



Assessment of Nurses' Performance regarding Care of Children Suffering from Intussusception

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Abstract

Intussusception is a serious condition in which part of the intestine folds into the section next to it. It may result in small bowel obstruction, peritonitis, and bowel perforation. It is the most common in children younger than 5 years old with high morbidity and mortality rate. This study aimed to assess nurses' performance regarding care of children suffering from intussusception. A descriptive research design was utilized in the current study. This study was conducted at the pediatric surgical department and pediatric surgical intensive care units at Mustafa Hassan affiliated to Fayoum University, Fayoum General Hospital and Fayoum Health Insurance Hospital. A purposive sample composed of (100) nurses who provide care for children with intussusception in the previous mentioned settings. Three tools were used for data collection, 1st tool: A structured interview questionnaire to assess nurses' knowledge related to intussusception, 2nd tool: Observational Checklist, to assess nurses' actual practices regarding care of children with intussusception and 3rd tool: attitude -type rating scale to assess nurses' attitude regarding care of their children suffering from intussusception. Revealed that, the mean age of studied nurses was 26.6 ± 5.45 years and 79% of the studied nurses had unsatisfactory knowledge also, 76% of them had in-competent level of practice regarding care of children with intussusception and 61% of the studied nurses had negative attitude regarding care of children suffering from intussusception. Furthermore, there were statistically significant relation between the studied nurses' total level of knowledge, practices and attitude and their personal characteristics with P value = 0.000. Based on results of the present study, it can be concluded that, more than two third of the studied nurses had unsatisfactory knowledge regarding care of children with intussusception also, more than three quarters of them had in-competent level of practice and less than two third of the studied nurses had negative attitude regarding care of children suffering from intussusception. Moreover, there were statistically significant relation between the studied nurses' total level of knowledge, practices and attitude and their personal characteristics, namely, age, educational level, years of experience in surgical department and attending training courses with p value=0,000. Constantly educational training program for nurses to improve their knowledge, practices, and attitude regarding care of children suffering from intussusception.

Keywords: Children, Intussusception, Nurses, Performance.

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1. Introduction

Intussusception is the invagination of a segment of bowel into an adjacent segment resulting in an intestinal obstruction. It is the most commonly acquired cause of intestinal obstruction in children aged 4 months to 2 years with a peak incidence between 4 to 9 months of age. Etiology of intussusception is reported to be idiopathic in about 90% of cases and it is rarely associated with pathological lead points such as Meckel's diverticulum, intestinal polyp, and intestinal lymphoma. Therefore, the mean annual incidence worldwide is estimated at 50–250 per 100,000 live births [31,40].

Consequently, there are different types of intussusceptions; ileo-colic, ileo-ileo-colic, jejuno-jejunal, jejuno-ileal, and Colo-colic. Therefore, Ileo-colic intussusception is considered the most common type which accounts for over 80% of cases in children [13]. Meanwhile, signs and symptoms of intussusception represents one of the most classic presentations of any patient's child which includes vomiting, intermittent abdominal pain, pulling legs to the chest, rectal bleeding, often with "red currant jelly" stool, and lethargy, but the passage of blood per rectum occurs in only one-third of patients.

However, ultrasound is the first-choice investigation for intussusception because ultrasound has high specificity and sensitivity of nearly 100% for intussusception [19,24]. Management of intussusception should be involving multidisciplinary team from pediatric surgeon, pediatrician, radiologist, anesthetist, and pediatric nurses, it can be treated by operative or non-operative through hydrostatic or pneumatic enema. The competence of qualified and well-trained pediatric nurses in the care of intussusception child makes them not only excellent alternative care provider, but also, they have knowledge and skills [11,37]. Nurses play an important role in caring of children with intussusception through assessing the child preoperative for measuring vital signs, abdomen examination, pain management, providing adequate respiration, providing rest and comfort, maintaining fluid and electrolyte balance, administer prescribed medications, initiate IV fluids to avoid dehydration. Also, monitor stool for bloody diarrhea, monitor intake and output, reducing fear and anxiety, insert nasogastric tube and perform gastric decompression, perform, or assist with therapeutic enema and explain each procedure for the parent, check the routine laboratory tests before surgery such as complete, blood count, electrolyte tests and coagulation studies [29]. Postoperative nursing care includes monitoring the child for cardiopulmonary response and identifying surgical complications. However, the high priority for the nurse is to maintain airway, breathing and circulation, care for the surgical site and notify the physician for any observe as signs of poor wound healing, bleeding or infection, maintaining normal bowel elimination, giving information and instructions for discharge plane of care, providing the parents with instruction in stoma care if the child has the colostomy, teach the parents to be alert and report signs of complications with explain follow up plan [16].

2. Significance of study

Intussusception is one of the most common causes of intestinal obstruction in infancy and childhood which leads to increasing morbidity and mortality. However, the accurate incidence is unknown for most developing countries and for many developed countries. It is overall estimated to occur in 24 to 230 cases per 100,000 live births [8]. Unfortunately, many children can initially be misdiagnosed with other abdominal or neurologic conditions, meanwhile, if not promptly diagnosed and treated the intussusception can lead to intestinal necrosis, perforation, sepsis and can potentially be fatal. At the same time, the prognosis for intussusception is excellent if treated quickly, but if untreated it can lead to death within two to five days. Therefore, the nurse must possess knowledge and practical skills regarding care of intussusception child [41,19]. So, from the research point of view, it is important to conduct the current study to assess nurses' knowledge, practice and attitude regarding care of children having intussusception.

