
Improve Nurses' Competency Level Regarding Care of Children Undergoing Intestinal Obstruction Surgery: An Educational Program

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Background: Intestinal obstruction is a serious health problem which may lead to intestine perforation and generalized peritonitis, septic shock, severe metabolic disorders and high mortality rates. **Aim:** This study was aimed to improve nurses' competency level regarding care of children undergoing intestinal obstruction surgery. **Research design:** A quasi-experimental design was utilized in the current study. **Setting:** This study was conducted in neonatal surgical units and pediatric surgical units at Specialized Pediatric Hospital in Benha City. **Subjects:** All available nurses (20) and a purposive sample of 20 children were used. **Tools of data collection:** Three tools were used: tool (1) A Structured interview sheet, tool (2) nurse competence scale and tool (3) quality of nursing care scale. **Results:** Regarding competency level; the vast majority (95.0%) of the studied nurses had incompetent level of performance pre- program while, the vast majority (92.0%) of them had competent level of performance post- program and less than half (48.0%) of the studied nurses had poor level of nursing care quality pre- program while, the vast majority (95.0%) of them had good level of nursing care quality post- program. **Conclusion:** The educational program was effective in improving nurses' competency and quality level regarding the care of children undergoing intestinal obstruction surgery. **Recommendation:** Provision of continuing education programs in order to update nurses' knowledge and enhance their competency level regarding care of children undergoing intestinal obstruction surgery.

Keywords: Nurses' competency level, Care, Children, Intestinal obstruction, Educational program.

Introduction

Nurses are key members of healthcare system and their clinical competency is important particular in the pediatric surgical department. There is a close relationship between nurses' clinical competency and quality of care. In the context of continual changes in the medical technology, it is important for nurses to develop their clinical competency to ensure the quality and safety of children care (*Ghanbari et al., 2011*).

Nursing competency is described as the ability to apply professional knowledge, skills and attitude to new situations successfully. Competencies manage the gap between education and practice. By continually using the standards of practice, outcome protocols, competency statements and experiences to ensure the delivery of high-quality nursing care (*Penasales et al., 2011*).

Providing high quality nursing care is a requirement which depends on the nursing competency. Clinical nursing competency means competence and qualification in the areas of cognitive, psycho-physical, clinical skills, critical thinking, decision making and ability to enhance learning through academic knowledge and clinical experience leading to standards and safe care (*Sharghi et al., ۲۰۱۵*).

The mortality rates of pediatric intestinal obstruction ranges between ۲۱% and ۴۵% in developing countries and less than ۱۵% in Europe. The most common causes of mortality were sepsis followed by anastomotic leakage. Sepsis was mainly due to late management leading to perforation or in cases of meconium ileus leading to peritonitis (*Verma et al., ۲۰۱۶*). Consequently, early management is needed to reduce mortality rates and serious complications.

Intestinal obstruction occurs when there is an interruption in the forward flow of intestinal contents. This interruption can occur at any point along the length of the gastrointestinal tract. Intestinal obstruction in children can occur as a result of various causes such as, intussusceptions, adhesive small bowel obstruction, malrotation and hirschsprung's disease. (*Alshareef et al., ۲۰۱۸*).

Specific criteria of clinical manifestation help in determine location of the obstruction. Children with proximal small intestinal obstruction rapidly develop nausea and vomiting which is projectile in nature, contain bile and vomiting usually relieves abdominal colic. Vomiting from more distal obstruction of the small intestine is more gradual in onset, the vomiting content may be organ - brown and foul smelling like feces. Persistent abdominal colic is seen with lower intestinal

obstruction. And the characteristic sign of mechanical obstruction is colic that comes and goes in waves (*Lewis et al., ۲۰۱۱*).

The nurse plays a vital role in caring for children with intestinal obstruction, recognizing physiological and psychological needs, ensure hours of fasting before surgery, frequent assessment of vital signs and abdominal circumference, rectal washouts with repeated warm saline enema, observing intake -output, care of nasogastric tube, providing intravenous fluids, care of urinary catheterization and preparing child and parents for (temporary) colostomy. Provide postoperative nursing care as suctioning, care of wound, colostomy care, instruct the parents about avoiding constipation and providing diet rich with fibers (*Robin et al., ۲۰۱۷*).

Significance of the study:

Nurses play a pivotal role in the promotion, maintenance and restoration of health, it is imperative to develop competent nurses who are able to take up expended roles in the delivery of care. Thus, apart from the roles of a caregiver, the nurse needs to develop competencies to take up the roles of a health promoter, educator, counselor, care coordinator, case manager, researcher as well as that of a child advocate. Hence, education programs for nurses must ensure that the nurses acquired the essential competencies that enable them to fulfill these roles competently and ethically (*National Authority for Quality Assurance and Accreditation of Education, ۲۰۱۷*).

According to the statistical office of Benha Specialized Pediatric Hospital, the incidence rate of intestinal obstruction were ۲۰۰ cases admitted in the neonatal and pediatric surgical department; most cases were subjected to surgery which required a competent nurse to provide high-quality

nursing care for these pediatric group (*Specialized pediatric hospital statistics department, ٢٠١٩*). So, this study aims to improve nurses' competency level and quality of nursing care regarding the care of children undergoing intestinal obstruction surgery.

