Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 8, Issue 1, pp: (662-678), Month: January - April 2021, Available at: www.noveltyjournals.com

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

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Abstract: **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 to ensure the delivery of high-quality nursing care. Aim: This study was aimed to improve nurses' competency level regarding care of children undergoing intestinal obstruction surgery after implementation the educational program. Research design: A quasi-experimental design was utilized in the current study. Setting: This study was conducted in neonatal and pediatric surgical units at Specialized Pediatric Hospital in Benha City. Subjects: A convenient sample of (50) nurses and a purposive sample of 50 children were selected from the above mentioned setting. Tools of data collection: Three tools were used: tool (1) A Structured interview questionnaire sheet, tool (2) nurse competence scale and tool (3) quality of nursing care Likert scale. Results: More than two thirds (68%) of the studied nurses had poor level of competency pre-program while, the vast majority (92.0%) of them had good level of competency post-program. Majority (86%) of them had high frequency level of performed skills in clinical practice and the vast majority (94%) of them had high level of quality of nursing care post-program. Conclusion: The educational program was effective in improving nurses' competency level, their frequency of performed skills in clinical practice and their quality of nursing care regarding 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: **Care, Children, Educational program, Intestinal obstruction, Nurses' competency level.**

1. 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., 2017).***

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., 2017).***

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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., 2015).***

The mortality rates of pediatric intestinal obstruction ranges between 21% and 45% in developing countries and less than 15% 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., 2016).*** 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., 2018).***

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 and contain bile. Vomiting from more distal obstruction of the small intestine is more gradual in onset, the content may be organ - brown and foul smelling like feces. Persistent abdominal colic is seen with lower intestinal obstruction. The characteristic sign of mechanical obstruction is colic that comes and goes in waves ***(Lewis et al., 2011).***

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, preparing child and parents for temporary colostomy, providing 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., 2017).***

Significance of the study:

Nurses have 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, 2017).***

According to the statistical office of Benha Specialized Pediatric Hospital, the incidence rate of intestinal obstruction were 200 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, 2019)***. So, this study aims to improve nurses' competency level and quality of nursing care regarding 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:

1-Assess nurses' competency level and their frequency of performed skills in clinical practice regarding children undergoing intestinal obstruction surgery.

2-Assess quality of nursing care regarding children undergoing intestinal obstruction surgery.

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

4-Evaluate the effect of educational program on nurses' competency level, their frequency of performed skills in clinical practice and their quality of nursing care regarding children undergoing intestinal obstruction surgery.

Research Hypothesis

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

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

3- There were a positive correlation between total nurses' competency level, total quality of nursing care and total frequency of performed skills in clinical practice.

2. 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 16 incubators, total numbers of nurses were 30 nurses while PSU found in the first floor, composed of two rooms with 11 beds, total numbers of nurses were 25 nurses.

Subjects:

The subjects consisted of two types of samples;

Type (1): A convenient sample of (50) nurses who are working at previously mentioned setting regardless their characteristics and willing to participate in the study.

Type (2): A purposive sample of 50 children suffering from intestinal obstruction was selected after fulfilling the following criteria:

Inclusion criteria:

- Age from 1 day to 2 years.

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

Exclusion criteria:

-Children with other congenital anomalies.

Tools of data collection:

Data were gathered by using the following tools:

Tool (I): A Structured interview questionnaire sheet:

It was designed by the researchers in the light of relevant research **Ibrahim et al., (2013)** to assess nurses' knowledge regarding care of children undergoing intestinal obstruction. It was written in an Arabic language and consisted of two main parts:

Part (1): Composed from three sections:

A-Characteristic of the studied nurses: age, gender, educational level, job tittle, 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 included, onset of disease, family history of congenital anomalies, present complain and type of intestinal obstruction. The researchers fill this data from the children medical record.

Part (2): Nurses' knowledge assessment: The tool composed of (22) multiple choice questions related to definition of intestinal obstruction (1question), causes (1question), types (4questions) clinical manifestation (1question), diagnosis (1question), complication (4 questions) and treatment of intestinal obstruction (1question), definition and importance of preoperative nursing care (2questions), routine laboratory tests and radiology before the surgery (1question), importance of measuring vital signs of the child before surgery (1question), changes that suddenly appear on the child and prevent surgery (1question), definition of post-operative nursing care (1question), indication of change the child's position after surgery (1question), nursing consideration and observation during wound care (2questions).