3. Aim of the study

This study aims to assess nurses' performance regarding care of children suffering from intussusception.

4. Research questions

The research will answer the following questions:

- What are the levels of nurses' performance regarding care of children suffering from intussusception?
- Is there a relation between nurses' performance regarding care of children suffering from intussusception and their characteristics?

5. Subjects and Methods

5.1. Technical design

- The technical design includes research design, setting, subject and tools for data collection.

5.2. Research design

A descriptive research design was used for conducting this study.

5.3. Setting

This study was conducted at pediatric surgical department and pediatric surgical intensive care units (PSICU) at Mustafa Hassan Hospital affiliated to Fayoum University, Fayoum General Hospital affiliated to ministry of health and Fayoum Health Insurance Hospital affiliated to health insurance.

5.4. Research subjects

A purposive sample composed of (100) nurses who are providing care for children with intussusception aged less than 3years old, from both sex at the previously mentioned settings during the study period and excluded the children who have any other disorders that may cause intestinal obstruction as Hirschsprung, malrotation, adhesive small bowel obstruction. Also, excluded the internship studied nursing.

5.5. Research tools

Three tools were developed by the researcher to collect the necessary data for this study through using the following tools:

5.5.1. Tool I: A structured interview questionnaire

It was designed by a researcher in an Arabic language after reviewing the related literature to assess nurses' knowledge about intussusception and consists of two parts [27]:

5.5.1.1. Part (I)

It was including data about:

1. Characteristics of the studied nurses namely, age, gender, educational level, years of experience and receiving training programs about intussusception.
2. Characteristics of the studied children namely, age, gender, weight, height, and length of hospital stay.
3. Weight and height were evaluated by using a child growth chart to distinguish between normal and abnormal height and weight.

5.5.1.2. Part (II): Predesigned questionnaire sheet

This tool was adapted [27] to assess nurses' knowledge about care of children with intussusception. It consisted of (37) multiple choice questions about definition, common age, type, signs & symptoms, diagnosis of intussusception, anatomy of GIT, and preoperative and postoperative care.

5.5.1.3. Scoring system

Knowledge of nurses was scored and calculated according to their answers, it was evaluated using the models answers sheet that was prepared by the researcher, each question had a score ranged 0-2 grade, whereas correct and complete answer had score 2 grades, correct and incomplete had score 1 grad and score zero was for an incorrect or unknown answer. The total score was 74 grades (equal 100%). Studied nurses' answers were categorized into:

- Satisfactory (75% & more) means equal or more than 54grads.
- Unsatisfactory (less than 75%) means less than 54 grades.

5.5.2. Tool (II): Nurses' practice observational checklist

The observational checklists were adapted from Nettina et al., (2013) to assess nurses' actual practices regarding care of children with intussusception. It consisted of 9 observational checklists which were used to assess the actual nursing practice at pediatric surgical departments related to intussusception care. It namely, measuring infant weight (7 point), child weight (12 point), measuring axillary temperature (10 point), nasogastric tube (14 point), intravenous injection procedure (19 point), preoperative care (20 point), postoperative care (19 point), care of wound (32 point) and suture removal procedure (17 point).

5.5.2.1. Scoring system

A scoring system followed to assess nurses' actual practices; where each correct (don) practice was scored as a one score and incorrect (not don) practice was scored as a zero score. The total score (150) grade equal 100%. These scores summed up and converted into a percentage score, the practice result classified into 2 categories:

- Competent practice if score $\geq 80\%$, it means more than or equal 120 grads.
- Incompetent practice if score $< 80\%$, it means less than 120 grads.

5.5.3. Tool (III): Nurses' Attitude Type- rating scale

This scale was designed by the researcher in the light of related references [20] & [10] to assess nurses' attitudes toward care of children with intussusception. It included 16 items.

5.5.3.1. Scoring system

Nurses' responses were classified as strongly disagree, disagree, sometimes agree, and strongly agree and respectively scored 5,4, 3, 2 and 1. The total score was 80 grades. The scoring of the items summed up and converted into a percentage scores. Attitude results classified into 2 categories:

- Positive attitude if score $\geq 60\%$, it means more than or equal 48 grads.
- Negative attitude if score $< 60\%$, it means less than 48 grads.

5.6. Validity and reliability

The tools were revised by a jury of three experts from staff at Faculty of Nursing - Helwan University (2experts specialized in pediatrics health nursing and one expert in pediatric surgery medicine). The jury reviewed the tools for

their validity, comprehensiveness, accuracy, clarity, and relevance. The internal consistency of the developed tools was tested for their reliability using Cronbach alpha coefficient test by a statistician to assess reliability of the tools; the tools were reliable at tool (I) $r=0.985$ and tool (II) was reliable at $r=0.992$ and 0.981 for nurses' attitude.

5.7. Pilot study

A Pilot study involved 10 nurses (10% of the total sample size) to test feasibility and applicability of the tools and to assess the time required to fulfill the tools. The result of the data obtained from the pilot study helped in modification of the study tools, where some items were corrected, omitted and added as necessary. Subjects included in the pilot study were excluded later from the study sample.

5.8. Field work

The actual field work was carried out for data collection over 6 months started from June (2022) year till ended of November (2022) years, The researcher was available two days per week by the rotation in the previously mentioned study settings during the morning shifts from 9 am to 12 pm. At the beginning, the researcher introduced herself to the studied nurses and explained the purpose of the study to the studied nurses who provided care for children with intussusception. The average time needed for completion of each questionnaire sheet was approximately 15 minutes, the researcher clarified some questions of questionnaire and observe the studied nurses, the researcher taken 4 nurses each week consists about 17 nurse per month, total number around six months about 100 nurses.