Aim of the study

This study aimed to:

Improve nurses' competency level regarding care of children undergoing intestinal obstruction surgery through the following objectives: -

١-Assess nurses' competency and quality of nursing care level regarding care of children undergoing intestinal obstruction surgery.

٢-Design and implement an educational program for nurses based on their actual needs.

٣-Evaluate the effect of educational program on nurses' competency and quality of nursing care level regarding care of children undergoing intestinal obstruction surgery.

Research Hypothesis

١-Nurses' who attended the educational program will have better competency level regarding care of children undergoing intestinal obstruction surgery.

٢-Nurses' who attended the educational program will have better level of quality regarding care of children undergoing intestinal obstruction surgery.

Subject and Methods

Research design:

A quasi-experimental design was utilized in the current study.

Research Settings:

The study was conducted at Neonatal Surgical Units (NSU) and Pediatric Surgical Units (PSU) at Specialized Pediatric Hospital in Benha City which affiliated to Egyptian Ministry of Health and Population. NSU found in the second floor and composed of two rooms with ١٦ incubators, total numbers of nurses were ٢٦ nurses while PSU found in the first floor, composed of two rooms with ١١ beds, total numbers of nurses were ٢٤ nurses.

Subjects:

The subjects consisted of two types of samples;

Type (١): All available nurses (٥٠) who are working at previously mentioned setting regardless their characteristics and willing to participate in the study (All are participated).

Type (٢): A purposive sample of ٥٠ children suffering from intestinal obstruction were selected after fulfilling the following criteria:

Inclusion criteria:

- Age from ١ day to ٢ years.

-Suffering from Hirschsprung's disease, intestinal atresia or intussusceptions.

Exclusion criteria:

-Children with congenital anomalies.

Tools of data collection:

Data were gathered by using the following tools:

Tool (I) A Structured interview sheet:

It was designed by the researcher in the light of current relevant studies and researches to assess personal and medical data for the studied subjects (nurses and

children). It was written in an Arabic language and composed of two main parts:

Part (1): Composed from three section:

a-Characteristic of the studied nurses: age, gender, educational level, job title, years of experience in pediatric surgical units and attendance of training courses related to caring of children undergoing intestinal obstruction surgery.

b- Characteristics of studied children: age, gender, residence and consanguinity

c-Medical data of studied children: It covered diagnosis, onset of disease, previous hospitalization related to intestinal obstruction, causes of previous hospitalization, present complain, family history of congenital anomalies and length of hospital stay. The researcher fills this data from children sheet.

Part (2): Nurses' knowledge assessment questionnaire:

It was developed by the researcher based on **Ibrahim et al., (2013)** and revised by supervisors to assess nurses' knowledge regarding care of children undergoing intestinal obstruction, it included knowledge related to definition of intestinal obstruction (1 question), causes (1 question), types (3 questions) clinical manifestation (1 question), diagnosis (1 question), complication (3 questions) and treatment of intestinal obstruction (1 question), definition and importance of preoperative nursing care (3 questions), routine laboratory tests and radiology before the surgery (1 question), importance of measuring vital signs of the child before surgery (1 question), changes that suddenly appear on the child and prevent surgery (1 question), definition of post-operative nursing care (1 question), indication of change the child's position after surgery (1 question), nursing consideration

and observation during wound care (3 questions). The tool composed of (13) multiple choice questions and (2) open ended questions.

Total scoring system

The studied nurses' answers were compared with a model key answer, where scored as; complete correct answer had score (3), incomplete correct answer had score (1) and unknown or wrong answer had score (0). Total knowledge scores ranged from (0 - 33) point. In this respect the level of nurses' knowledge was categorized as poor knowledge (< 30%) was ranged from (0 > 27) points, average knowledge (30% to < 40%) was ranged from 27 > 30 points and good knowledge ($\geq 40\%$) was ranged from 30 \geq 33 points.

Tool (II): Nurse Competence Scale (NCS):

Nurse competence scale was adapted from **Meretoja et al., (2004)** and **Lynn, (2010)** to assess nurses' competency level regarding nursing care of children undergoing intestinal obstruction, modified by the researcher and supervised by supervisors to suit the nature of the study as addition of insertion of nasogastric tube, provide pre-operative nursing care, provide immediate post-operative nursing care, wound care and stoma care and excluded some steps not applicable as utilizing information technology in work, professional identity serves as resource in nursing, orchestrating the whole situation when needed and making proposals concerning further development and research. Nurse competence scale included 30 steps grouped under seven main parts as helping role (3 steps), teaching- coaching (3 steps), diagnostic functions (3 steps), managing situations (3 steps), therapeutic interventions (2 steps), ensuring quality (3 steps) and work role competencies (3 steps).