Total scoring system:

The studied nurses' answers were compared with a model key answer, where scored as; complete correct answer had score (2), incomplete correct answer had score (1) and unknown or wrong answer had score (0). Total knowledge scores ranged from (0 - 44) point. In this respect, the level of nurses' knowledge was categorized as poor knowledge (< 60%) was ranged from (0 < 26) point, average knowledge (60 % to < 80%) was ranged from 26 < 35 point and good knowledge (80-100%) was ranged from 35 - 44 point.

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

Nurse competence scale was adapted from **Meretoja et al., (2004) and Lynn, (2015)** to assess nurses' competency level regarding care of children undergoing intestinal obstruction, modified by the researchers to suit the nature of the study. Nurse competence scale included 35 steps grouped under seven main parts as helping role (3 steps), teaching-coaching (6 steps), diagnostic functions (3 steps), managing situations (7 steps), therapeutic interventions (5 steps), ensuring quality (3 steps) and work role competencies (8 steps). In addition, the nurse competence scale includes a separate column for nurses to evaluate how frequently the skills performed in a clinical practice.

Scoring system for nurses' competence:

The nurses' competency level was evaluated by using visual analog scale from 0 to 100. The mean scores in each item was the indicator of clinical competence in that item. The total mean of items in each domain was the indicator of competence of nurses in that domain and the total mean of domains was indicator of the total clinical competence of nurses. Total competency scores ranged from (0 - 3500) point. Accordingly, level of nurses' competency was categorized as poor competence (< 70%) was ranged from 0 < 2450 point, average competence (70 % to < 85%) was ranged from 2450 < 2975 and good competence (85-100%) was ranged from 2975 to 3500 point.

Scoring system for nurses' frequency:

The nurses 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). Total frequency scores ranged from (0 - 105) point. So, level of nurses' frequency was categorized as less frequency (< 70%) was ranged from 0 < 74 point, fair frequency (70 % to < 85%) was ranged from 74 < 89 point and high frequency (85-100 %) was ranged from 89-105 point.

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

Quality of nursing care scale was adopted from **Koy et al., (2015)** to assess quality of nursing care provided to children undergoing intestinal obstruction surgery. It includes (24) statement categorized under 7 main categories as; nurse's attributes (7 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 (2 statement), progress of nursing process (2 statement) and cooperation with relatives (2 statement).

Scoring system:

The studied nurses' response were compared using three point Likert scale ranged from (0-3) as; most of time had score (3), sometime had score (2), rarely had score (1) and never done had score (0). Total quality of nursing care scores ranged

from 0-72. So, the level of quality of nursing care was categorized as low quality (< 60%) was ranged from 0 < 43point, moderate quality (60% to < 80%) was ranged from 43 < 58 point and high quality (80-100%) was ranged from 58-72 point.

Tool (IV): Educational program: The educational program were developed by the researchers and aimed to improve nurses' competence level regarding care of children undergoing intestinal obstruction surgery.

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 the study 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) 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 ($\alpha = 0.91$) for a structured interview questionnaire sheet, ($\alpha = 0.79$) for nurse competence scale and ($\alpha = 0.84$) for quality of nursing care scale. This indicates the favorable internal consistency and high 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. Also, nurses allow to withdrawal from the study at any time without giving explanations. 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, (5) children undergoing intestinal obstruction surgery and (5) 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 researchers were 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 researchers 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 15 minutes for each child. The researchers gave the studied nurses questionnaire for filling it to assess their knowledge and it took 15 minutes. Each nurse was observed separately during

their actual practice of procedures to assess their competency level with their frequency and their 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 researchers 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 5 nurses, the program has taken 9 hours for each group and were implemented according to nurses readiness, distributed as the following; (4) session for theoretical part each session kept going from 30-45 minutes and (5) session for practical part, each session kept going 1 hours, 4 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 group of nurses.

Evaluation phase:

After program implementation, the post test was carried out to assess nurses' knowledge, competency level with their frequency 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.

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.

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 predicator 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 $p < 0.001$.

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3. RESULTS

Table (1): Distribution of the studied nurses according to their characteristics (n =50).

