Effect of Nursing Intervention Guidelines on Nurses' Performance and Clinical Outcomes Related To Problems Accompanying Infants with Hirschsprung Disease

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Abstract:
Background: Hirschsprung disease (HD) is acongenital colonic aganglionosis disorder that presents mainly with chronic constipation. Children suffering from HD have problems both before and after surgery. Nursing care is an integral part of managing those problems. **Aim of the study was to** evaluate the effect of nursing intervention guidelines (IGs) on nurses' performance and clinical outcomes related to problems accompanying infants with HD. **Subjects and methods:** This is a prospective randomized controlled trial. Sixty nurses from Pediatric Surgical Unit(PSU) at Tanta University Hospital(TUH) and Benha Children's Hospital(BENCH), and another sample of infants suffering from problems accompanying HD; both preoperative and postoperative, were included in the study. **Three tools** were used to collect data: **Nurses' knowledge**, **Nurses' performance using observational checklist sheet** and **infant clinical outcomes**. **Results:** Total scores of nurses' knowledge and practice for the majority of the studied nurses showed poor knowledge and unsatisfactory performance before IGs while immediately and one month after IGs the total scores of nurses' knowledge and practice significantly improved. The clinical problems of infants with HD showed an overalls improvement but it was statistically non- significant. **Conclusion:** A significant improvement in nurses knowledge and performance in relation to HD and its care occurred after IGS implementation with anon significant reduction of the problems accompanying those infants. **Recommendations:** In-service training programs should be conducted periodically for teaching the nurses the basic clinical skills and improving their clinical knowledge.
Key Words: Intervention Guidelines, Hirschsprung disease, Infants clinical outcome.

I. Introduction

HD, also known as;" colonic aganglionosis" or "congenital megacolon" also was first discovered by Harold Hirschsprung, a Danish pediatrician in1886. He thought that the colonic dilatation was the cause of the problem, although the actual pathology was in the distal contracted segment[1, 2].

HD is a functional disorder of the gut, which is caused by the failure of neural crest cells (precursors of enteric ganglion cells) to migrate completely during intestinal development during fetal life. The resulting aganglionic segment of the colon fails to relax, causing a functional obstruction. In about 80 percent of patients, the disorder affects the rectosigmoid colon (known as short-segment disease). In 15 to 20 percent of patients, the aganglionosis extends proximal to the sigmoid colon (known as long-segment disease). In approximately 5 percent, the entire colon is affected known as total colonic aganglionosis, and in rare cases the small bowel may also be involved. Outcomes are generally worse for patients with long-segment as compared to short-segment disease [3, 4].

The incidence of HD is approximately 1 in 5000 live births. The most common associated abnormality is trisomy 21.Typically, the most obvious sign is a newborn's failure to have a bowel movement within 48 hours after birth, constipation, bilious vomiting, failure to thrive. Atypical presentations include neonatal intestinal obstruction and Hirschsprung associated enterocolitis(HAEC) [5].

The nurse plays a crucial role in caring of these infants through providing care preoperatively ; to 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 if needed, providing intravenous fluids, care of urinary catheterization if needed and preparing child and parents for (temporary)colostomy if needed. Nursing care extends postoperatively; suctioning, care of wound, colostomy

care if present, performing good perineal skin care, instruct the parents about avoiding constipation, providing diet rich with fibers and avoiding introduction of any suppositories through rectum or measuring temperature rectally due to the risk of anastomotic disruption approximately 3 weeks after surgery, and anal diltation[6,7]

The nurse advises the parents about signs and symptoms of HAEC (Fever - lethargy- abdominal distention - bilious vomiting - bloody explosive diarrhea with offensive odor) for which they should immediately seek medical care [8].

Recognizing physiological and psychological needs are essential skills for the pediatric surgical nurse who should interpret them in the form of nursing intervention. The purpose of IGs are to enhance the quality, safety, effectiveness and availability of care for infants with HD[9] .

Raising the awareness and educating nurses about problems of infant with HD and how to deal and care for them is supposed to improve the care and outcomes of these infants.

II. Aim of The Study

The study was conducted to evaluate the effect of IGs on nurses' knowledge and performance and clinical outcomes related to problems accompanying infants with HD

III. Subjects and Methods

This is a prospective randomized controlled trial. The study was conducted at; Pediatric Surgical Unit(PSU) at Tanta University Hospital (TUH) and Benha Children's Hospital(BENCH). The study included two types of samples;

Sample I: A convenient sample of sixty nurses, were included in the study. They were randomly divided into two groups; group I; the study group 30 nurses who received training about IGs and group II; the control group 30 nurses who didn't receive IGs. **Sample II:** infants suffering from problems accompanying HD, both preoperative and postoperative were included and having the following criteria; both sexes, free from other congenital anomalies and admitted for pull-through for HD. A random sample was collected before, and another sample was collected 3months after effecting the teaching sessions and IGs to the study group, comparing the incidence of clinical problems in both groups.