Total scoring system

The nurses' competency level was evaluated by using visual analog scale from 0 to 100 as; low competence 0-20, quite competence 20-50, good competence 50-70 and very good competence 70-100. In addition, the nurse competence scale includes a separate column for nurses to evaluate how frequently the items are used in a clinical practice using rating scale response with four options available as; not applicable to nurse's work had score (0), used very seldom (1), used occasionally (2) and used very often (3). Accordingly, level of nurses' competency was categorized as incompetent level (< 50%) and competent level ($\geq 50\%$).

Tool (III): Quality of nursing care: Likert scale

Quality of nursing care scale was adapted from *Koy et al.*, (2019) to assess quality of nursing care provided to children undergoing intestinal obstruction surgery. It includes (5) statement categorized under 4 main categories as; nurse's attributes (4 statement), met nursing care needs to children undergoing intestinal obstruction surgery (4 statement), good experiences of care (3 statement), good leadership (4 statement), physical environment (4 statement), progress of nursing process (4 statement) and cooperation with relatives (4 statement).

Total scoring system

The studied nurses' response were compared using three point Likert scale ranged from (0-3) as; most of time had score (3), some time had score (2), rarely had score (1) and never done had score (0). So, the level of nursing care quality was categorized as poor quality (< 60%) was ranged from 0 > 4 point, moderate quality (60% to < 80%) was ranged from 4 > 0

point and good quality ($\geq 80\%$) was ranged from 0 > 4 point.

II- Operational Design:

Operational design was including; preparatory phase: content validity, reliability, pilot study and filed work.

Preparatory Phase:

This phase included reviewing the related literatures and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and journals at the local as well as international level to develop tools and to get acquainted with the various study aspects of the research problems.

Content validity:

Tools of data collection were translated into Arabic and investigated for their content validity by three expert's (two in pediatric nursing and one in the field of medical surgical nursing specialty from faculty of nursing, Benha University) who are selected to test the content validity of the instruments and to judge its clarity, comprehensiveness, relevance, simplicity and accuracy. All of their remarks were taken into consideration; some items were re-phrased to arrive at the final version of the tools. The tools were regarded as valid from the experts' point of view.

Reliability:

Reliability of the tools was applied by using Cronbach's alpha coefficient test. This turned to be ($\alpha = 0.90$) for knowledge assessment questionnaire, ($\alpha = 0.92$) for nurse competence scale and ($\alpha = 0.93$) for quality of nursing care scale. This indicates a high degree of reliability for the study tools.

Ethical considerations:

The researcher clarified aim of the study to nurses included in the study. A written

approval was a prerequisite to recruit nurses in the study. Nurses were assured that all gathered data was used for research purposes only and the study was harmless. Additionally, nurses allow to withdrawal from the study at any time without giving the reason. Confidentially of the gathered data and results were secured.

Pilot study:

A pilot study was conducted to test the clearness and applicability of the study tools and to estimate the time needed for each tool. It was done on 10% of the total subjects, (2) children undergoing intestinal obstruction surgery and (2) nurses who excluded from the present study to avoid sample bias and contamination. In the light of pilot study analysis, modification was done and the last form was developed. This phase took one month from (beginning of September 2018 to the end of September 2018).

Field of Work:

The educational program was implemented to achieve the aim of the current study by these phases; assessment, planning, implementation and evaluation phase. The educational program was conveyed from the earliest starting point of September 2018 to the end of May 2019 covering

Assessment phase

Assessment phase involved interviews with nurses to collect baseline data. The researcher was available four days/week; (Saturday, Monday, Tuesday and Thursday) from 11.00 AM and extended to 1.30 AM and it took about 16 weeks. At the beginning of interview; the researcher welcomed each nurse, explained the purpose, duration and activities of the study and took written consent. The data of children undergoing

intestinal obstruction were collected by researcher from the medical record and it took was nearly 10 minutes for each child. The researcher gave the studied nurses questionnaire for filling it to assess their knowledge and it took 10 minutes. Each nurse was observed separately during their actual practice of procedures to assess their competency level and quality of nursing care by using nurse competence scale and quality of nursing care scale and it took 30 minutes.

Planning phase

Based on baseline data obtained from assessment phase and relevant review of literature, the educational program was developed by the researcher as indicated by nurses' level of understanding in simple Arabic language. Different methods of teaching were used as modified lecture, brain storming, demonstration, re-demonstration and group discussion. Suitable teaching media were included a hand out as well as audio-visual aids, role play, case study, manikin and real equipment to help proper understanding of the content by nurses.

Implementation phase

Toward the start of the program sessions, a direction to the motivation behind program took place and the nurses were informed about the time and place of sessions which were carried out at the neonatal and pediatric surgical units lecture room. The studied nurses were divided into 10 groups, each group consisted of 2 nurses, the program has taken 9 hours for each group and were implemented according to nurses readiness, distributed as the following; (2) session for theoretical part each session kept going from 30-40 minutes and (2) session for practical part, each session kept going 1 hours, 2 days/week in the morning shift. It took about (16) weeks for program implementation. **Theoretical**

part; the first session of program included introduction to the educational program, overview about gastrointestinal system anatomy and physiology, **the second session** included intestinal obstruction as definition, causes, type, diagnosis and treatment, **the third session** included pre/post-operative nursing care of child, **the fourth session** focused on component of quality of nursing care.