Nurses' Characteristics	No.	%
Age / years		
20- < 25	11	22.0
25- < 30	5	10.0
30- < 35	24	**48.0**
≥ 35	10	20.0
Mean ± SD	**30.72 ± 5.77 years**	
Gender		
Female	40	**80.0**
Male	10	20.0
Educational level		
Secondary school of nursing	30	**60.0**
Technical institute of nursing	13	26.0
Bachelor of nursing science	4	8.0
Post-graduate studies	3	6.0
Job tittle		
Staff nurse	43	**86.0**
Unit supervisor	7	14.0
Head of Nursing	0	0.0
Years of experience		
1- < 5 years	12	24.0
5- <10 years	4	8.0
10- <15 years	24	**48.0**
≥ 15 years	10	20.0
Mean ± SD	**12. 20 ± 6.20 years**	
Attendance of training courses regarding caring of children undergoing intestinal obstruction surgery	41	**82.0**
	9	18.0

Table (1): Revealed that, 48% of nurses were in the age group 30<35 years with mean age 30.72 ± 5.77 years, 80 % of them were female, 60 % of them had secondary school of nursing certificate, 86% of them were working as staff nurse, 48% of them had10<15 years of experience in pediatric surgical units with mean 12. 20 ± 6.20 years and 82% of them did not attend any training courses regarding caring of children undergoing intestinal obstruction surgery.

Table (2): Distribution of the studied children according to their characteristics (n =50).

Children' Characteristics	No.	%
Age / months		
One day- < 6 months	34	**68.0**
6-<12 months	6	12.0
12-<18 months	8	16.0
18-≤24 months	2	4.0
Mean ± SD	5.32 ± 6.43 months	
Gender		
Female	15	30.0
Male	35	**70.0**

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Residence		
Rural	35	**70.0**
Urban	15	30.0
Consanguinity		
Yes	33	**66.0**
No	17	34.0

Table (2): It is clear from this table that 68% of children were in the age group one day- < 6 months with mean age 5.32 ± 6.43 months, 70 % of them were male, 70% of them were from rural areas and 66% of them had positive consanguinity.

Table (3): Distribution of the studied children regarding their medical data (n=50).

Medical data	No.	%
Onset of disease/ day		
One day- < 2 day	26	**52.0**
2-<4 day	13	26.0
4-<6 day	8	16.0
6-≤8 day	3	6.0
Mean ± SD	**2.22 ± 1. 81 day**	
Family history of congenital anomalies:		
Yes	28	**56.0**
No	22	44.0
Present complains:		
Abdominal distention		
Yes	45	**90.0**
No	5	10.0
Bilious emesis		
Yes	21	42.0
No	29	**58.0**
Vomiting		
Yes	17	34.0
No	33	**66.0**
Constipation		
Yes	39	**78.0**
No	11	22.0
Abdominal pain		
Yes	40	**80.0**
No	10	20.0

Table (3): Demonstrated that, 52% of children suffered from one day to less than 2 day with mean 2.22 ± 1. 81 days, 56% of them had family history of congenital anomalies, 90%, 58%, 66%, 78% and 80% of them complained from abdominal distention, bilious emesis, vomiting, constipation and abdominal pain respectively.

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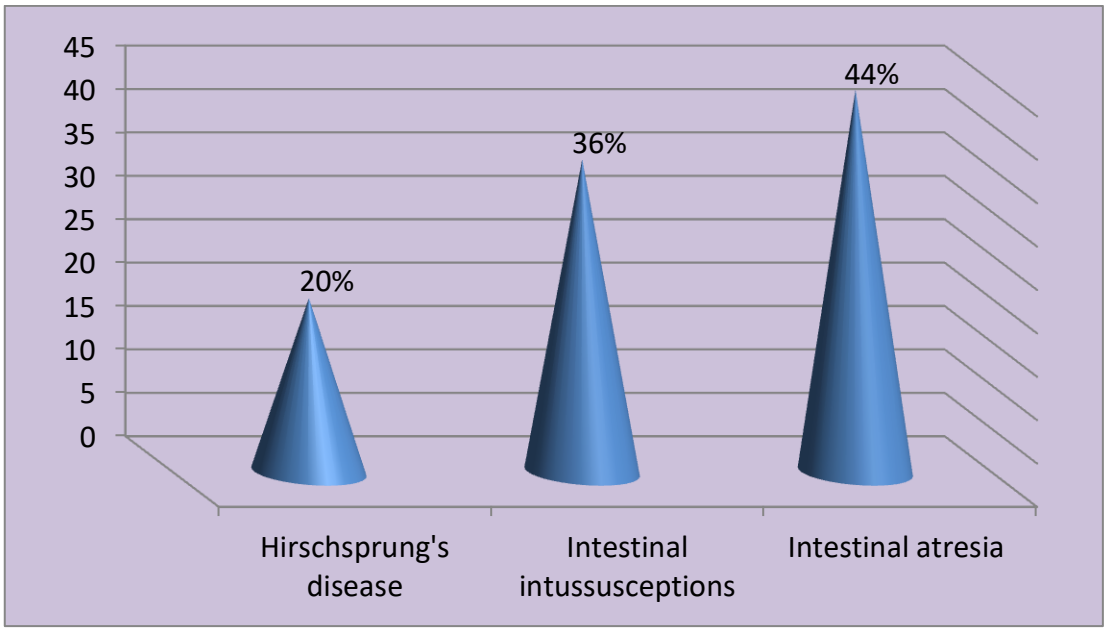