5.9. Administrative Design

An official letter requesting permission to conduct the study was submitted from the Dean of Faculty of Nursing Helwan University to the director at Mostafa Hassan Hospital affiliated to Fayoum University Hospitals and Fayoum General Hospital affiliated to Ministry of Health to conduct the study, this letter included the aim of the study in order to get permission and help for collection of data. The necessary approval was obtained from the unit 's directors.

5.10. Ethical considerations

The research approval was obtained from the Research Ethical Committee affiliated to Faculty of Nursing Helwan University before starting the study. Assured that the collected data would be treated confidentially and that it would be used for the purpose of the study only. The purpose of the study was simply explained to the nurses who agree to participate in the study prior to data collection. The researcher assured maintaining anonymity and confidentiality of the subject data. Mothers were informed that they were allowed to withdraw from their studies at any time without giving any justification.

5.11. Statistical Design

Upon completion of data collection, data was organized, categorized, tabulated, entered, and analyzed using Statistical Package for the Social Science (SPSS), IBM SPSS Statistics for Windows, and Version 20.0. Armonk, NY: IBM Corp.

Statistical presentation and analysis of the present study was conducted, using the mean, standard deviation (SD), chi-square test (X²) was used to compare between groups in qualitative and linear correlation coefficient was used for detection of correlation between two quantitative variables in one group. Statistical significance was considered at (P-value <0.05), P value >0.05 mean non-significant, while P value <0.001 mean High significant.

6. Results

Table 1 showed that, about two-thirds (66%) of the studied nurses were in the age group of $20 \leq 30$ years old with Mean \pm SD = 26.6 ± 5.45 . As regards the studied nurses' qualifications, this table illustrated that, 59% of them had diploma of technical institute of nursing. Concerning years of experience, it was clear that 65% of them years of experience were less than 5 years with Mean \pm SD = 5.78 ± 4.04 while, slightly less than two third (65%) of them hadn't any previous training course about intussusception. Table 2 portrayed the studied children's' characteristics, it was showed that, more than one-third (38%) of the studied

children were in age group ranged from $1 < 2$ years old with Mean \pm SD = 1.78 ± 0.93 and nearly three quarters (73%) of them were male. Moreover, the majority (92% & 93%) of the studied children's weight and height were within a normal range with Mean \pm SD = 11.67 ± 3.21 and 85.37 ± 7.92 respectively. Table 3 represents that, the total mean score of knowledge regarding care of children with intussusception among the studied nurses was $\bar{x} + SD = 13.76 \pm 8.41$, while $\bar{x} + SD$ for pre-operative preparation and post-operative care was 5.78 ± 5.51 and 10.50 ± 8.03 respectively. Furthermore, the $\bar{x} + SD$ about nasogastric tube was 3.93 ± 1.82 . As regards total knowledge level of the studied nurse's Figure 1 illustrated that, more than two third (79%) of the studied nurses had unsatisfactory level of knowledge regarding care of children with intussusception. Moreover, the satisfactory to unsatisfactory ratio is 0.3:1. Table 4 revealed that 88%, 92%, and 90% of the studied nurses had incorrect level of practice regarding pushing of intravenous, intravenous drip and cleaning the site of suture respectively. Furthermore, more than three quarters (83%) of them had an incorrect level of practice regarding post-operative care and wound care.

Table 1: Frequency distribution of studied nurses according to their personal characteristics (n= 100).

Items	No.	%
Age (year)		
< 20	20	20.0
$20 \leq 30$	66	66.0
$30 \leq 40$	13	13.0
>40	1	1.0
Mean \pm SD	26.6 ± 5.45	
Educational level		
Diploma of secondary school	8	8.0
Diploma of technical institute of nursing	59	59.0
Bachelor's degree	33	33.0
Years of experience in surgical department		
< 5	65.0	65.0
$5 < 10$	20	20.0
$10 < 15$	7	7.0
≥ 15	8	8.0
Mean \pm SD	5.78 ± 4.04	
Attending training courses		
Yes	35	35.0
No	65	65.0

Table 2: Frequency distribution of studied children according to their personal characteristics (n= 100).

Items	No.	%
Age (year)		
< 1	37	37.0
1 < 2	38	38.0
2 ≤ 3	25	25.0
Mean ± SD	1.78 ± 0.93	
Gender		
Male	73	73.0
Female	27	27.0
Male to Female ratio	2.7:1	
Child weight		
Within the normal range	92	92.0
Less than the normal range	8	8.0
Mean ± SD	11.67 ± 3.21	
Child height		
Within the normal range	93	93.0
Less than the normal range	5	5.0
more than the normal range	2	2.0
Mean ± SD.	85.37 ± 7.92	

Table 3: Distribution of the studied nurses according to Total mean score of knowledge regarding care of children with intussusception (n= 100).