Practical part concerned with application of competency toward nursing care of children undergoing intestinal obstruction surgery ; the first session included helping role and teaching – coaching, **the second session** included diagnostic functions and managing situations, **the third session** included insertion of naso-gastric tube and pre-operative nursing care, then **the fourth session** included immediate post-operative nursing care, wound and stoma care and finally the **fifth session** focused on ensuring quality and work role competences. These sessions were repeated to each subgroup of nurses.

Evaluation phase:

After program implementation, the post test was carried out to assess nurses' knowledge, competency level and quality of nursing care regarding care of children undergoing intestinal obstruction surgery by using the same pretest format and it took 1 month.

III - Administrative design:

An official approval was obtained from the Dean of Faculty of Nursing Benha University, hospital directors and head of the neonatal and pediatric surgical units at Specialized Pediatric Hospital in Benha city. A clear explanation was given about the nature, importance and expected outcomes of the study to carry out the study with minimal resistance.

IV -Statistical Design:

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 21 for windows, running on IBM compatible computer. Data were presented using descriptive statistics in the form of numbers and percentages for qualitative variables, and mean and standard deviation for quantitative variables. Quantitative continuous data were compared using paired t test in case of comparison between two groups. Qualitative variables were compared using Chi-square test. Whenever the expected values less than 5, Fisher exact test was used instead. Pearson correlation analysis were done for assessment of inter relationship among quantitative variables. To test the independent predictor of nurses' score of competency and personal data, as independent factor, linear regression test and analysis of variance for the full regression were done. Statistical significance was considered at p- value < 0.05 and a highly statistical significant was considered at p- < 0.001.

Results

Table (١): Distribution of the studied nurses regarding their characteristics (n = ٥٠).

Characteristics	No.	%
Age / years		
٢٠- < ٢٥	١١	٢٢.٠
٢٥- < ٣٠	٥	١٠.٠
٣٠- < ٣٥	٢٤	٤٨.٠
≥ ٣٥	١٠	٢٠.٠
Mean ± SD	٣٠.٧٢ ± ٥.٧٧ years	
Gender		
Female	٤٠	٨٠.٪
Male	١٠	٢٠.٪
Educational level		
Secondary school of nursing	٣٠	٦٠.٠
Technical institute of nursing	١٣	٢٦.٠
Bachelor of nursing science	٤	٨.٠
Post-graduate studies	٣	٦.٠
Job title		
Staff nurse	٤٣	٨٦.٠
Unit supervisor	٧	١٤.٠
Head of Nursing	٠	٠.٠

Table (١): Reveals that, less than half (٤٨٪) of nurses were in the age group ٣٠- < ٣٥ years with mean age ٣٠.٧٢ ± ٥.٧٧ years. More than three quarter ٨٠ % of nurses were female. Concerning educational level, less than two thirds (٦٠ %) of nurses had secondary school of nursing. Regarding job title, the majority (٨٦٪) of nurses are working as staff nurse.

Table (٢): Distribution of the studied children regarding their characteristics (n = ٥٠).

Characteristics	No.	%
Age / months		
One day- < ٦ months	٣٤	٦٨.٠
٦- < ١٢ months	٦	١٢.٠
١٢- < ١٨ months	٨	١٦.٠
١٨- ≤ ٢٤ months	٢	٤.٠
Mean ± SD	٥.٣٢ ± ٦.٤٣ months	
Gender		
Female	١٥	٣٠.٪
Male	٣٥	٧٠.٪

Residence		
Rural	30	70.0
Urban	10	30.0

Table (٢): It is clear from this table that more than two thirds (٦٨%) of children were in the age group one day- < ٦ months with mean age 0.٣٢ ± ٦.٤٣ months. Concerning gender, that more than two thirds (٧٠ %) of children were male. Regarding residence, more than two thirds (٧٠%) of children were from rural area.

Figure (١): Distribution of the studied children according to type of intestinal obstruction (n= ٥٠).

