational programs to enhance nurses' knowledge and practice in pediatric IV cannulation.

Conflicts of Interest

No conflicts of interest exist.

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