Figure (1): Distribution of the studied children according to type of intestinal obstruction (n= 50).

Figure (1): Showed that 44%, 36% and 20% of children had intestinal atresia, intestinal intussusceptions and Hirschsprung's disease respectively.

Table (4): Distribution of total level of nurses' knowledge regarding intestinal obstruction pre and post-program implementation (n =50).

Nurses' knowledge level	Pre-program implementation (n =50)		Post-program implementation (n =50)		X^2 FET	P value
	No.	%	No.	%		
Good level (80-100%)	6	12.0	48	**96.0**	65.37	0.000**
Average level (60 % to < 80%)	11	22.0	2	4.0		
Poor level (< 60%)	33	**66.0**	0	0.0		

**** A highly statistical significant difference (P <0.001) - Fisher exact test "FET"**

Table (4): Illustrated that, there was a highly statistical significant difference between pre and post- program implementation regarding total nurses' knowledge level. Where, 66% had poor level of knowledge pre-program implementation. In contrast, 96% of them had good level of knowledge post-program (P <0.000).

Table (5): Mean scores of total nurses' competency domains regarding care of children undergoing intestinal obstruction surgery pre and post-program implementation (n =50).

Competency domains	Pre-program implementation (n =50)	Post-program implementation (n =50)	Paired t test	P value
	Mean ± SD	Mean ± SD		
Helping role	110.4 ±19.6	242 ±15.2	42.36	0.000**
Teaching – coaching	214.2±27.8	552.3±15.7	74.80	0.000**
Diagnostic functions	118.8±15.7	281.5±7.41	79.39	0.000**
Managing situations	282.1±25.2	658.1±14.9	87.49	0.000**
Therapeutic interventions	266.1±19.6	483.8±4.30	78.32	0.000**
Ensuring quality	113.2±15.1	281.5±11.0	86.39	0.000**
Work role competence	190.1±30.2	284.2±7.4	8.53	0.000**
Total competency	**1295 ± 157**	**2850 ± 174**	47.13	0.000**

**** A highly statistical significant difference (P <0.001)**

Table (5): Indicated that, the mean score of nurses total competency in the pre- program was 1295 ± 157 which improved to be 2850 ± 174 post-program and there was a highly statistical significant difference in all nurses' competency domains regarding nursing care of children undergoing intestinal obstruction surgery post-program implementation compared to the pre- program results (P<0.000).