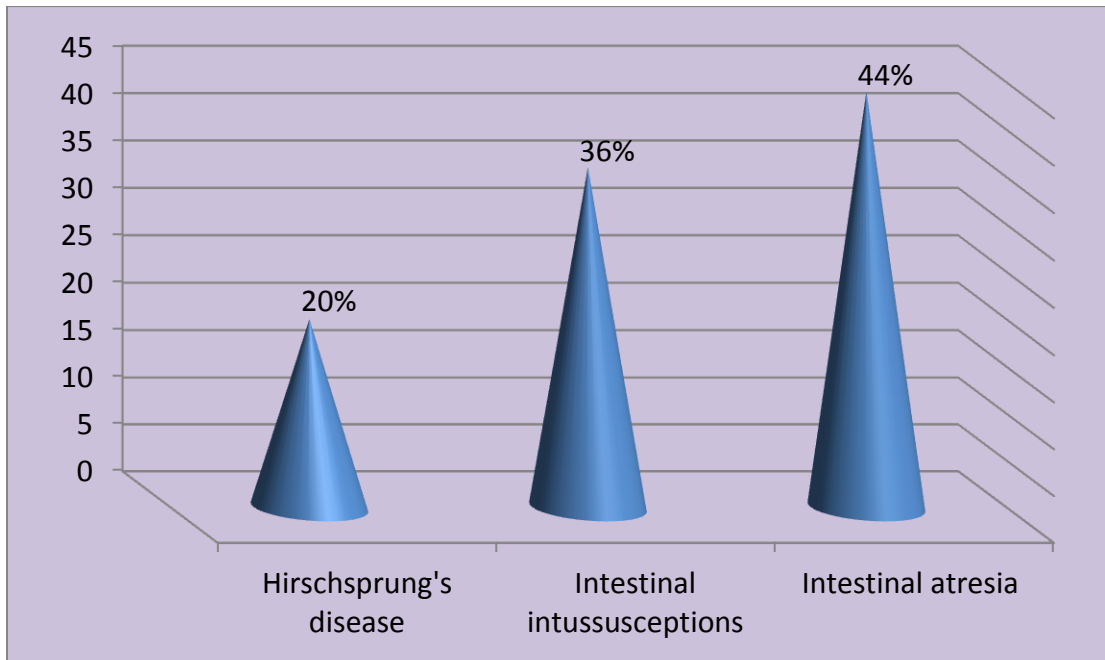


Fig (١): Shows that less than half (٤٤%) of children had intestinal atresia, followed by ٣٦% & ٢٠% had intestinal intussusceptions and Hirschsprung's disease respectively.

Table (٣): Distribution of total level of the studied nurses' knowledge regarding intestinal obstruction (n = ٥٠):

Nurses' knowledge level	Pre program (n = ٥٠)		Post program (n = ٥٠)		X ^٢ FET	P value
	No.	%	No.	%		
Good level (≥ ٨٠ %)	٨	١٦.٠	٤٨	٩٦.٠	٦٥.٣٧**
Average level (٦٠ % to < ٨٠%)	١٨	٣٦.٠	٢	٤.٠		
Poor level (< ٦٠%)	٢٤	٤٨.٠	٠	٠.٠		

** A highly statistically significant difference (P < ٠.٠٠١)

- Fisher exact test "FET"

Table (۳): Illustrates that, less than half of the studied nurses (۴۸.۰٪) had poor level of knowledge pre- program. In contrast, most (۹۶.۰٪) of them had good level of knowledge post- program. Moreover, there is a highly statistical significant difference between pre and post program regarding total nurses' knowledge level ($P < ۰.۰۰۰$).

Table (۴): Distribution of the studied nurses' competency total level regarding nursing care of children undergoing intestinal obstruction surgery ($n = ۵۰$)

Nurses' competency level	Pre program ($n = ۵۰$)		Post program ($n = ۵۰$)		X ^۲ FET	P value
	No.	%	No.	%		
Competent ($۸۵\% \leq ۱۰۰\%$)	۳	۶.۰	۴۶	۹۲.۰	۷۳.۹۹	۰.۰۰۰
Incompetent ($< ۸۵\%$)	۴۷	۹۴.۰	۴	۸.۰		

**** A highly statistically significant difference ($P < ۰.۰۰۰$)**
 - Fisher exact test "FET"

Table (۴): Demonstrates that, vast majority (۹۴.۰٪) of the studied nurses had incompetent level of performance pre- program while, vast majority (۹۲.۰٪) of them had competent level of performance post- program. And there is highly statistical significant difference in nurses' competency level post- program as compared to the pre- program ($P < ۰.۰۰۰$).

Table (۵): Distribution of the studied nurses' total level of quality of nursing care provided to children undergoing intestinal obstruction surgery ($n = ۵۰$)

Nurses' level of quality of care	Pre program ($n = ۵۰$)		Post program ($n = ۵۰$)		X ^۲ FET	P value
	No.	%	No.	%		
Good quality ($\geq ۸۰\%$)	۷	۱۴.۰٪	۴۷	۹۴.۰٪	۶۴.۹۶	۰.۰۰۰**
Moderate quality (۶۰% to $< ۸۰\%$)	۱۹	۳۸.۰٪	۳	۶.۰٪		
Poor quality ($< ۶۰\%$)	۲۴	۴۸.۰٪	۰	۰.۰٪		

**** A highly statistically significant difference ($P < ۰.۰۰۰$)**
 - Fisher exact test "FET"

Table (۵): Represents that, less than half (۴۸.۰٪) of the studied nurses had poor level of nursing care quality pre- program while, the vast majority (۹۴.۰٪) of them had good level of nursing care quality post- program. Where, there is highly statistical significant improvement in nurses' total level of quality of nursing care post- program when compared to the pre- program result ($P < ۰.۰۰۰$).

Table (٦): Multiple linear regression model for studied nurses' competency pre and post program scores and various characteristics (n = ٥٠).

