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ORIGINAL PAPER

Nurses' knowledge of paediatric gastrostomy care

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ABSTRACT

Introduction: Gastrostomy enables long-term enteral nutrition for patients who are unable to consume food orally due to various medical conditions. Currently, children with gastrostomy are found in all types of hospital departments, which emphasizes the importance of ensuring that nursing staff possess adequate and up-to-date knowledge regarding its care and management. Proper gastrostomy care is essential to prevent complications, ensure patient comfort, and support effective nutritional therapy. The aim of this study was to assess the level of nurses' knowledge concerning various aspects of gastrostomy care.

Material and methods: The study was conducted in July and August 2023 at the Children's Clinical Hospital of the Medical University of Warsaw. Researchers utilized a structured questionnaire consisting of 23 questions, including 18 focused specifically on practical knowledge related to gastrostomy care.

Results: A total of 181 nursing staff members participated in the study. The majority of participants were female (98%), over the age of 35 (61%), and held higher education degrees (73.5%). Among all respondents, only 42.4% demonstrated a good level of knowledge. No statistically significant correlation was found between the knowledge level and the type of department (surgical vs. non-surgical; $p = 0.567$) or level of education ($p = 0.315$). However, years of professional experience had a statistically significant influence on the knowledge level ($p = 0.043$). The highest percentage of correct answers (90%) was given to the question, "What can be administered through a gastrostomy?", while the lowest percentage (34.3%) concerned the timing of gastrostomy plate movement.

Conclusions: The findings clearly highlight the need for ongoing training and educational programs to enhance nursing competencies in gastrostomy care and improve patient safety.

KEY WORDS:
care, children, gastrostomy, gastrostomy tube.

INTRODUCTION

Gastrostomies are primarily performed to provide nutritional support for children who are unable to maintain adequate oral nutrition. They are considered when long-term feeding *via* a nasogastric or nasoenteric tube comes to be required for more than 3–6 weeks [1]. Additionally, they allow for the administration of medications and for gastric decompression. A gastrostomy tube can be placed either endoscopically or surgically; the success rate of the procedure is approximately 99%, and the mortality rate does not exceed 1% [2, 3].

The main indications for performing a gastrostomy include improving the nutritional status of malnourished patients for whom oral nutrition is insufficient or impossible [4], swallowing disorders, which most commonly affect patients with neurological conditions [5, 6], the need to provide increased energy intake, such as in children with cystic fibrosis or during chemotherapy or radiotherapy [7], and nutritional support in metabolic or

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neurological diseases, such as facilitating the administration of a poorly tolerated diet or a ketogenic diet [7, 8]. Gastrostomy is becoming increasingly common. It allows for longer survival, better weight and growth gains in patients, and facilitates a quicker transition to outpatient care, which in turn improves the quality of life not only for the children but also for their parents.

One of the key elements of care for a gastrostomy tube is nursing care, and the knowledge of nurses in this area is important for several reasons. Firstly, it ensures the provision of high-quality care for patients – nurses with adequate knowledge of gastrostomy can more effectively prevent complications and respond quickly to concerning symptoms. This, in turn, leads to improvements in the health and comfort of patients and reduces the risk of hospitalization due to complications. Secondly, good gastrostomy care helps prevent complications – gastrostomy, as a medical procedure, carries the risk of various complications such as infections, leaks, displacement or obstruction of the gastrostomy. Well-trained nurses are able to identify these risks early, allowing for quicker resolution and minimizing the risk of more serious health issues. Thirdly, it helps improve the quality of life of patients – nurses' knowledge of proper gastrostomy care can significantly impact the quality of life for patients, especially those who rely on this type of support long-term. Proper care of the gastrostomy prevents discomfort and helps maintain the best possible health condition of the patient. Increased knowledge enhances safety in clinical practice – nurses who are well-trained in gastrostomy care are more confident in their actions, reducing the risk of errors. This knowledge also promotes adherence to procedures and standards that are critical for safe and effective medical care. Finally, the educational aspect cannot be overlooked – nurses with appropriate knowledge are also better equipped to educate patients and their families on gastrostomy care. This helps patients and their families feel more competent in caring for the gastrostomy themselves, promoting their independence and reducing the stress associated with daily life [7].