Three tools were used to collect data:

Tool I: Nurses'knowledge and bio-sociodemographic data:
Structured interview questionnaire.

It was developed by the authors after reviewing the related literature to assess nurses' knowledge before, immediately after and one month after implementation of IGs. It comprised of two parts: Part I:-Biosociodemographic and professional characteristics of the studied nurses, (Sheet I). Part II: -It covered the nurses' knowledge about HD**, (Sheet I)**.

The nurses' knowledge questionnaire sheet included 11 questions. The nurses were asked to respond to these questions with only one correct response for each question. Three levels of scoring for questions used: Correct and complete answer was scored (2), Correct and incomplete answer was scored (1) andIncorrect answer was scored (0).The total score was 0- 22 ; ≤13 was considered poor knowledge,14-17 was considered fair knowledge, and >17 was considered good knowledge.

Tool II: Nurses Performance observational checklist: This checklist was devised by modifying 3 checklists from Paul U. et al., Khadka S. et al and Vicky R et al [10-12]. It included parameters for assessing nursing performance both for pre and postoperative care of infants with (HD), **(Sheet II).**
Ascore was calculated as; correctly done (1 point),incorrectly done or not done (0 point)
The total score of nurses' practice was calculated and classified as follow:184 < 230 was considered unsatisfactory; while 230-307 was considered satisfactory.

Tool III: Infant characteristics and clinical outcomes: (Sheet III)
Part I-Data related to infant such as: Age, sex, birth order, weight, past and present medical history.
Part II : Infant clinical outcomes sheet: The incidence of clinical problems related to HD both pre and post operative were compared before and 3months after IGs implementation

IV. Methods

This study was approved by Research Ethical Committee REC of Faculty of Nursing at (TUH) 12-2-2017. Nurses' consent was taken to participate in the study, including the right to withdraw at any time. The face validity of the questionnaire was calculated based on experts' opinion in Pediatric Nursing after calculating content validity index (%) of its items and it was 94%. To assess reliability, the study tool was tested by the pilot

subjects at first session for calculating Cronbach's Alpha which was 0.891. A pilot study was carried out on (10%) of nurses to test the tool for its clarity, applicability, feasibility and the necessary modification was done Pilot study was excluded from total sample of the study. The studied nurses were divided into five groups; each group six nurses. IGS were carried out for each group separately through conduction of successive sessions according to the actual needs assessment of the studied nurses. They were conducted in 6 sessions; two / week ; 30 minutes/session. Different methods and media of teaching were used including lectures, group discussions and demonstrations.

The first session:- Focused on definition, causes and pathophysiology of HD.
The second session: Focused on clinical manifestation, diagnosis and surgical management of HD.
The third session: Focused on pre-operative care of infants with HD.
The fourth session: Focused on post-operative care for infant with HD.
The fifth session: Focused on preoperative problems accompanying infants with HD.
The sixth session: Focused on postoperative problems accompanying for infant with HD. The data was collected over a period of 11months from April 2017 to February 2018.

Reevaluation of the nurses was carried out using the same assessment tools, immediately after implementation of the guidelines(post-test) and one month after implementation of IGs(follow-up),and these were compared to pre-test levels. The control group were reevaluated at the same times.

Infant outcomes: the evaluation was done by comparing the assessment after IGs with that before IGs and the incidence of HD associated problems was assessed in another random sample of infants with HD 3 months after IGs implementation.

Statistical Analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between means of two groups of parametric data of independent samples, student t-test was used. For comparison between means of two groups of non-parametric data of independent samples, Z value of Mann-whitney test was used. For comparison between means of two related groups (before and after data) of parametric data, paired t-test was used.

For comparison between means of two related groups (before & after data) of non-parametric data, Z value of Wilcoxon Signed Ranks Test was used. For comparison between more than two means of parametric data, F value of ANOVA test was calculated. For comparison between more than two means of non-parametric data, Kruskal-Wallis (χ^2) was calculated. Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance[13].