	Pre program				Post program			
	Beta Coefficient	Standard error	t-test	p-value	Beta Coefficient	Standard error	t-test	p-value
Constant	٤٤.٩١٢	٥.٦٥٧	٩.٣١١	٠.٠٠٠**	٣٠.٣٨١	٣٤.٠	٨.٩٠	٠.٠٠٠
Nurses' age.	.١٥٨	.٠٩٨	١.٧٨	٠.٠٤٨*	.١٥٦	٩.٣١	.٥٠٥	.٦١٦
Sex	.٠٩١	.٣١٠	١.٨٣٤	٠.٠٧٤	.٣٠٢	٩٤.٤	١.٣٧	.١٧٥
Educational level	١.١٣٥	٧.٧٠٢	٢.٢٦٤	٠.٠٢٩*	.٢٣١	٤٤.٨٤	١.٠٢	.٣١٣
Job tittle	.٥٠٩	٨.٥٨١	١١.١٢	٠.٠٠٠**	.١٥٩	١١٨.٥	.٦٦٨	.٥٠٨
Experience	.٦٥٠	٢.٥٦٣	٦.٤٤	٠.٠٠٠**	.٢٨٩	٦.٧٠	١.٢١	.٢٣٢
Attendance of training courses	.٠٤٧	١٢.٤٢٧	٢.١٩	٠.٠٢٣*	.٥٥٣	٤٦.٢	٤.١٣	٠.٠٠٠**

** A highly statistically significant difference (P < ٠.٠٠١)

* A statistically significant difference (P < ٠.٠٥).

Table (٦): Indicates that, nurses age, educational level, job tittle, experience and attendance of training courses were statistical significant positive independent predicator of nurses competency scores preprogram (P < ٠.٠٠٠, ٠.٠٤٨, ٠.٠٢٩, ٠.٠٠٠, ٠.٠٠٠ & ٠.٠٢٣) respectively. Meanwhile, attendance of training courses were statistical significant positive independent predicator of nurses' competency scores (p < ٠.٠٠٠) post program.

Table (٧): Correlation between nurses' competency level and frequency of performing clinical skills (n = ٥٠)

Total scores	Pearson correlation coefficient			
	Frequency of performing clinical skills pre program		Frequency of performing clinical skills post program	
	r	P-value	r	P-value
Competence score pre program	.٨٥١	٠.٠٠٠**	-	-
Competence score post program	-	-	.٧٢٩	٠.٠٠٠**

** Correlation is significant at the ٠.٠١ level (٧- tailed).

Table (٧): Reflects that, there is statistical significant positive correlation between studied nurses' total competency level and total frequency of performing clinical skills pre and post program (P < ٠.٠٠٠).

Table (A): Correlation between studied nurses' total knowledge, total competency level and total quality of nursing care pre and post program.

Total scores	Pearson correlation coefficient			
	Competence score pre program		Competence score post program	
	r	P-value	r	P-value
Knowledge score	٠.٤٣١	٠.٠٠٠**	٠.٤٩٨	٠.٠٠٠**
Quality of nursing care score	٠.٨٣٤	٠.٠٠٠**	٠.٩٢٩	٠.٠٠٠**

** Correlation is significant at the ٠.٠١ level (٢-tailed).

Table (A): Notes that, there is statistical significant positive correlation between studied nurses' total knowledge, total competency level and total quality of nursing care pre and post program ($P < ٠.٠٠٠$).

Discussion

Intestinal obstruction is a potentially life-threatening condition that occurs due to mechanical or functional obstruction of the intestine that preventing normal transit of intestine contents. Intestinal obstruction is one of the most common emergencies in pediatrics surgical units. Undiagnosed or improper management of Intestinal obstruction can progress to vascular compromise which causes bowel necrosis, perforation, sepsis and death, hence early recognition, prompt treatment and competent nursing care is required to prevent complication and decrease mortality rates (*Dasaradha et al., ٢٠١٥*).

As regards nurses' characteristics, the findings of the present study revealed that the majority of them were females. This might be because the study of nursing in Egypt was exclusive for females only till a few years ago, thus the profession of nursing in Egypt was mostly feminine. Besides, the male nurses preferred to travel abroad or worked in private hospitals. This finding is in the same context with *Hussein and Rada, (٢٠١٦)* who conducted a study to assess

the effectiveness of an educational program on nurses' knowledge concerning preoperative care of children undergoing intestinal obstruction surgery at pediatric teaching hospitals in Baghdad city, and found that more than two-thirds (٧٢%) of nurses were females.

Regarding the educational level of studied nurses, the present study revealed that less than two-thirds of the nurses had a secondary school of nursing. The finding of this study might be due to the fact that the nursing secondary school provided the community with a large number of diploma nurses graduates than the other agencies such as the faculties of nursing and the technical institutes of nursing. The finding of this study is in agreement with *Zaki et al., (٢٠١٨)* who carried out a study to assess nurses' performance regarding care for neonates with necrotizing enterocolitis at intensive care units and found that nearly half of the studied nurses had a diploma of the secondary school of nursing and exactly quarter of them had a bachelor degree in nursing.