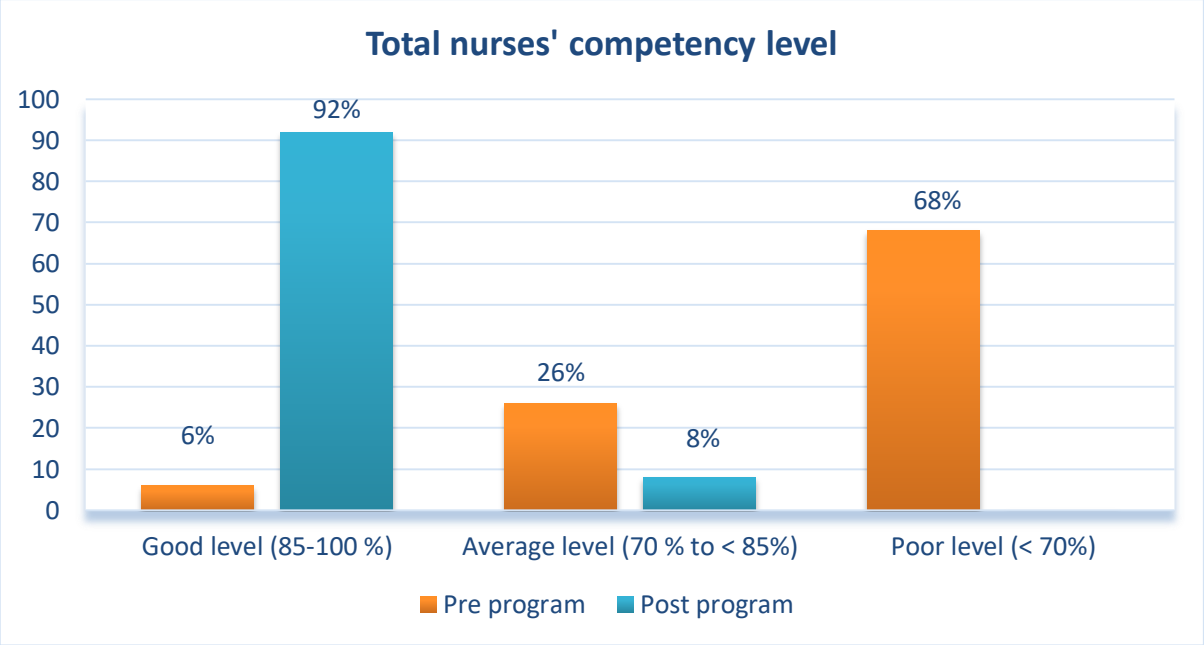

Figure (2): Distribution of total nurses' competency level regarding care of children undergoing intestinal obstruction surgery pre and post-program implementation (n =50).

Figure (2): Demonstrated that, 68% of the studied nurses had poor level of competency level pre-program implementation. On the other hand, 92% of them had good level of competency level post- program implementation.

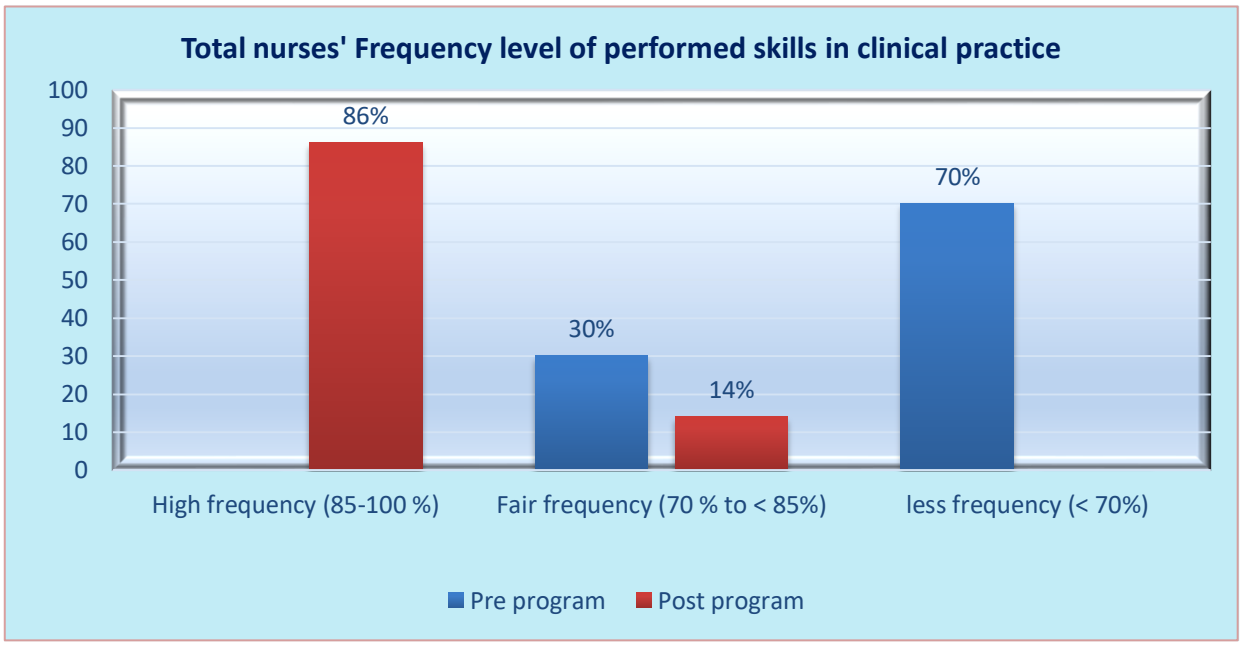

Figure (3): Distribution of total nurses' frequency level of performed skills in clinical practice regarding care of children undergoing intestinal obstruction surgery pre and post- program implementation (n =50).