V. Results

I- Sociodemographic data; Table (1): Sixty percent of the studied nurses were from the BENCH While 40% of the studied nurses were from PSU at TUH. Eighty percent of the studied nurses were more than 30 years with a mean, SD of 29.48±8.92. Regarding sex, 96.7% of the studied nurses were females while only 3.3 were males and 91.7% were married. Two thirds of the studied nurses had nursing diploma. Regarding their years of experience in PSU, 33.3% of the studied nurses had years of experience were ranging from 5 to ≤10 years with mean ± SD12.46±4.56.

Regarding attendance of training courses and conferences about nursing care for infants with HD; 60% of the studied nurses had attended training courses; all were based in BENCH; two hours every month and these courses were arranged by Continuous learning and training center at BENCH. Forty percent of the studied nurses who were based in PSU at TUH, didn't attend any training courses or conferences about nursing care for infants with HD.

II- Nurses' knowledge about HD Group I; Table (2): Regarding HD general knowledge; 86.7% of **group I** had poor knowledge before application of IGs and improved to (83.3%,40%) good knowledge immediately after and one month after application of IGs with highly statistical significant differences P=0.0001.

Regarding knowledge about pre and post operative nursing care; 53.3% had poor knowledge before application of IGs and improved to (100%, 66.7%) good knowledge immediately after and one month after application of IGs and this improvement was a highly statistically significant P=0.0001.

Regarding problems accompanying infants with HD; 86.7% of the studied nurses had poor knowledge before application of the IGs and improved to (73.3%,50%)respectively good knowledge immediately after and one month after application of IGs and this improvement was a highly statistically significant P=0.0001

III-Nurses' knowledge about HD, Group II, Table (3);Evaluation of the control group showed that 86.7% of the control group had poor knowledge about all aspects of HD, and repeating the evaluation at the same periods done for the study group, but without IGs implementation, showed no change in the level of knowledge.

IV- Infant clinical outcomes Table (4); Regarding the infants clinical outcomes, we had a variable change in the incidence of HD related problems. Fever and tachycardia, number of defecations, abdominal distention, vomiting, fluid and electrolytes balance as well as incidence of postoperative anal stricture, all improved after implementation of IGS but this improvement was not significant. While preoperative number of defections significantly improved. Whereas soiling, diarrhea, foul smelling, stool showed statistically non significant worsening in incidence

Table (1): Percentage distribution of studied nurses related to their sociodemographic and professional characteristics.

Sociodemographic and professional characteristics of studied nurses	The studied nurses (N=60)	
	No	**%**
Age years:		
<20	1	1.7
20-<30	11	18.3
≥30	48	80.0
Mean±SD	29.48±8.92	
Sex:		
Female	58	96.7
Male	2	3.3
Educational level:		
-Nursing diplome	40	66.7
-Technical health Institute	9	15.0
-Technical Institute of Nursing	3	5.0
-Baccalaureate Degree	8	13.3
Residence:		
Rural	30	50.0
Urban	30	50.0
Marital status:		
-Married	55	91.7
-Single	3	5.0
-Divorced	1	1.7
-Widowed	1	1.7
Experience years inside pediatric surgical unit:		
<5	6	10
5-<10	20	33.3
10-<15	12	20
15-<20	9	15
≥20	13	21.7
Mean±SD	12.46±4.56	
Place of work:		
Banha Neonatal ICU	20	33.3
Continue table (1) Socio demographic characteristics of studied nurses	**No**	**%**
Banha surgical unit	16	26.7
Tanta surgical unit	24	40
Training courses:		
Yes	36	60.0
No	24	40.0

Table (2): Percentage distribution of knowledge level of the study group nurses, related to HD & its care.

Knowledge level about HD & its care	Before		Immediate after		One month after		χ^2	P
	N	**%**	**N**	**%**	**N**	**%**		
knowledge about Hirschsprung disease:								
Poor knowledge	26	86.7	1	3.3	3	10.0	74.473	0.0001*
Fair knowledge	2	6.7	4	13.3	15	50.0		
Good knowledge	2	6.7	25	83.3	12	40.0		
knowledge about pre and post-operative nursing care:								
Poor knowledge	16	53.3	0	0	3	10.0	42.009	0.0001*

							χ²	P
Fair knowledge	6	20.0	0	0	7	23.3		
Good knowledge	8	26.7	30	100	20	66.7		
knowledge about problems accompanying infants with Hirschsprung disease:							38.308	0.0001*
Poor knowledge	26	86.7	4	13.3	9	30.0		
Fair knowledge	2	6.7	4	13.3	6	20.0		
Good knowledge	2	6.7	22	73.3	15	50.0		
Total knowledge							87.314	0.0001*
Poor knowledge	**26**	**86.7**	**0**	**0**	**0**	**0**		
Fair knowledge	**2**	**6.7**	**0**	**0**	**9**	**30.0**		
Good knowledge	**2**	**6.7**	**30**	**100**	**21**	**70.0**		