Knowledge items		No	%	Min	Max	Mean± SD
Knowledge regarding intussusception	Un- satisfactory	66	66.0	2	17	9.27 ± 6.81
	Satisfactory	34	34.0	19	24	22.47 ± 1.54
	Total	100	100.0	2	24	13.76 ± 8.41
Pre-operative preparation	Un- satisfactory	82	82.0	0	11	3.62 ± 3.28
	Satisfactory	18	18.0	13	16	15.61 ± 0.850
	Total	100	100.0	0	16	5.78 ± 5.51
Post-operative care	Un- satisfactory	83	83.0	2	18	7.67 ± 5.39
	Satisfactory	17	17.0	19	26	24.29 ± 2.59
	Total	100	100.0	2	26	10.50 ± 8.03
Naso Gastric tube	Un- satisfactory	53	53.0	2	3	2.26 ± 0.445
	Satisfactory	47	47.0	5	6	5.81 ± 0.398
	Total	100	100.0	2	6	3.93 ± 1.82

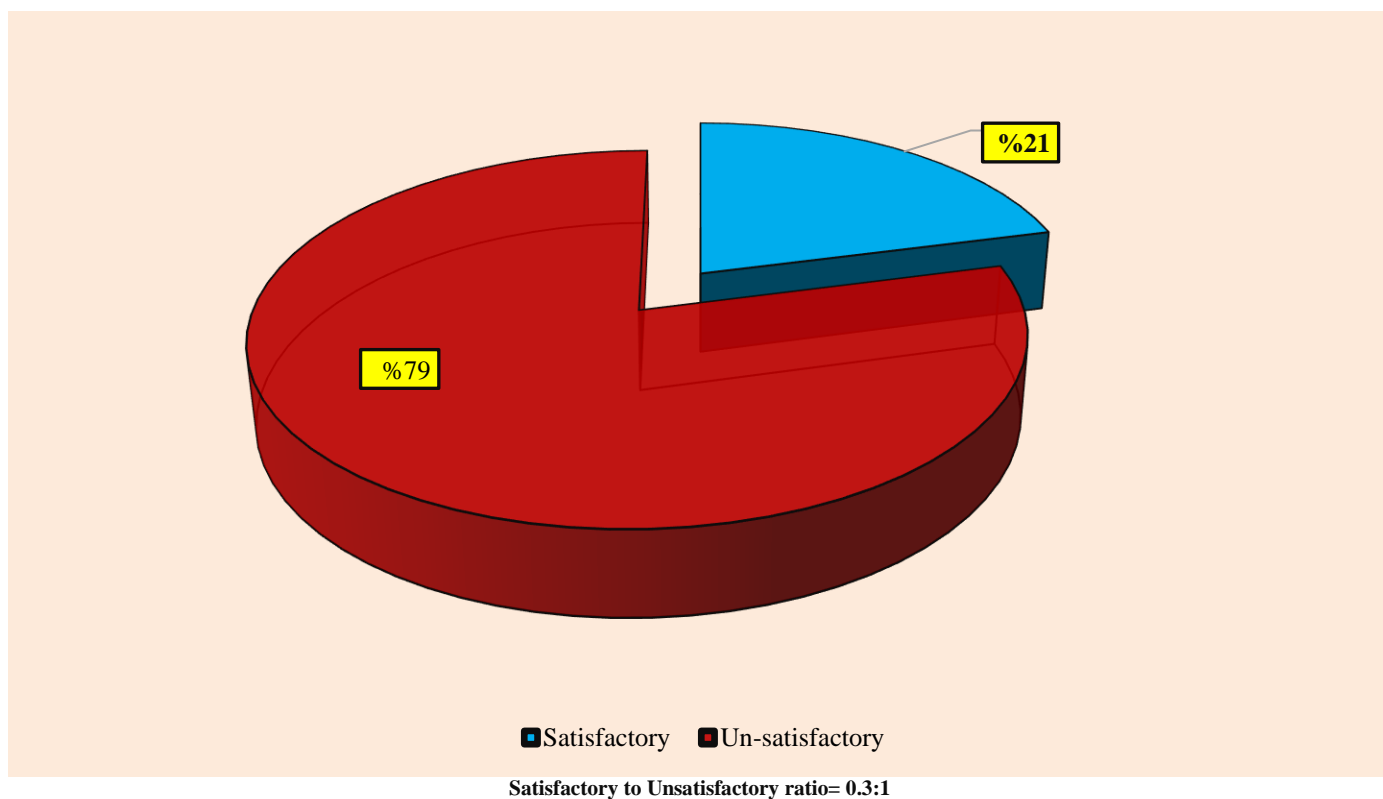
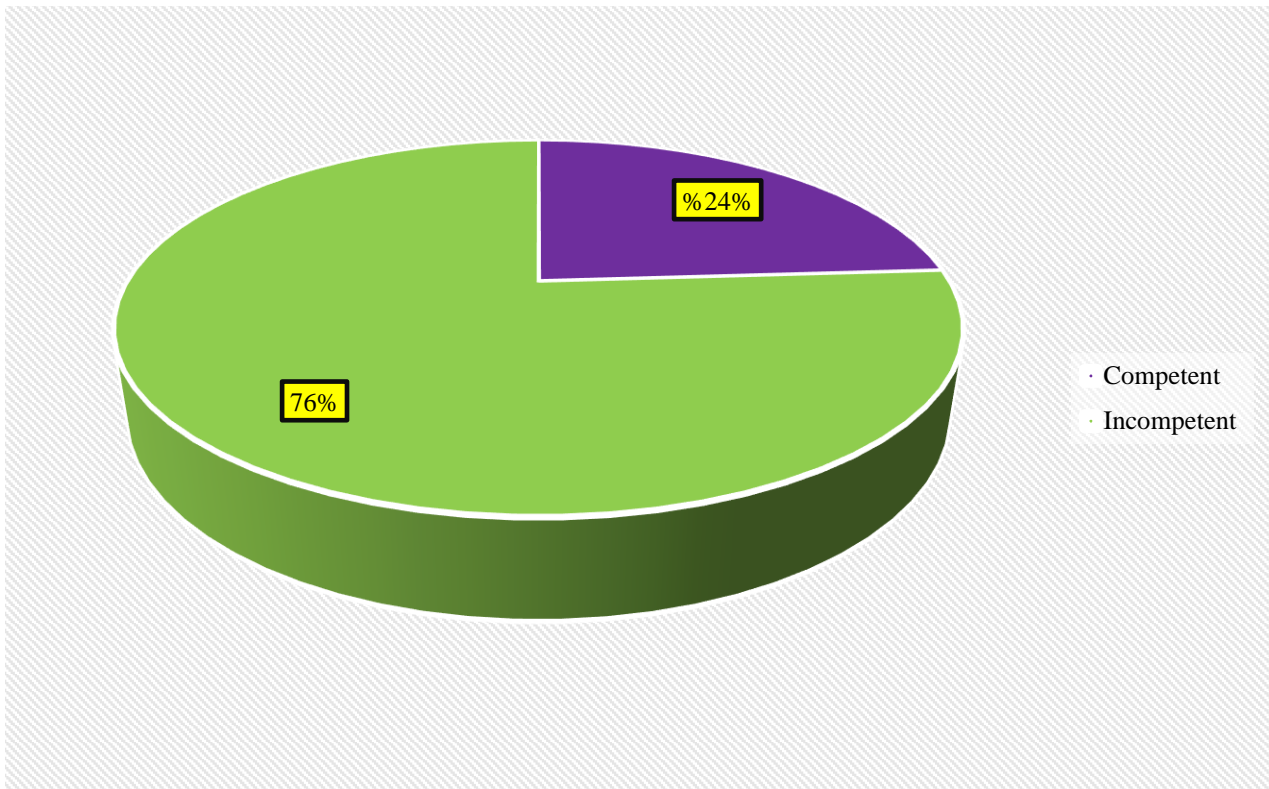