Figure (3): Showed that, 70% of the studied nurses had less frequency level of performed skills in clinical practice at the pre-program phase. Conversely, 86% of them had high frequency level post- program implementation.

Novelty Journals

ISSN 2394-7330

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Table (6): Distribution of total level of nurses' quality of nursing care provided to children undergoing intestinal obstruction surgery pre and post- program implementation (n =50).

level of quality of nursing care	Pre-program implementation (n =50)		Post-program implementation (n =50)		X^2 FET	P value
	No.	%	No.	%		
High quality (80-100 %)	7	14.0%	47	**94.0%**	64.96	0.000**
Moderate quality (60 % to < 80%)	15	30.0%	3	6.0%		
Low quality (< 60%)	28	**56.0%**	0	0.0%		

**** A highly statistical significant difference (P <0.001)**

- Fisher exact test ''FET''

Table (6): Reflected that there was a highly statistical significant improvement in the total level of quality of nursing care among the studied nurses post-program implementation. Where, 94% of them had high level of quality of nursing care post-program implementation compared to 56% of them had low level of quality of nursing care pre-program implementation (P <0.000).

Table (7): Multiple linear regression model for studied nurses' competency scores pre and post- program implementation and various characteristics (n =50).

	Pre-program implementation				Post-program implementation			
	Beta Coefficient	Standard error	t-test	p-value	Beta Coefficient	Standard error	t-test	p-value
Constant	44.912	5.657	9.311	0.000	303.81	340	8.90	.000
Nurses' age.	.158	.098	1.78	0.048*	.156	9.31	.505	.616
Sex	.091	.310	1.834	0.074	.302	94.4	1.37	.175
Educational level	1.135	7.702	2.264	0.029*	.231	44.84	1.02	.313
Job tittle	.509	8.581	11.12	0.000**	.159	118.5	.668	.508
Experience	.650	2.563	6.44	0.000**	.289	6.70	1.21	.232
Attendance of training courses	.047	12.427	2.19	0.023*	.553	46.2	4.13	.000**

**** A highly statistically significant difference (P <0.001)**

*** A statistically significant difference (P<0.05).**

Table (7): Indicated that nurses age, educational level, job tittle, and experience were statistical significant positive independent predicator of nurses competency scores pre-program implementation(P<0.048, 0.029, 0.000, & 0.000) respectively. Meanwhile, attendance of training courses were statistical significant positive independent predicator of nurses' competency scores pre and post-program implementation (p <0.000&0.023).

Table (8): Correlation between total nurses' competency level, total quality of nursing care and total frequency of performed skills in clinical practice pre and post-program implementation (n=50).

Total scores	Pearson correlation coefficient			
	Total nurses' competence level			
	Pre- program implementation		Post- program implementation	
	r	P-value	r	P-value
Total quality of nursing care	0.834	0.000**	0.929	0.000**
Total Frequency of performed skills in clinical practice	0.851	0.000**	0.729	0.000**

**** Correlation is significant at the 0.01 level (2- tailed).**

Table (8): Noted that, there was a highly statistical significant positive correlation between total nurses' competency level and total quality of nursing care pre and post-program implementation (r=0.834, r=0.929 &P<0.000) respectively. Again, there was a highly statistical significant positive correlation between total nurses' competency level and total frequency of performed skills in clinical practice pre and post-program implementation (r=0.851, r=0.729 &P <0.000) respectively.

4. DISCUSSION

Nurses play an important role in providing high-quality health services and promoting the health of society. Clinical competence is one of the requirements that nurses should have in clinical settings **(Kemppainen etal., 2013)**. Competency is defined as the capability of nurses to apply and use a set of related knowledge, skills, and abilities required to successfully perform critical work functions or tasks in a defined work setting. Competency evaluation is a tool used by healthcare facilities to construct the culture of quality that affects children's care and potentially decreases the incidence of mortality rates (**Saied et al., 2018**).