Table (3): Percentage distribution of knowledge level of the control group nurses, related to HD & its care

Knowledge level about HD & its care							χ²	P
	Before		**Immediate after**		**One month after**			
	N	%	N	%	N	%		
knowledge about Hirschsprung disease:							0.000	1.000
Poor knowledge	26	86.7	26	86.7	26	86.7		
Fair knowledge	4	13.3	4	13.3	4	13.3		
Good knowledge	0	0	0	0	0	0		
knowledge about pre and post-operative nursing care:							1.776	0.777
Poor knowledge	17	56.7	19	63.3	19	63.3		
Fair knowledge	10	33.3	6	20.0	7	23.3		
Good knowledge	3	10.0	5	16.7	4	13.3		
knowledge about problems accompanying infants with Hirschsprung disease:							3.214	0.200
Poor knowledge	26	86.7	29	96.7	29	96.7		
Fair knowledge	4	13.3	1	3.3	1	3.3		
Good knowledge	0	0	0	0	0	0		
Total knowledge							0.525	0.971
Poor knowledge	**26**	**86.7**	**27**	**90.0**	**27**	**90.0**		
Fair knowledge	**2**	**6.7**	**2**	**6.7**	**2**	**6.7**		
Good knowledge	**2**	**6.7**	**1**	**3.3**	**1**	**3.3**		

Table (4): Percentage distribution of pre and postoperative problems of the studied infants with HD before and after application of intervention guidelines**.**

Pre and postoperative problems associated with disease	Before guidelines (N=25)				After guidelines (N=20)				χ² P	χ² P
	Preoperative problems (N=13)		Post operative problems (N=12)		Preoperative problems(N=11)		Post operative problems(N=9)		Preope rative	Post operative
	N	%	N	%	N	%	N	%		
Fever	0	0	0	0	0	0	0	0	0.020 0.877	0.290 0.592
Tachycardia	0	0	0	0	0	0	0	0		
Tachycardia & fever	2	15.4	1	8.3	1	9.1	1	11.1		
•No. of defecation / day:									8.270 0.041*	2.890 0.089
Less than once a day	3	23.1	0	0	1	9.1	0	0		
Once a day	7	53.8	5	41.7	2	18.2	0	0		
From 2 - 3 times a day	2	15.4	7	58.3	8	72.7	9	100		
• Foul smell- stool:									0.220 0.898	0.100 0.755
Yes	2	15.4	0	4.4	1	9.1	0	0		
No	11	84.6	12	100	10	90.9	9	100		
• Bloody stool:									-	-
Yes	0	0	0	0	0	0	0	0		

No	13	100	12	100	11	100	9	100		
• **Watery or incoherent stool:**										
Yes	2	15.4	0	0	1	9.1	0	0	0.020	-
No	11	84.6	12	11	10	90.9	9	100	0.877	
• **Explosive diarrhea**										
Yes	2	15.4	0	0	1	9.1	0	0	0.020	-
No	11	84.6	12	100	10	90.9	9	100	0.877	
• **Abdominal distention:**										
Yes	13	100	4	33.3	11	100	2	22.2	-	0.310
No	0	0	8	66.7	0	0	7	77.8		0.577

Continue table (4)

Pre and postoperative problems associated with disease	Before guidelines (N=25)				After guidelines N=20				χ^2 P	χ^2 P
	Preoperative problems (N=13)		Post operative problems (N=12)		Preoperative problems(N=11)		Post operative problems(N=9)		Preoperative	Post-operative
	N	%	N	%	N	%	N	%		
vomiting:										
Yes	2	15.4	2	16.7	6	54.5	2	22.2	2.540	0.060
No	11	84.6	10	83.3	5	45.5	7	77.8	0.111	0.810
•Weight percentile:										
•Na and K balanced electrolytes:										
Balanced	11	84.6	11	91.7	11	100	9	100	0.380	0.020
Imbalanced	2	15.4	1	8.3	0	0	0	0	0.537	0.882
•Intake and output:										
Balanced	11	84.6	11	91.7	11	100	9	100	0.380	0.020
Imbalanced	2	15.4	1	8.3	0	0	0	0	0.537	0.882
•Fecal soiling	N/a	N/a			N/a	N/a				
Yes	N/a	N/a	2	16.7	N/a	N/a	2	22.2	-	1.520
No	N/a	N/a	10	83.3	N/a	N/a	7	77.8		0.676
Anal stricture	N/a	N/a	2	16.7	N/a	N/a	0	0		
Rectal prolapse	N/a	N/a	0	0	N/a	N/a	0	0		
Anal stricture & rectal prolapse	N/a	N/a	0	0	N/a	N/a	0	0		