Figure 1: Distribution of the studied nurses’ knowledge regarding care of children with intussusception (n= 100).

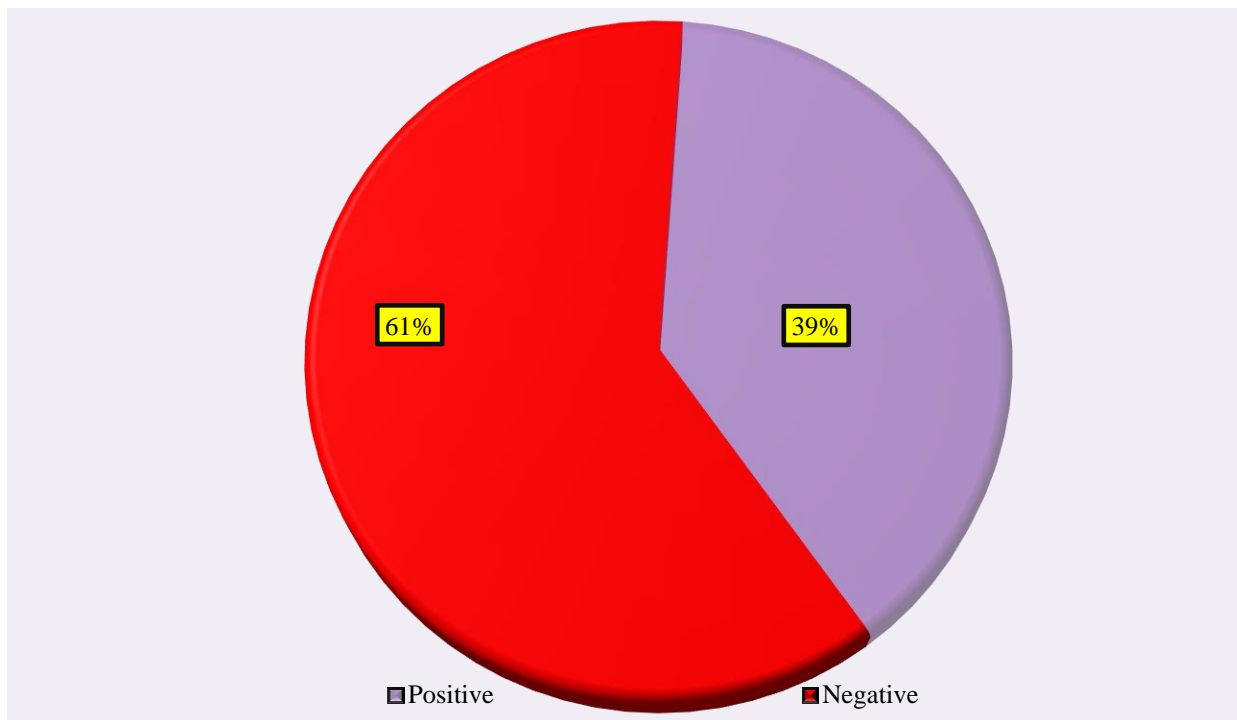
Table 4: Distributions of the studied nurses according to their total score practices about care of children with intussusception (n= 100).

Procedure	Correct		In correct	
	N	%	N	%
Measuring child’s weight	39	39.0	61	61.0
Axillary body temperature	38	38.0	62	62.0
Nasogastric tube insertion	29	29.0	71	71.0
Pushing of intravenous	12	12.0	88	88.0
Intravenous drip	8	8.0	92	92.0
Pre-operative care	28	28.0	72	72.0
Post-operative care	17	17.0	83	83.0
Wound care	17	17.0	83	83.0
Cleaning the site of suture	10	10.0	90	90.0
Removing of suture	43	43.0	57	57.0



Competent to Incompetent ratio= 0.3:1

Figure 2: Distribution of the Studied Nurses' Total practice regarding care of children with intussusception (n= 100).