As regards nurses' characteristics, the finding of the present study revealed that the majority of nurses 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 was in the same context with **Hussein and Rada, (2016*)*** who conducted a study about the effectiveness of an educational program on nurses' knowledge concerning preoperative care of children undergoing intestinal obstruction surgery and found that more than two-thirds of nurses were females.

Regarding the educational level of studied nurses, the present study found that less than two-thirds of the nurses had a secondary school of nursing certificate. The finding of this study might be explained by 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 was in agreement with **Zaki et al., (2018)** who carried out a study about 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 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 was in accordance with **Raiza et al., (2014**) who carried out a study about the level of competency of new registered nurses as perceived by their nursing supervisors and reported that three-quarters 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 was 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. In this regard, **Martin et al., (2015)** mention that the congenital anomalies of the gastrointestinal system as Hirschsprung's disease and intestinal atresia were more common in males than females.

The present study presented that more than half of the children had a family history of congenital anomalies. This could be due to the fact that nearly two thirds of the children had positive consanguinity. The result of this study was in harmony with **Ameen et al., (2018)** who reported that there was a statistical significant association between maternal history of previous congenital anomalies and children had congenital anomalies.

On assessing children complain, the present study reported that the vast majority of children had abdominal distention, more than half of them had bilious emesis, two-thirds of them had vomiting, more than three-quarters of them had constipation, and the majority of them had abdominal pain. This might be due to path-physiology sequences of the disease process. These results were in accordance with the study done by **Tesfamichael et al., (2019)** about the surgical management outcome of intestinal obstruction and its associated factors and found that the majority of children suffered from abdominal pain, vomiting; more than three-quarters of them had abdominal distension and failure to pass abdominal contents as feces.

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 was in accordance with **Subbarayan et al., (2015)** who conducted a study about histo morphological features of intestinal atresia and its clinical correlation and reported that intestinal atresia accounted for one-third of the children with intestinal obstruction. Again, the finding of this study was supported with **Elbaih et al., (2018)** who conducted a study about 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.

Concerning the consanguinity of studied children, the result of the current study clarified that nearly two thirds of the children had positive consanguinity. This could be due to the fact that more than two-thirds of the studied children were from a rural area where the concept of positive consanguinity was more common in these communities and this may lead to congenital anomalies. The finding of this study was compatible with **Ameen et al., (2018)** who conducted a study about the pattern of congenital anomalies at birth and their correlation with maternal characteristics and revealed that more than two-thirds of the children had positive consanguinity.

The finding of the current study was reported that, nearly two thirds of the studied nurses had poor level of knowledge at the pre-program phase. This could be due to 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. After the implementation of the program, most of the studied nurses had significantly good level of knowledge. This improvement indicated that the program was a successful method for increasing nurses' knowledge. These findings were congruent with **El-Sharkawy et al., (2019)** who carried out a study about the effect of nursing intervention guidelines on nurses' performance and clinical outcomes related to problems accompanying infants with Hirschsprung's disease and revealed that the majority (86.7%) of studied nurses had poor knowledge level before application of intervention guidelines and improved significantly to (83.3%) good knowledge level immediately after application of intervention guidelines ($P < 0.001$).

On investigating nurses' competency level regarding the care of children undergoing intestinal obstruction surgery, the present study revealed that more than two thirds of the studied nurses had poor level in the pre-program phase. The reasons may be that nurses lack continuous education and resources for their competency development regarding the care of children undergoing intestinal obstruction surgery. The finding of the current study was incongruent with **Hassankhani et al., (2018)** who done a study to assess clinical skills performed by Iranian emergency nurses: perceived competency levels and attitudes toward expanding professional roles and reported that the emergency nurses had perceived a good level of competence (73.31 ± 14.2) in the assessment phase. Following the implementation of the program, vast majority of nurses had good competency level. This could be due to the program made refreshment in nurses' knowledge which in turn led to an improvement of their competency level. The finding of this study was compatible with **Khdayaryan etal., (2011)** who carried out a study about the effect of nursing management development program on nurses clinical competencies and found that nurses' clinical competency improved to good level in the study group after intervention compared with the control ones.