Figure (1): Total performance mean scores of the study group**.**
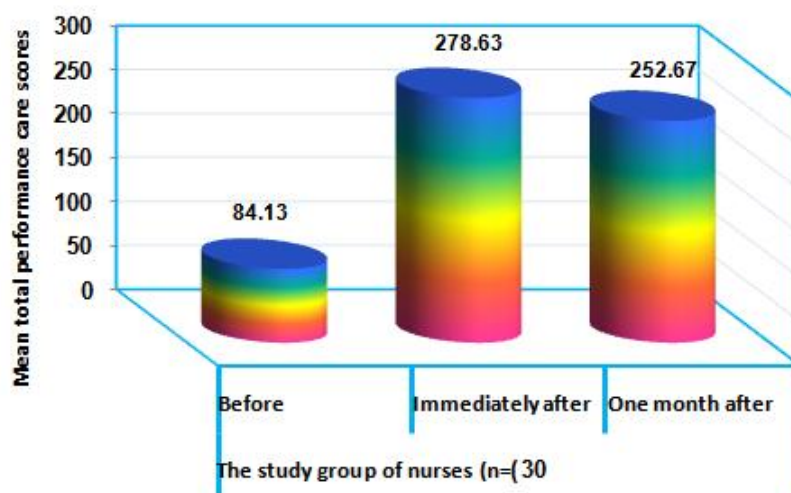
Shows that total performance mean scores among the study group related to infants with HD had improved from 84.13 before application of the intervention guidelines to (278.63, 252.67) respectively immediately after and one month after application of the intervention guidelines.

Figure (2) Total performance mean scores of the control group.
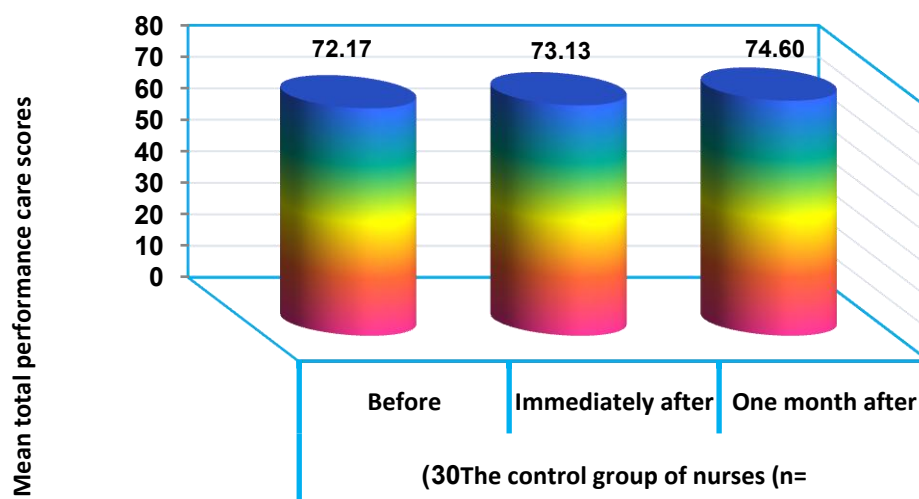
Shows that total performance mean scores among the control group related to infants with HD hadn't improved immediately after and one month after application of the intervention guidelines than before as they hadn't receive any intervention guidelines.

VI. Discussion

The nurse plays a vital role in caring for infants with HD, recognizing physiological and psychological needs are essential skills for the pediatric surgical nurse who should interpret them in the form of nursing intervention through providing care preoperatively ; to 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 if needed, providing intravenous fluids, care of urinary catheterization if needed and preparing child and parents for (temporary)colostomy if needed. Nursing care extends postoperatively; suctioning, care of wound, colostomy care if present, performing good perineal skin care, instruct the parents about avoiding constipation, providing diet rich with fibers and avoiding introduction of any suppositories through rectum or measuring temperature rectally due to the risk of anastomotic disruption approximately 3 weeks after surgery, and anal dilatation [14].