Positive to Negative ratio= 0.6:1
 $\chi^2=4.84, P=0.028^{**}$

Figure 3: Distribution of the Studied Nurses' level of attitude regarding care of children with intussusception (n= 100).

Table 5: Relation between the Studied Nurses Characteristic & their knowledge regarding care of children with intussusception (n= 100).

Nurses' Characteristics		Nurses' total knowledge				χ^2	P-Value
		Satisfactory		Un-satisfactory			
		21	21.0	79	79.0		
		N	%	N	%		
Age (year)						50.7	0.000**
< 20	20	2	2.0	18	18.0		
20 ≤ 30	66	6	6.0	60	60.0		
30 ≤ 40	13	12	12.0	1	1.0		
>40	1	1	1.0	0	0.0		
Educational level						22.5	0.000**
Secondary school	8	1	1.0	7	7.0		
Technical institute	59	4	4.0	55	55.0		
Bachelor's degree	33	16	16.0	17	17.0		
Years of experience in surgical department						53.9	0.000**
< 5	65.0	2	2.0	63	63.0		
5 < 10	20	6	6.0	14	14.0		
10 < 15	7	7	7.0	0	0.0		
≥ 15	8	6	6.0	2	2.0		
Attending training courses						24.6 F	0.000**
Yes	35	17	17.0	18	18.0		
No	65	4	4.0	61	61.0		

*Significant p < 0.05

**Highly significant p < 0.01

NS: Not significant at P > 0.05

F: Fisher Exact Test

Table 6: Relation between the studied nurses' characteristic & their total practice regarding care of children with intussusception (n= 100).

Nurses' Characteristics	No	Nurses' total practice				χ^2	P-Value
		competent		In-competent			
		24	24.0	76	76.0		
		N	%	N	%		
Age (year)							
< 20	20	2	2.0	18	18.0	42.4	0.000**
20 ≤ 30	66	9	9.0	57	57.0		
30 ≤ 40	13	12	12.0	1	1.0		
>40	1	1	1.0	0	0.0		
Educational level							
Secondary school	8	1	1.0	7	7.0	30.5	0.000**
Technical institute	59	4	4.0	55	55.0		
Bachelor's degree	33	19	19.0	14	14.0		
Years of experience in surgical department							
< 5	65.0	2	2.0	63	63.0	54.0	0.000**
5 < 10	20	9	9.0	11	11.0		
10 < 15	7	7	7.0	0	0.0		
≥ 15	8	6	6.0	2	2.0		
Attending training courses							
Yes	35	20	20.0	15	15.0	32.4 F	0.000**
No	65	4	4.0	61	61.0		

*Significant p < 0.05

**Highly significant p < 0.01

NS: Not significant at P > 0.05

F: Fisher Exact Test

Table 7: Relation between the studied nurse's characteristic & their total attitude regarding care of children with intussusception (n= 100).

Nurses' Characteristics	No	Nurses' total Attitude				χ^2	P-Value
		Positive		Negative			
		39	39.0	61	61.0		
		N	%	N	%		
Age (year)						24.3	0.000**
< 20	20	2	2.0	18	18.0		
20 ≤ 30	66	24	24.0	42	42.0		
30 ≤ 40	13	12	12.0	1	1.0		
>40	1	1	1.0	0	0.0		
Educational level						43.5	0.000**
Secondary school	8	1	1.0	7	7.0		
Technical institute of nursing	59	10	10.0	49	49.0		
Bachelor's degree	33	28	28.0	5	5.0		
Years of Experience in surgical department						70.8	0.000**
< 5	65.0	6	6.0	59	59.0		
5 < 10	20	20	20.0	0	0.0		
10 < 15	7	7	7.0	0	0.0		
≥ 15	8	6	6.0	2	2.0		
Attending training courses						55.6 F	0.000**
Yes	35	31	31.0	4	4.0		
No	65	8	8.0	57	57.0		

*Significant p < 0.05; **Highly significant p < 0.01; NS: Not significant at P > 0.05; F: Fisher Exact Test.

Table 8: Correlation between Total Nurses' Knowledge, Practice and Attitude Regarding Care of Children with Intussusception (n= 100).

Item		Total knowledge	Total practice	Total attitude
Total knowledge	R		0.879	0.936
	P		0.000**	0.000**
Total practice	R	0.879		0.791
	P	0.000**		0.000**
Total attitude	R	0.936	0.791	
	P	0.000**	0.000**	

*Significant $p < 0.05$; **Highly significant $p < 0.01$.

Figure 2 showed that, more than three quarters (76%) of the studied nurses had in-competent level of practice regarding care of children with intussusception. However, the competent to in-competent ratio is 0.3:1. As regards the studied nurses' total attitude Figure 3 illustrated that, 61% of the studied nurses had negative attitude regarding care of children with intussusception. Table 5 illustrated that, there were a highly significant statistically relation between nurses' personal characteristics namely; age, educational level, experience in surgical department and attending training courses and their total level of knowledge with P value = 0.000. Table 6 illustrated that, there were a high significant statistically relation between personal characteristics namely, age, educational level, experience in surgical department and attending training courses and studied nurses' total level of attitude with P value = 0.000. Table 7 illustrated that, there were a highly significant statistically relation between personal characteristics namely, age, educational level, experience in surgical department and attending training courses and studied nurses' total level of attitude with P value = 0.000. Table 8 regarding correlation between total nurses' knowledge, practices and attitude about care of children with intussusception it was observed that, there was positive correlation among all study variables with P= 0.000).