Regarding job title of studied nurses, the current study clarified that the majority of nurses were working as staff nurses. The finding of this study might be due to the fact that less than two-thirds of the studied nurses in the present study had a secondary school of nursing. This finding is in accordance with *Raiza et al.*, (2014) who carried out a study to assess the level of competency of new registered nurses as perceived by their nursing supervisors and reported that three-quarters (75%) of nurses were working as staff nurses.

As regards characteristics of studied children, the finding of the current study revealed that more than two-thirds of the children were male. This could be because the frequency of congenital anomaly was more common in the male gender. The finding of this study is parallel with *Ullah et al.*, (2019) who conducted a study about the ultrasound-guided hydrostatic reduction of intussusceptions in children with late presentation and found that more than three-quarters of them were males. Moreover, the finding of this study is in harmony with *Martin et al.*, (2015) Neonatal-perinatal medicine E-book: diseases of the fetus and infant, who found that the congenital anomalies of the gastrointestinal system as Hirschsprung's disease and intestinal atresia are more in males than females.

As for the type of intestinal obstruction of studied children, the current study mentioned that more than two-fifth of the children had intestinal atresia, more than one-third of them had intestinal intussusceptions and one-fifth of them had Hirschsprung's disease. This might be due to the fact that intestinal atresia and Hirschsprung's disease were the most common causes of neonatal

intestinal obstruction, and intussusceptions were the most common cause of pediatric intestinal obstruction. This result is in accordance with the study done by *Subbarayan et al.*, (2015) who conducted a study to evaluate histomorphological features of intestinal atresia and its clinical correlation and reported that intestinal atresia accounted for one-third of the children with intestinal obstruction. In the same line, the result of this study is convenient with *Khalafallah et al.*, (2014) who conducted a study to assess the effect of designed wound care guidelines for pediatric nurses on the occurrence of surgical site complications and demonstrated that more than one-third of the children had intussusceptions followed by less than one-quarter of them had Hirschsprung's disease. The finding of this study is supported by an Egyptian study done by *Elbaih et al.*, (2014) who conducted a study to assess the incidence, nature, and outcome of emergency neonatal intestinal obstruction in Egypt and reported that more than one-fifth of the children had Hirschsprung's disease.

The finding of the current study has reported that, less than half of the studied nurses had poor level of knowledge at the pre-program phase. This could be due to the fact that the majority of nurses did not attend any training courses related to caring for children undergoing intestinal obstruction surgery, the lack of nurses' incentives and desire to enhance or at least refresh their knowledge whether new or old graduated nurses as well as the work overload. The finding of this study is congruent with *El-Sharkawy et al.*, (2019) who carried out a study to assess the effect of nursing intervention guidelines on nurses' performance and clinical outcomes related to problems accompanying infants with

Hirschsprung's disease and mentioned that the majority (86.7%) of studied nurses showed poor knowledge level before intervention guidelines at the pre-test phase. After the implementation of the program, there was a significant improvement in the total scores of nurses, most of them had good level of knowledge. Moreover, there is a highly statistical significant difference between pre and post program regarding total nurses' knowledge level ($P < 0.001$). This improvement indicated that the program was a successful method to increase nurses' knowledge. This finding is in agreement with *Hussein and Rada*, (2017) who revealed that there were highly statistically significant differences between pretest and posttest for nurses' knowledge related to intestinal obstruction ($P < 0.001$).

On investigating nurses' competency level regarding the care of children undergoing intestinal obstruction surgery, the present study revealed that the majority of studied nurses had an incompetent level of performance in the pre-program phase. This might due to the lack of continuous training and education performed for the nurses regarding the care of children undergoing intestinal obstruction surgery. The finding of the current study is compatible with *Ibrahim et al.*, (2018) who carried out a study to assess nurses' knowledge and practice regarding pre- and post-operative nursing care provided to children with intestinal obstruction and showed that more than two-thirds (77.8%) of nurses had a poor level of performance regarding the care of children with intestinal obstruction. The finding of this study is in contrast with an Egyptian study done by *Abd-Elhamed et al.*, (2017) to assess nurses' knowledge and practices regarding neonates with a tracheoesophageal fistula at Assuit

university children hospital and found that less than one-third (32.0%) of nurses had an incompetent level of practices. Following the implementation of the program, most of nurses had significantly competent level post-program and there is highly statistical significant difference in nurses' competency level post-program as compared to the pre-program ($P < 0.001$). This might be because the program made a refreshment in nurses' knowledge which in turn led to an improvement their competency level. The finding of this study is compatible with *El-Sharkawy et al.*, (2019) who reported that the total performance mean scores among the study group related to infants with HD had improved from 84.12 before the application of intervention guidelines to (278.63 & 202.67) respectively immediately after one month of the application of intervention guidelines.