The present study reveals that nearly two thirds of the studied nurses at BENCH received in service training program about HD but their knowledge about HD, pre and post operative nursing care and problems of infants with HD were poor before implementation of the IGs and also their performance in pre and post operative care were unsatisfactory. This may be due to lack of updating teaching methods that meet the learners needs, decreased motivation as all nurses were overwhelmed with work load in hospital and large number of children admitted daily to BENCH also doctors who gave the training program didn't emphasize on nursing role especially pre and post operative nursing care and the limited time of lectures; maximum one hour/month. It is to noted that 40% of the studied nurses group didn't attend any conferences or training courses on HD or its related nursing care.

Our results were congruent with **Hussein S. and Rada A. (2016)** [15] who stated that nurses' knowledge before implementation of IGs, was poor and their performance was unsatisfactory as they didn't attend in service training program or conferences before. This may be attributed to the fact that updating nurses knowledge through in service training program or conferences are very important for acquisition of nurses clinical skills, new trends in pediatric nursing and evidence based nursing practices that are based on standers.

While this finding wasn't in agreement with **Mohamed E. (2008)** who revealed that in-service training program had no effect on both nurses' knowledge and performance[16]. Our results were congruent with **Golik M. and Kurek M. (2014)**[17] and **Swierzewski S., (2015)** [18] who reported that, nurses who provide advanced care for patients with stoma should have a bachelor degree in nursing and experience to be able to advise both patients and staff from other units, engage in educational activities and work closely with doctors specializing in the care of stomas

In our study, more than two thirds of the studied nurses had nursing diploma; this findings congruent with **The American Association of Colleges of Nursing (AACN) 2016**, believes that education has a significant impact on the knowledge and competencies of the nurse clinician, as it does for 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. They are prized for their skills in critical thinking, leadership, case management, and health promotion, and for their ability to practice across a variety of inpatient and outpatient settings[19].

The present study revealed that 96.7% of the studied nurses were females and this was in agreement with **Hassanin A. and Mohamed H. (2016)** [20] who reported that the majority of studied nurses were female and **Durai R. and Hoque H. (2010)** [21] who stated that, all the nurses of her study were females, **Elfeky H. (2013)** [22] **and Kizza I (2012)** [23] who stated that most of their studied samples were females due to the old belief that nursing is an exclusive profession to females so the majority of nurses in Egypt are females.

Regarding the relationship between nurses' knowledge and years of experiences, the present study showed that, nurses with years of experience less than 5years had higher mean score of knowledge after implementation IGs than nurses with more years of experience while nurses with years of experience from 10 to less than 15 years had higher mean score of performance than nurses with fewer years of experience.

This may be due to the fact that nurses with few years of experience are young and may have fresh knowledge, better learning abilities, motivation and enthusiasm than others and receive different teaching methods that are supported with new technology. While nurses with more years of experience may have great effect in their performance after IGs than others as their years of experience exposed them to different situation in pediatric surgery that require proper nursing care and so they demonstrate more than nurses with few years experience.

This finding was incongruent with Abd-Elgalil N. (2007) who found that, there was statistically significant relation between nurses' knowledge, experiences and performance(24). Regarding total performance mean scores related to nursing care for infant with HD, the results of the present study revealed that the total scores of all nurses' performance significantly improved immediately after and one month after the IGs than before. This may be attributed to lack of nurses' evaluation against identified standards of patient's care and lack of periodic evaluation of nursing performance by the hospital administration to detect points of strength and weakness to act on, enhancing and updating nurses' knowledge and performance besides improving the quality of care given to infants. Hussein S. and Rada A. (2016) found that the majority of nurses had unsatisfactory performance score before the guidelines application regarding pre and post operative care for infant with intestinal obstruction(15). Taha N. and Abd Elaziz N. (2015) also stated that the nurses' practice after implementing guidelines demonstrated significant improvement, which extended throughout the follow-up(25). On the other hand there were no differences in nurses level of total knowledge and total performance in the control group and the majority of them still had poor knowledge and unsatisfactory performance at initial evaluation and with repeated evaluation as they didn't receive any IGS.

Regarding the infants clinical outcomes, we had a variable change in the incidence of HD related problems. Fever and tachycardia, number of defecations, abdominal distention, vomiting, fluid and electrolytes balance as well as incidence of postoperative anal stricture, all improved after implementation of IGS but this improvement was not significant. While preoperative number of defections significantly improved. Whereas soiling, diarrhea, foul smelling, stool showed statistically non significant worsening in incidence. This can be explained by the fact that some clinical problems are essentially related to good nursing care where as others are solved only or result from surgical intervention, sticking to suppository treatment, washouts, regular anal dilatation program that improve strictures (if present) will improve constipation and distention. On the other hand only surgery can lead to spontaneous regular defecation and also to other postoperative complication. The difference can also be explained by the fact that the sample were different.