The current study showed that majority of the studied nurses had high frequency level of performed skills in clinical practice post-program implementation. This finding was in agreement with **Bahreini et al., (2011)** who conducted a study to compare the competence assessments made by head nurses and practicing nurses in a university hospital in Iran and indicated that 88% of nurses were more frequently using the skills in their clinical settings.

Regarding nurses' quality of nursing care, the finding of the present study presented that more than half of the studied nurses had low level of quality of nursing care pre-program phase. This finding might be due to that nearly two thirds and more than two thirds of nurses had a poor level of knowledge and competency level pre-program phase. This finding was consistent with **Abd-El Fattah & Zein-El Dein., (2012)** who conducted a study about the quality of nursing care provided immediately after birth at the university hospital and found that the majority of nurses had a poor level of quality of nursing care. However, after the implementation of the program, the vast majority of the studied nurses had significantly high level of quality of nursing care. This could be attributed to the improvement of nurses' knowledge and

competency level post-program lead to increase level of quality of nursing care. In contrast, this finding contradicted with **El-Zeneny et al., (2017)** who carried out a study about the effect of clinical supervision training program for nurses 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 quality of nursing care post-program phase.

The finding of the present study mentioned that nurses' age was statistical significant positive independent predictors of nurses' competency scores pre-program. This finding was consistent with **Adib-Hajbaghery & Eshraghi-Arani, (2018)** who done a study to assess nurses' clinical competence from their own viewpoint and the viewpoint of head nurses and found that there was a significant relationship between the clinical competence and variable of age.

The finding of the present study mentioned that nurses' experience was statistical significant positive independent predictors of nurses' competency scores pre-program. This could be due to the great effect of experience on nurses' competency level as their years of experience exposed them to many difficult situations in pediatric surgery ward that enabled them to master clinical skills competent. This finding was in harmony with **Istomina et al., (2011)** who done a study about the competence of nurses and factors associated with it and reported that work experience is one of the factors influencing the clinical competence of nurses. Thus, it is expected that, with an increase in the work experience, clinical competence will also increase.

Concerning the relationship between the studied nurses' competency scores and educational level pre-program, the current study mentioned that nurses' educational level was a statistical significant positive independent predicator of nurses' competency scores pre-program. This finding was supported by **the American Association of Colleges of Nursing, (2019**) 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 were 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.

In the matter of the relationship between the studied nurses' competency scores and the attendance of training courses pre and post-program implementation, the present study demonstrated that the attendance of training courses was statistical significant positive independent predicator of nurses' competency scores pre and post-program. This could be due to the attendance of training courses helped in improving nurses' knowledge and this in turn improves their competency level. This result was consistent with **Ahmed, (2013)** who conducted a study to assess the quality of nursing care for neonates with trachea-esophageal fistula and found that there was a statistical significant relation between total nurses' performance and attendance of training courses.

The present finding revealed that there was a highly statistical significant positive correlation between total nurses' competency level and total quality of nursing care pre and post-program implementation. This might be explained by improving nurses' clinical competency level help to achieve the highest quality of nursing care. This finding was congruent with **El-Zeneny et al., (2017)** who reported that there was a significant positive correlation between nurses' competencies and the quality of nursing care. In this context, **Grondahl et al., (2019**) stated that it is important for nurses to develop their clinical competency to ensure the quality and safety of children care.

The current study finding proved that there was a highly statistical significant positive correlation between total nurses' competency level and total frequency of performed skills in clinical practice pre and post-program implementation. This could be explained by the fact that frequent application of competency domains in the clinical setting was associated with increasing competency level that help the nurses to master their performance of clinical skills. This finding was supported by **Hassankhani et al., (2018)** who found that there was a positive significant correlation between frequency of performing skills in clinical practice and competency level ($r = 0.651$ &$P < 0.001$).

5. CONCLUSION

The educational program was effective in improving nurses' competency level, their frequency of performed skills in clinical practice and their quality of nursing care regarding children undergoing intestinal obstruction surgery. Again, there was a highly statistical significant positive correlation between total nurses' competency level, total quality of nursing care and total frequency of performed skills in clinical practice pre and post-program implementation ($P < 0.000$).

International Journal of Novel Research in Healthcare and Nursing
Vol. 8, Issue 1, pp: (662-678), Month: January - April 2021, Available at: www.noveltyjournals.com

6. 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 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 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 studies are recommended to investigate the factors influencing the clinical competencies of nurses.

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