7. Discussion

Intussusception is the most frequent cause of bowel obstruction in infants and toddlers. It is an acquired invagination of the proximal bowel into the distal bowel [26]. It occurs when a portion of the intestine is introduced into a more distal segment, potentially causing intestinal ischemia. It is the most common cause of intestinal obstruction in children under 2 years of age. During ileocolic intussusception, occurs prolonged ischemia which can lead to perforation and death. So, hence the importance of timely diagnosis and treatment therefore, nurses have a variety of roles and functions associated with caring of children with intussusception. A knowledgeable and qualified nurse can help such children by providing quality care [34,41]. So, it was important to carry out this study to assess nurses' performance regarding care of children suffering from intussusception. Regarding personal characteristics of the

studied nurses Table 1, the current study revealed that, about two-thirds of the studied nurses were in the age group of 20 to less than or equal 30 years old with Mean \pm SD was 26.6 ± 5.45 years. This result was similar to Hamed et al., who conducted a study entitled "Assessment of Nurses' knowledge and Practices Regarding Children Undergoing Gastrointestinal Surgery" and found that the largest proportion of the studied nurses ranged from 20 to 25 years old mean age of the studied nurses was 29.3 ± 9.2 years [16]. Also, the present study results showed that more than half of the studied nurses had a diploma from a technical institute of nursing. In contrast, Abuejheisheh et al., who carried out a study about "Predictors of intensive care unit nurses' practice of evidence-based practice guidelines" and reported that most of the studied nurses had Bachelor's degree [3]. Concerning personal characteristics of the studied children Table 2, the present study clarified that more than one-third of the studied children were in age group ranged from 1 < 2 years old with mean 1.78 ± 0.93 . These findings matched with a study by Wu et al., that studied "Clinical characteristics of pediatric intussusception and predictors of bowel resection in affected patients" and demonstrated that, the largest proportion of the studied children were less than 3 years old [41]. In addition, the current study results declared that nearly three quarters of the studied children were male. Conversely, Adel & Helmy who carried out a study about "Nursing intervention guidelines regarding Care for Neonates with Necrotizing Enterocolitis: its effect on Nurses' Knowledge and Performance" and noticed that, more than half of the studied children were females [5]. Regarding the studied nurses' knowledge about intussusception Table 3, the present study displayed that more than two thirds of the studied nurses had unsatisfactory level related to knowledge regarding intussusception. This may be related to lack of theoretical knowledge, updating of their knowledge and more than half of the studied nurses had diploma of technical institute of nursing. Likewise, a study carried out by Salman et al., about "Assessment of Nursing knowledge and Practices in Caring of Neonatal Intestinal Obstruction" and mentioned that the less than half of the studied nurses had satisfactory knowledge related to neonatal intestinal obstruction [38].

In addition, the current study showed that, most of the studied nurses had unsatisfactory level of knowledge related to preoperative preparation and post-operative care. This may relate to 20% of the studied nurses was newly staff and years of experience for most of them was less than 5 years. Conversely, a study carried out by Al-Sudani about "pediatric nurses' knowledge regarding colostomy at pediatric hospitals in Baghdad city" and presented that, the largest percentage of nurses had significant knowledge concerning childcare [7]. The present study displayed that more than half of the studied nurses had unsatisfactory level of knowledge about nasogastric tube. This may be due to not attaining training courses and lack of ongoing education among those nurses. In the same line, a study carried out by Mohammed to evaluate "Assessment of Nurses' Knowledge and Practices Regarding Nasogastric Tube at Neonatal Intensive Care Unit in Baghdad Hospitals" and found that, nurses' knowledge about NG tube was poor among more than half of them [28]. Regarding the studied nurses' total knowledge about care of children with intussusception Figure 1, the findings of the current study reported that, more than three quarters of the studied nurses had unsatisfactory level of knowledge regarding care of children with intussusception. This could be attributed to nurses hadn't insufficient theoretical background and lack of updating nurses' knowledge about care of children with intussusception so, the researcher emphasized on the importance of frequent educational program about care for children with intussusception. Conversely, Goma, et al., who carried out a study in Egypt about "Nurses' Knowledge & Practices toward Enteral Feeding and its effect on selected High-Risk Neonates' Outcomes" and found that, nearly two thirds of the studied nurses had average level of total knowledge [15]. On the other hand, these findings matched with, a study by Kreem & Hamza entitled "Effectiveness of educational program on nurses' knowledge regarding pre- and post-operative nursing management" and declared that, most of nurses had knowledge deficit concerning management regarding pre- and post-operative nursing management [21]. As regards the studied nurses' practices regarding pushing of intravenous Table 4, the current study illustrated that, the majority of them had incorrect practice in relation to total score of pushing intravenous and total score of intravenous drip. From the research point of view, this may be related to lack of attending training courses that improve nurses' skills and lack of observation and monitoring of the staff during work. These results agreed with Rafique et al., they carried out a study entitled "Assessment of Nursing Care Skills in Neonatal Unit: A Cross Sectional Observational Study" and stated that, the highest percentage of the studied nurses had incorrect practice regarding intravenous injection [35]. Abdrbou et al., about "Pediatric Nurses' Practice towards Reporting of Intravenous Infusion Therapy Errors among Surgical Children" and reported that, most of the studied nurses had unsatisfactory practice associated intravenous infusion therapy [2]. Pertaining to the studied Nurses' practices regarding wound care, the current study declared that, most of the studied nurses had incorrect practice in relation to total score of wound care and cleaning the site of suture. This may be related to inadequate supplies and working load. Correspondingly, this finding was in harmony with Bahnasawy et al., who conducted a study to assess "Nurses Attitude and Practice Regarding Patient Undergoing Abdominal Surgery" who mentioned that, most of the