In summary, the knowledge of nursing staff is a key element in ensuring safe and effective care, and its assessment allows for the identification of training needs that can improve the quality of care, patient safety, and the better organization of work in medical facilities.

The aim of the study was to assess the level of nurses' knowledge regarding the care of a child with a gastrostomy tube. Additionally, the study evaluated the relationship between the level of knowledge and factors such as work experience, workplace, and education level.

MATERIAL AND METHODS

The survey study was conducted among the nursing staff employed at the Józef Polikarp Brudziński Public Paediatric Clinical Hospital of the University Clinical Center of the Medical University of Warsaw (DSK UCK WUM) in Warsaw. The study was carried out in July and August 2023.

The survey included 23 questions and was divided into two parts: a demographic section and 18 closed-ended, single-choice questions related to the care of percutaneous endoscopic gastrostomy (PEG). Additionally, the respondents were asked to provide a subjective assessment of their knowledge regarding PEG.

The survey was distributed to all nurses working in both non-surgical departments (paediatrics, diabetology, pneumonology and allergology, paediatric gastroenterology and nutrition, oncology and haematology, cardiology, endocrinology, nephrology, neurology, infectious diseases) and surgical departments (surgery, traumatology, otolaryngology, cardiac surgery).

The primary endpoint was the number of respondents with a high level of knowledge, defined as providing > 75% correct answers to the questions in the questionnaire. A medium level of knowledge was defined as providing 25–75% correct answers, and a low level of knowledge as providing < 25% correct answers.

χ^2 tests were used to compare qualitative variables, with 0.05 considered the threshold for statistical significance. Calculations were made using Statistica 13 software (TIBCO, Tulsa, Oklahoma, USA).

The study was approved by the Bioethics Committee of the Medical University of Warsaw, under approval number 69/2024.

RESULTS

A total of 181 surveys (79.98%) were analyzed. Respondents' ages ranged from 20 to 60 years. The vast majority of respondents were women (178/181, 98.3%), under 35 years old (39.2%), with a master's degree (43.1%), and more than 20 years of work experience (45.3%). Among them, 123 (68.0%) were employees of non-surgical departments. Selected characteristics of the respondents are summarized in Table 1.

The vast majority of respondents reported that their knowledge about gastrostomy was obtained in the medical school or from colleagues (43.1% and 38.7%, respectively). The remaining participants indicated other sources, such as specialized courses (9.9%) or scientific articles (5.5%). Only two individuals admitted that they had no knowledge about gastrostomy. A clear majority (118 people, 65.2%) rated their level of knowledge as average, 25 (13.8%) individuals rated it as high, and 38 people (21.0%) rated it as low. Nearly all respondents expressed a willingness to participate in training on gastrostomy (161 people, 89.0%).

The largest group of respondents (54.1%) demonstrated an average level of knowledge about gastrostomy care, as shown in Table 2.

The level of knowledge was significantly higher among individuals with longer work experience ($p = 0.043$). However, neither education nor age had an impact on the level

TABLE 1. Characteristics of the studied group

Age (years)	20–35	36–50	> 50
n (%)	71 (39.2)	58 (32.0)	52 (28.7)
Education	Secondary	Bachelor's degree	Master's degree
n (%)	48 (26.5)	55 (30.4)	78 (43.1)
Work experience (years)	0–5	6–20	> 20
n (%)	46 (25.4)	53 (29.3)	82 (45.3)

of knowledge, with $p = 0.315$ and $p = 0.567$, respectively. The actual knowledge of the respondents exceeded their self-assessment – 13.8% believed their knowledge to be high, while 42.5% actually achieved this result.