Regarding nurses' quality of nursing care, the finding of the present study presented that less than half of the studied nurses had a poor level of nursing care quality pre-program phase. This finding might be due to the fact that the majority of nurses had a poor level of knowledge and an unsatisfactory competency level pre-program phase. This finding is consistent with an Egyptian study by *Abd El Fattah & Zein El Dein.*, (2018) who conducted a study to assess the quality of nursing care provided immediately after birth at the university hospital and found that the majority (82.7%) of nurses had a poor level of nursing care quality. However, after the implementation of the program, there is a highly statistically significant improvement in the total level of nurses' scores regarding the quality of nursing care provided to children undergoing intestinal obstruction surgery, while the vast majority of them had a good level of nursing care quality post-

program. This might be attributed to the improvement of nurses' knowledge and competency level post-program. This finding is in agreement with *El Zeneny et al.*, (۲۰۱۷) who carried out a study to assess the effect of clinical supervision training program for nurse managers on the quality of nursing care in intensive care units and reported that more than three-quarters of staff nurses had a moderate level of nursing care quality post-program phase.

Regarding the relationship between studied nurses' competency scores and nurses' age and experience pre-program, the finding of the present study mentioned that nurses' age and experience are statistically significant positive independent predictors of nurses' competency scores pre-program ($P < .05$). This could be due to the great effect of experience on nurses' competency level as their years of experience exposed them to different situations in pediatric surgery; years of experience enabled them to master skills competently. This finding is in harmony with the study done by *Ahmed et al.*, (۲۰۱۴) who conducted a study to assess the quality of nursing care provided for neonates with a tracheoesophageal fistula and reported that there was a statistically significant relation between nurses' performance, years of experience, and age ($p < .05$).

Concerning the relationship between studied nurses' competency scores and educational level pre-program, the present study mentioned that nurses' educational level is a statistically significant positive independent predictor of nurses' competency scores pre-program ($P < .05$). This finding is supported by *the American Association of Colleges of Nursing (AACN) ۲۰۱۹*, which believed

that education has a significant impact on the knowledge and competencies of nurse clinician as well as all health care providers. Nurses with Bachelor of Science in Nursing (BSN) degrees are well-prepared to meet the demands placed on today's nurse and are prized for their skills in critical thinking, leadership, case management, health promotion, and for their ability to practice across a variety of inpatient and outpatient settings. Moreover, the finding of this study is matched with an Egyptian study done by *Loutfy et al.*, (۲۰۱۴) who conducted a study to assess the quality of nursing care provided for preterm infants suffering from respiratory distress syndrome and reported that there was a highly statistically significant relation between nurses' academic qualification and total nurses' practice score.

In the matter of the relationship between the studied nurses' competency scores and the attendance of training courses pre- and post-program, the present study demonstrated that the attendance of training courses was statistically significant positive independent predictor of nurses' competency scores pre- and post-program ($P < .000$). This could be due to that attendance of training courses helped in improving nurses' competency level. This result is consistent with *Ahmed*, (۲۰۱۴) who conducted a study to assess the quality of nursing care to neonates' pre-post operation with a tracheotomy and found that there was a statistically significant relation between total nurses' performance and training courses.

Regarding the correlation between nurses' competency level and frequency of performing clinical skills, the present study reported that there was a statistically significant positive

correlation between nurses' competency level and frequency of performing clinical skills pre- and post- program ($P < .000$). This could be explained by the fact that frequent application of competency domains in clinical setting was associated with increasing competency level which helped the nurses to master their performance of clinical skills. This finding is supported by *Hassankhani et al.*, (2014) who conducted a study to assess clinical skills performed by Iranian emergency nurses: perceived competency levels and attitudes toward expanding professional roles and found that there was a positive correlation between frequency of performing clinical skills and competency level ($P < .000$).

The present finding revealed that there was a statistically significant positive correlation between studied nurses' knowledge, competency level and quality of nursing care pre- and post-program. This means that increasing nurses' knowledge will improve their competency level and this will reflect the level of nursing care quality provides to children. This could be explained by the fact that nurses' competency level directly influenced by nurse's knowledge and nurse's knowledge was essential to achieve the best competency and the high quality of nursing care. This finding is congruent with *El Zeneny et al.*, (2017) who reported that there was a positive correlation between nurses' competencies and the quality of nursing care. Moreover, the finding of this study is matched with *Gron Dahl et al.*, (2019) who conducted a study to assess perceived quality of nursing care and patient education: a cross-sectional study of hospitalized surgical patients in Finland and reported that there was a positive correlation between the quality of surgical nursing care and knowledge.

Conclusion

The educational program was effective in improving nurses' competency and quality level regarding the care of children undergoing intestinal obstruction surgery. Besides, there was a positive correlation between nurses' total knowledge, competency level and quality of care towards caring for children undergoing intestinal obstruction surgery pre and post program. As well as there was a statistically significant positive correlation between studied nurses' total competency level and total frequency of performing clinical skills pre and post the program ($P < .000$).

Recommendations

Based on the findings of the present study, these points are recommended:

- Provision of continuing education programs in order to update nurses' knowledge and enhance their competency level regarding the care of children undergoing intestinal obstruction surgery.
- Designing and distributing Arabic booklets to all nurses who are working in pediatric and neonatal surgical units including all the competency domains related to the care of children with intestinal obstruction surgery.
- Periodic evaluation of nurses' competency level by the hospital directors to detect the points of strength and weakness to act on .
- Further researches; the study should be replicated on a larger random sample in a different setting for the generalization of the obtained results.

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