Thus overall many of HD related problems deceased after application of the IGS but improvement was statistically non significant. This may be attributed to the impact of the IGS in updating of nurses knowledge and acquiring new skills regarding pre and post operative care for infants with HD that are reflected in improving infants clinical outcomes postoperatively after application of the IGs.

This is in agreement with **Taha N. and Abd Elaziz N. (2015)** who described similar results that the number of problems among the patients of their study decreased post operatively after application of IGs at the post-guidelines phase, but this decrease did not reach statistical significance[25].

VII. Conclusion

Based on the results of the present study, it can be concluded that there was a significant improvement on nursing staff knowledge and performance in relation to pre and post operative nursing care for infants with HD as well as problems accompanying those infants with HD. Also there was apositive correlation between total knowledge scores among the studied nurses and total performance scores of care for infants with HD. Moreover, there was a non significant reduction of many of the problems accompanying infants with HD.

VIII.   Recommendations

Based on the findings of the present study, **the following recommendations are suggested:**

1. In-service training program should be conducted periodically and regularly for teaching the nurses the basic clinical skills.
2. Establishment of central in-service educational department in hospital to refresh nurses' knowledge and practice periodically regarding pre and post operative care for infant with HD and also other surgical conditions
3. Providing procedures manual handbooks containing all necessary information (knowledge) about nursing care procedures related to pre and post operative care for infants with HD and other congenital anamolies in pediatric surgical units.
4. Periodic nursing performance evaluation against certain policy standards established by the hospital to detect points of strength and weakness to act on.

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Sheet I

I-Sociodemographic characteristics of the studied nurses:

A-Age:

Less than 20 years   (   )

From 20-less than 30 years (   )

From 30 and more   (   )

b- **Nurse's educational level**

Nursing diploma   (   )

Technical Institute   (   )

Technical Institute of Nursing (   )
Technical Institute (   )
Baccalaureate Degree (   )
c-Place of residence
Village   (   )
Town   (   )
d-Years of experience inside pediatric surgical unit
less than 5years-10years
from 10years-less than 15 years
from 15 years-less than20 years
20 years and more
E-Marital status
single
Married
Divorced
widow
F-Attendance of training courses and conferences about nursing care for infant with Hirschsprung Disease:
Yes (   )
No   (   )
G-If the answer is yes determine:
a- The name of training course or conference:
b-The duration:
c-The Date:
D-Name of organizer:
II-Data about nurses' knowledge about Hirschsprung Disease:
Read the following statements and choose the correct answer for each question by placing a correct mark between the brackets in front of the selected answer:
1- What is the meaning of Hirschsprung Disease ?
a- It is a disorder in the development and growth of the intestinal nervous system ()
b- It is the entry of part of the intestine into another part.( )
C -It Is a defect in the nerve ganglion cells of the final part of the colon of the muscles forming the intestinal wall.( )
d-A & C only ( )
e-I do not know ( )
f- Other mentions( )
2- What are the causes of Hirschsprung Disease ?
a. The real cause of the disease is rare and occurs commonly in premature babies.()
b - The cause of the disease is the absence of migration of nerves from the top to the bottom of the colon during the development of the fetus. ( )
c - Increasing the risk of disease with Down syndrome. ()
d All of the above.( )
e-I do not know ( )
f- other mentions ( )
3- What is the life span of the child life that has the highest rate of Hirschsprung Disease ?
a- Postpartum period immediately ( )
b- One month after birth ( )
c- one year after the birth of the child ( )
d- All of the above ( )
 E-I do not know ( )
 F-Other mentions ( )
4-What are the main symptoms of Hirschsprung disease?
A-Delayed passage of meconium for 24 hours after birth. ( )
B - Bilious vomiting (   )
C - Abdominal distention. (   )
d- All of the above (   )
 E-I do not know (   )
 F-Other mentions (   )

5- How is Hirschsprung diagnosed?
A-Examination of full thickness rectal biopsy ( )
B-X-ray after an enema with barium dye. ( )
C) Diagnosed by ultrasound ( )
D-A & B only ( )
E-I do not know ( )
F-Other mentions ( )