Analysing the frequency of correct answers to the questions, regardless of the type of department the respondents worked in, showed that the most challenging questions were those regarding the initiation of feeding time, the time for activating the gastrostomy, and the need to assess gastric content retention. The answers to the questions are presented in Table 3.

The answers were compared between non-surgical and surgical departments, revealing statistically significant differences in the responses regarding the frequency of catheter flushing and the assessment of gastric content retention before using the feeding tube. Respondents from non-surgical departments significantly more often answered correctly the question about the frequen-

TABLE 2. Overall knowledge assessment of respondents

Level of knowledge	Number of respondents, *n* (%)
High	77 (42.5)
Average	98 (54.1)
Low	6 (3.3)

TABLE 3. Questions included in the survey along with the number of correct answers received

Question	Number of people who answered correctly, *n* (%)
How long since the gastrostomy procedure can feeding be started through it?	90 (49.7)
How often should the gastrostomy be flushed?	99 (54.7)
Can a person with a gastrostomy bathe in a bathtub or swim in a pool, and if so, when?	117 (64.6)
What can be administered through a gastrostomy?	176 (97.2)
In what position should a patient with a gastrostomy be fed?	163 (90.1)
How should the completely healed skin around the gastrostomy be cared for?	162 (89.5)
What should be used to flush the gastrostomy?	174 (96.1)
Can a patient with a gastrostomy eat orally?	114 (62.9)
How long can a patient be fed through a gastrostomy?	147 (81.2)
Can a patient with a gastrostomy undergo rehabilitation?	135 (74.6)
How long does a patient feel pain after a gastrostomy is placed?	147 (81.2)
What should be done if the gastrostomy falls out?	154 (85.1)
When should the external disc of the gastrostomy be rotated?	62 (34.3)
Before administering nutrition through the gastrostomy, should the gastric contents be checked for retention?	63 (34.8)
How much fluid should be used to flush the gastrostomy?	171 (94.5)

TABLE 4. Comparison of correct answers provided by respondents from non-surgical and surgical departments

Questions	Correct answers *n* (%)		*p*-value
	Non-surgical	Surgical	
How often should the gastrostomy be flushed?	75 (61.0)	24 (41.4)	0.014
Can a patient with a gastrostomy undergo rehabilitation?	98 (79.7)	37 (63.8)	0.022
Before administering nutrition through the gastrostomy, should the gastric contents be checked for retention?	36 (29.3)	27 (46.6)	0.023

TABLE 5. Correct answers depending on work experience and education

Parameters	Work experience, correct answers, *n* (%)			
	0–5 years	6–20 years	> 20 years	*p*-value
How often should the gastrostomy be flushed?	33 (71.7)	30 (56.6)	36 (43.9)	0.009
How should the completely healed skin around the gastrostomy be cared for?	36 (78.3)	51 (96.2)	75 (91.5)	0.011
Can a patient with a gastrostomy eat orally?	16 (34.8)	42 (79.3)	56 (68.3)	< 0.001
What should be done if the gastrostomy falls out?	30 (65.2)	50 (94.4)	74 (90.2)	0.000
Parameters	**Education, correct answers, *n* (%)**			
Education	**Secondary**	**Bachelor's degree**	**Master's degree**	***p*-value**
How long after the gastrostomy creation can feeding be started through it?	34 (70.8)	23 (41.8)	33 (42.3)	0.003

cy of catheter flushing (OR = 2.2 (95% CI: 1.17–4.18)). The opposite situation applied to the assessment of gastric content retention, where respondents from non-surgical departments had lower chances of providing the correct answer (OR = 0.5 (95% CI: 0.25–0.9)). Similarly, a statistically significant difference between non-surgical and surgical respondents was observed in the response to the question about the possibility of rehabilitating a patient with a PEG tube. Respondents from the non-surgical departments had twice the chance of providing the correct answer (OR = 2.2; 95% CI: 1.11–4.45). Detailed results are presented in Table 4.