studied nurses had unsatisfactory practice regarding wound care [9]. Conversely, Emad et al., who studied "Assessment of Nurses' Performance Regarding Care of Children Undergoing Liver Transplantation" and declared that more than half of studied nurses had competent practice of wound care after operation [14]. As regard the studied nurses' total practice regarding care of children with intussusception Figure 2, the present study results illustrated that, more than three quarters of the studied nurses had incompetent level of practice regarding care of children with intussusception. From the research point of view, this may be related to lack of training sessions, and absence of continuous nurses' supervision and evaluation. Also, this result indicates that the lack of nurses' knowledge affected their practice. This finding was supported by Yang & Oh whose study "Effectiveness of Debriefing for Meaningful Learning-based simulation training on high-risk neonatal care: A randomized controlled simulation study [42]. Clinical Simulation in Nursing" declared that, a largest proportion of the studied nurses had unsatisfactory level of total practice at pre intervention. Likewise, a study "Nurses Attitude and Practice Regarding Patient Undergoing Abdominal Surgery" performed by Bahnasawy et al., affirmed that, more than three fifths of the studied nurses had unsatisfactory total practice regarding patients undergoing abdominal surgery [9]. As regard the studied nurses' total level of attitude regarding care of children with intussusception Figure 3, the present study results demonstrated that, slightly more than three fifths of the studied nurses had negative attitude regarding care of children with intussusception. This may be related to lack of nurses' knowledge and insufficient training courses about care of children with intussusception. Conversely, this finding was against Karikuru who conducted a study entitled "Knowledge, attitudes and practices regarding pediatric pain management among undergraduate nursing students at a university in the Western Cape" and stated that most of the studied nurses had favorable attitudes towards pediatric care management [23]. Likewise, these findings were in accordance with Nada whose study "Effect of Implementing Evidence Based Nursing Guideline on Nurses' Performance Related to Care Providing for Children at Pediatric Intensive Care Unit" reported that, more than half of the studied nurses had negative attitude towards care provided for children at pediatric intensive care unit [32]. Regarding relation between the studied nurses' characteristic and their knowledge about care of children with intussusception Table 5, the present study result revealed that, there were a highly significant statistically relation between nurses' personal characteristics namely, age, educational level, experience in surgical department and attending training courses and their knowledge regarding care of children with intussusception. This could be due to nurses with older age, high level of education, increased years of experience and attended training courses proved to have better knowledge than others. Parallel to these findings, a study by Al-Sudani who found that there was significant relation between the studied nurse's total knowledge and their personal characteristics as age, educational level, years of work experience and attending training course [7]. Conversely, a study by Salman et al., stated that there was no significant association between the knowledge level of nurses and their age. This inconsistency may be due to the difference between both study sample characteristics and setting [37].

Pertaining to relation between the studied nurses' characteristic and their total practice regarding care of children with intussusception Table 6, the present study revealed that, there were a high significant statistically relation between personal characteristics namely, age, educational level, experience in surgical department and attending training courses. This can be interpreted as nurses with older age, higher educational level, increasing in years of experience, and nurses attending training courses had better practice than others. In opposite to a study performed by Emad al., declared that there were no associations between nurses' education and their practice score [14]. These findings agreed with Hendy et al., whose study reported that there was a significant relation between nurses' level of practice and their age, educational level and years of experience and attending training courses [17]. Concerning relation between characteristics of the studied nurses and their total attitude regarding care of children with intussusception Table 7, the present study results highlighted that, there were a highly significant statistically relation between personal characteristics namely, age, educational level, experience in surgical department and attending training courses. This could be due to nurses with older age, high level of education, increased years of experience and attended training courses proved to have favorable attitude than others. These results were compatible with a study conducted by Ali et al., who found that there was significant relation between the studied nurses' total attitude and their educational level [6]. Conversely, a study carried out by Liu et al., stated that there was no significant association between attitude level of nurses and their age, years of experience and attending training courses [25]. Related to correlation between total nurses' knowledge, practice, and attitude regarding care of children with intussusception Table 8, the present study portrayed that, there was a highly significant positive correlation between the studied nurses' total knowledge, total practice and total attitude. This can be interpreted as the more the nurses have knowledge the more competent practice and favorable attitude toward care of children with intussusception. This result was supported by Abd Elfatah et al., whose study mentioned that there was a positive statistical correlation between total level of nurses' knowledge and practices regarding care of neonates undergoing esophageal atresia surgery [1]. From the research investigator's point of view, nurses' knowledge is a significant factor that influences increasing the correct done practices. On contrary, a study carried out by Adams et al., who conducted a study to assess "Nurses' knowledge and attitude towards postoperative pain management in Ghana" and found that, there was no significant relationship between nurses' knowledge and nurses' attitude [4].

8. Recommendations

Based upon the results of the current study the following recommendations are suggested:

- Frequent educational training program for nurses to improve their knowledge, practice, and attitude regarding care of children suffering from intussusception.
- Distribution of simple illustrated guidelines booklets and posters for nurses about care of children with intussusception.

- Replication of this study on a larger sample from the different geographical locations at the Arab Republic of Egypt and further research.

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