6-What do you know about the surgical intervention of Hirschsprung disease?
A-The condition is treated through surgical intervention by removing the non-functioning part of the colon. ( )
B - Anastmosis of the part of the rectum with the intestine with a healthy nerve supply. ( )
c-There is no treatment other than surgical intervention. ( )
D- All of the above ( )
E-I do not know ( )
F- Other mention ( )

7- What are the nursing care for a child with Hirschspung disease preoperativly?
A-Nothing per mouth before surgery. ( )
B-Providing the patient with intravenous fluids as instructed by the doctor. ()
C - Rectal washout with warm saline enema ( )
D) Insertion of nasogastric tube. ( )
E-A & d only
F) All of the above

8- Nursing care for a child with Hirschsprung disease postoperatively includes:
A-Measuring of vital signs. ( )
B- Rectal washout with warm saline enema ( )
C - Measuring the abdominal circumference two hours. ( )
D-A & C only ( )
E-I do not know ( )
F- Other mentions ( )

9-What are the most important points focused by the nurse in the health education of parents before the child is discharged from the hospital:
A- Informing parents not to use suppositories after surgery ( )
B - Informing parents not to measure temperature rectal and provide perineal skin care to the infant . ( )
C - Avoiding eating meals that rich with natural fibers such as vegetables and fruits. ( )
D-A & B only ( )
E- I do not know ( )
F- Other mentions ( )

10 - What are the most important problems that the child with Hirschsprung disease suffered from?
A - Constipation and abdominal distention. ( )
B - Fluids and electrolytes imbalance. ( )
C - Bilious vomiting. ( )
of the above. ( ) D- All
E-I do not know. ( )
F - Other mentions. ( )

11- What are the most important problems that the child is exposed to it postoperatively and need rectal dilatation
A - Anal Stricture ( )
B-Rectal prolapse and fecal soiling
C- All of the above ( )
D-A & B only ( )
E-I do not know ( )
F- Other mentions ( )

Sheet II

Nurses Performance pre and post operative observational checklist

Preoperative nursing care	Done incorrectly or not done	Done correctly
• Physical assessment		
• Laboratory investigation		
• Monitoring vital signs.		
• Nothing per mouth prior to surgery.		

• Administration of intravenous fluids.		
• Administration of blood if needed.		
• Rectal washout with repeated warm saline enema.		
• Insertion of nasogastric tube.		
Post-operative nursing intervention:		
• Monitoring vital signs.		
• Administration of intravenous fluids.		
• Insertion of afoley catheter if needed.		
• Oxygen therapy		
• Insertion of nasogastric tube.		
• Performing suctioning for 24-48 hours after surgery.		
• Frequent abdominal dressing changes.		
• Measuring abdominal girth every two hours.		
• Performing perineal skin care.		
• Administration of medication to reduce pain as ordered.		
• Informing parents about having nothing placed in the rectum that include:(thermometers, suppositories and catheters).		

Sheet III

Infant characteristics and clinical outcomes
Sociodemographic data about the child
Name (…………….)
Age
Birth -1month   ( )
From 1month –less than 6monthes   ( )
From 6monthes –1year   ( )
Sex
Male   ( )
Female   ( )
Child order
First   ( )
Second   ( )
Third   ( )
Fourth and more ( )
Child weight
less than 5 kilograms
From 5-10 kilograms
More than 10 kilograms
1-Is there is a past medical history for your child?
Yes ( )   No ( )
If yes, what is this past medical history?
2-Does your child suffered from any of these problems postoperatively?
A- Fever ( )
B. Tachycardia ( )
C- All of the above ( )
D- I do not know ( )
E-Other mentions ( )
3-What are the number of your child defecation every day postoperatively?
A-Less than once a day ( )
B - Once a day ( )
C - From 2 - 3 times a day ( )
D- More than 3 times a day ( )
E-Other mentions ( )
4-Is your child's stool has a foul smell ?
Yes ( )   No ( )
5. Is there is blood in your child's stool?
Yes( )   No ( )
6. Does your child's stool is watery or incoherent?
Yes( )   No ( )
7. Does your child's stool is explosive when it gets out of the anus?
Yes ( )   No ( )

8. Does your child suffers from abdominal distention postoperatively?
Yes ( )   No ( )
9. Does your child have vomiting postoperatively?
Yes( )   No ( )
Other mentions ( )
10- Is your child is dry between numbers of defecations postoperatively?
Yes ( )   No ( )
11-Does your child have any of these problems after the surgery?
A - Anal stricture ( )
B- Rectal prolapse ( )
 C-A & B
D-I do not know ( )
E-Other mentions ( )
F-No problem ( )