The impact of work experience on the frequency of correct answers was found to be significant in the case of four questions, while the impact of education was significant in only one question (Table 5).

DISCUSSION

We found that less than half of the respondents had high-level knowledge on the subject, defined as providing > 75% correct answers. It might seem that the threshold we set was too high; however, in matters of patient care, nursing staff should adhere to the highest standards. It should be emphasized that the level of knowledge was very diverse and depended on the topics addressed in the questions. In some areas covered by the survey, the level of knowledge was very high (with correct answers from the majority of respondents in the range of 90%), while other areas presented significant problems, with only about 30% of answers given correctly. We did not observe any correlation between the level of knowledge and the type of department (surgical/non-surgical) or education level. However, longer work experience was correlated with a higher level of knowledge.

In the available literature, in both Polish and English, no similar studies have been conducted among nursing or medical staff. Additionally, no similar study was found that addressed, for example, caregivers in nursing homes or parents of children with a gastrostomy. Therefore, it is difficult to assess the level of knowledge in the discussion for these other groups of respondents. One can only, with all the differences, compare our results with the works assessing nursing staff knowledge regarding other nursing procedures. Alotaibi *et al.*, who assessed the knowledge of 395 nurses working in hospitals with adult and paediatric patients with tracheostomies, found that 59% of nurses had insufficient knowledge, 39% had moderate knowledge, and only 2% had good knowledge; the average number of points obtained in the survey was 21.6 ±9.11 out of 43 [8]. Góźdź, in her survey conducted a few years ago at the Department of Surgical and Clinical Nursing at the Medical University of Warsaw, found an average score of 10.8 ±0.18 out of 15. She used the same knowledge assessment scale as we did in our study, which is based on quartiles [9]. According to her study, only 43% of the respondents had a sufficiently high level of knowledge, meaning that they answered 12 or more questions correctly. Similar results were obtained in a study in Kazakhstan, where knowledge about care for peripheral intravenous catheter insertion was assessed as low (defined as < 50% correct answers) in 79.5% of nurses [10]. In other Polish survey studies, the results are similar. For example, just over half of the respondents demonstrated a good or very good level of knowledge about the proper nutrition of individuals with chronic wounds [11].

As mentioned above, we did not find a correlation between the level of knowledge of nurses regarding gastrostomy care and their level of education. The results obtained significantly differ from those found by most authors assessing nurses' knowledge of tracheostomy care or hospital infections. In most of these studies, nurses with higher education demonstrated greater knowledge than nurses with vocational education. In the study by Alotaibi *et al.*, higher education was associated with greater knowledge of tracheostomy care. In the Kazakh study, Cruz *et al.* also showed that higher education correlates with a greater understanding of the principles of care for peripheral intravenous catheters [8, 10]. In Poland, Chwedoruk *et al.* demonstrated the impact of higher education of nurses on the scope of knowledge regarding hospital

infections transmitted through direct contact [12]. However, some authors obtained results similar to ours. For example, Zhang *et al*., who assessed nurses' knowledge about stoma care, found that the level of education had no impact on their knowledge [13]. It should also be noted that the level of knowledge may be related to specialization in a specific narrow field. For example, stoma nurses or those who have completed relevant courses and training have a higher level of knowledge about caring for patients with a stoma than those who are not stoma nurses or have not completed the aforementioned courses [14]. In the Polish study by Cichońska *et al*., no differences were found related to education level in the knowledge about vascular access [15]. Similar results were obtained by Pisarek *et al*. in a study assessing nurses' knowledge about the importance of nutrition in patients with chronic wounds [11]. The differences in the results described above may arise from various factors. The curricula in such different regions of the world as Poland, Saudi Arabia, and Kazakhstan may be completely different. Additionally, different nursing procedures were assessed, making it difficult to directly compare the care for peripheral intravenous access, which is certainly performed many times by every nurse working in a given department, with care for tracheostomies, which is often the domain of otolaryngology departments, or care for gastrostomies, which is more commonly found in departments of gastrointestinal surgery and gastroenterology. It should also be considered that the surveyed groups were relatively small, and the majority of the surveys were not validated. These results are very difficult to summarize or compare. However, in all studies, one noticeable fact is that completing training or courses, regardless of the education level, significantly increases knowledge about patient care. This statement seems obvious, but the number of practical courses or training offered to working nurses, at least in Polish hospitals, is not large. It also seems that in the case of procedures that are not part of mandatory lectures (e.g., gastrostomy care or vascular access), or those that do not receive sufficient time during practical classes, clinical practice and independent (or ideally supervised) learning to perform the procedure, followed by repeated practice, are of the greatest importance. However, it must be remembered that these practices may vary slightly between departments.

Based on the results of our study, it can be concluded that a higher level of knowledge was associated with a longer work experience. These results are consistent with the findings of the previously cited studies [14, 16]. However, it should be emphasized that the differences between the groups were not significant, i.e., the group with 0–5 years of work experience provided 67.4% correct answers, while the group with 6–20 years of work experience and the group with over 20 years of work experience provided 76.1% and 73.5% correct answers, respectively. The vast majority (65.2%) of respondents assessed their level of knowledge about gastrostomy as average, with approximately 14% rating it as high or very high. Almost all (89%) respondents expressed a willingness to participate in a training session on gastrostomy.

The study conducted, with all its differences, is most similar to numerous studies evaluating nurses' knowledge about tracheostomy care, both in foreign and Polish research [10–12]. All these results are very consistent and indicate that the majority of nurses do not consider themselves prepared to care for gastrostomy or tracheostomy. In a Polish study conducted in the same center, it was shown that in their subjective assessment of their knowledge about tracheostomy care, only one in ten nurses rated it as high, and none rated it as very high [11]. In the study by Alotaibi *et al*., who assessed knowledge about tracheostomy in a group of nearly 400 nurses working in Saudi Arabia, it was found that 59% and 39% of the respondents rated their knowledge as poor and moderate, respectively [8]. Similarly, this was found in other studies assessing knowledge about tracheostomy care, including in Brazil and Rwanda [14, 15]. At the same time, it should be emphasized that the overwhelming majority of nurses in all the aforementioned studies expressed a willingness to participate in training that would increase their knowledge on the assessed topic. It is difficult to compare the results of such diverse studies, but it seems that nurses in Poland adequately assess their knowledge of the described procedures and express a desire for further education.

Our study is the first to assess the knowledge of nursing staff regarding the care of patients with a gastrostomy. This study involved the entire nursing staff employed in the hospital, both in surgical and non-surgical departments. It allows for the identification of areas of low and high knowledge among many individuals who may come into contact with children fed through gastrostomy, which will help to implement appropriate actions aimed at improving the quality of care for gastrostomy patients. However, our study has limitations. One of them is that it was conducted in a single center and did not include the knowledge level of nurses working in Primary Health Care. After the patient leaves the hospital, they – along with the staff of the nutrition clinic – are the ones who most frequently have contact with the patient and should be the source of transferring/information about proper procedural standards. The study included a relatively small group of respondents (181 people), but it was sufficient for a reliable statistical analysis.

It seems that this survey, in its current or slightly modified version, could be used for routine assessments of the knowledge of nurses working in departments where they encounter or could potentially encounter patients with a gastrostomy. It could also be used to assess the knowledge of staff working in nursing homes with children with disabilities (many of whom require gastrostomy feeding) or the parents or caregivers of children. The results obtained this way could help improve

the quality of care not only for children but also for adults with a gastrostomy.

CONCLUSIONS

The results of our study indicate an insufficient level of knowledge among nurses working at DSK UCK WUM regarding the care of patients with a gastrostomy. It is necessary to introduce training for the aforementioned medical staff group.

DISCLOSURES

1. Institutional review board statement: The study was approved by the Bioethics Committee of the Medical University of Warsaw, under approval number 69/2024.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

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