

Impact of Application of Nursing Guidelines on Health Outcomes for Patients Undergoing Gastrointestinal Endoscopes

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Abstract

Background: Endoscopy is a nonsurgical procedure used to examine a person's digestive tract. Using an endoscope, a flexible tube with a light and camera attached to it, the doctor can view pictures of the digestive tract on a color TV monitor. **Aim** of this study was to evaluate impact of application of nursing guidelines on health outcomes for patients undergoing gastrointestinal endoscopes. **Subjects and methods:** A quasi-experimental research design was used. A convenient sample was used; it includes all nursing staff working with patient undergoing GI endoscopy (40 nurses) and 240 adult patients. This study conducted at GI endoscopy unit at Al-Azhar University Hospital at new Damietta city. **Three tools used for data collection.** Tool (1) is a pre/post-patient structured interview. Tool (2) is a pre \ post nurse structured interview. Tool (3) is an observational check list for nurses' practice. **Results,** show a significant improvement in the nurses' knowledge and practice scores after nursing guidelines implementation regarding the care of patients with GIT endoscopy at (p- value = 0.00, 0.02 & 0.04) respectively. Positive significant correlation between nurses' knowledge and practice before and after guidelines implementation in the following items (general preparation - pre-procedure) post procedure items and total practice score. **Conclusion,** there was significant improvement in nurse's knowledge and practice about care of patients undergoing GI endoscopy after implementation of nursing guidelines. As well as improving patient outcomes. **The study recommended** that Continuous and adequate education and training of nursing staff working at gastrointestinal endoscopy units with regular and continuous evaluation of nurses' practice.

Keywords: Gastrointestinal endoscopy, nursing guidelines, nurse's knowledge and practice, patient's outcome.

Introduction

Gastrointestinal (GI) endoscopy is used to identify and treat different disorders of the gastrointestinal tract. It also replace more aggressive interventions such as surgery by allows minimally invasive therapeutic techniques in addition to aids in diagnosis. Therefore, these advances have reduced rate of mortality and hospital staying of patients with gastrointestinal disorders undergoing these procedures (Timby and Smith, 2010).

Procedure of upper gastrointestinal (GI) endoscopy don by using a lighted, flexible, fiberoptic endoscope to visualize inside the upper GI tract to diagnose the cause of nausea ,abdominal pain, unexplained weight loss, gastric reflux, vomiting, swallowing difficulties, also

facilitate the detection of cancers ,ulcers, polyps and internal bleeding sites (ASGE, 2012).

Gastrointestinal endoscopy is a safe and well-tolerated procedure. However, it may be accompanied with high levels of pain or discomfort and some less satisfaction. Patient's anxiety is often experience with gastroscopy procedure due to fear. Hampers compliance and decrease the patients' tolerance is often caused by inadequate information about gastroscopy. To improves the cooperation of the patient to procedure and reducing the need to repeat the gastroscopy and hospital stay of patients with gastro-intestinal disorders adequate information is needed (Gómez, 2009).

The aim of endoscopy is to achieve the best diagnostic therapeutic result while minimizing the risks of the patient Acquiring skills to perform endoscopy needs experience and time and

depends on the ability of the trainee, the feedback given by an experienced supervisor and the method of endoscopy training (Triantafyllou et al., 2014).

Responsibilities of endoscopy nurses are starting from preparing the patient before different types of endoscope. It is divided to general and specific preparations before each type. The general preparations involve the patient's history through interviewing the patient to determine the plan of care to be implemented. Privacy must be maintained especially if sensitive issues are addressed. The nurse is responsible for minimizing or eliminating any environmental distraction (Society of Gastroenterology Nurses and Associates, 2010).

Patient outcomes known as changes in their health status, self-perceived or changes in the distribution of health determinants, or factors, which are known to affect their health, well-being and quality of life. Health outcomes defined as "all the possible results that may stem from exposure to a causal factor from preventive or therapeutic interventions. To measure health outcomes there are many different ways include Age-adjusted or age – specific mortality rates, life expectancy from birth, condition-specific changes in life expectancy and mortality rates and self-reports such as general level of health. Health outcomes composed of two types: how healthy people feel while alive (quality of life) and how long people live (length of life) (Eisenberg, 2011).

Clinical practice Guidelines are systematically statements developed to help practitioner in decisions making for a specific clinical circumstances about appropriate health care (British Society of Gastroenterology, 2011). To promote of high quality and evidence-based practice in health care and to reduce inappropriate variations in practice, guidelines should be used. Field of medicine is the common one that use the development and evaluation of clinical guidelines. In addition, to facilitate evidence-based practice the nurses should use of guidelines as one means. They may be provide a mechanism by which healthcare professionals can be made accountable for clinical activities (Devière et al., 2010).

Aim of the Study

The study was aimed to evaluate impact of application of nursing guidelines on health outcomes for patients undergoing gastrointestinal endoscopes through:

- 1- Assess nurse's knowledge regarding upper GIT endoscopy.
 - 2- Evaluate nurse's practice regarding endoscopy.
 - 3- Planning and implementation of the nursing guidelines regarding upper GIT endoscopy procedure.
 - 4- Evaluate the effect of nursing guidelines on health outcomes for patients undergoing gastrointestinal endoscopes
- Research Hypotheses:

- H1- Nurses' knowledge regarding the care of patients undergoing endoscopy will be improved in post assessment phase.
- H2- Nurses' practice regarding the care of patients undergoing endoscopy will be improved in post assessment phase.
- H3- Patients' complications rate will be decreased after application of nursing guidelines.

Subjects and Methods

(I) Technical design:

Research design:

A quasi-experimental research design was used in this study to fulfill the aims of this study

Setting:

The study was conducted at the endoscopy unit at Alazhar university hospital at new Damietta city.

Sample:

A convenient sample of all staff nurses working in endoscopy unit at Alazhar university hospital, the total number were (40). In addition to (240) adult patients (males and females) who undergoing GIT endoscopy who divided into two equal groups, group1 (120) patients pre guidelines implementation &

group2 (120) patients post guidelines implementation to assess effect of nursing guidelines on health outcomes for patients .

Tools:

The following tools were utilized to collect data:

Tool I: Patients' Structured Interview: included two parts:

Part 1: Socio-demographic data of patients such as (name, age, gender, education level, residence, etc.).

Part 2: Complications of Gastrointestinal Endoscopy: it was included eight questions related to gastrointestinal endoscopy procedure, such as blood pressure elevation, Hematemesis, distension of the abdomen, sedation drugs allergy, elevated body temperature...etc.

Tool II: Nurses' Knowledge about care of patients undergoing gastrointestinal endoscopy, which include questions related to types of endoscopy and nursing role pre, during and after procedure. It included ten questions.

Scoring system: the right answer was scored one point and wrong answer was scored zero point, the total points were converted to percentage as follows: The total score of $\geq 60\%$ was considered a satisfactory level of knowledge, and $< 60\%$ was considered as unsatisfactory level of knowledge.

Tool III: Nurse's Observational Checklist: It included assess nurses' practices during three phases: (21 steps pre procedure), (5 steps during procedure) and (8 steps after procedure) .

Scoring system: one point for done correctly step, and zero for UN correct or not done step. Total points converted to percentage as follow: total scores of $\geq 60\%$ was considered a satisfactory level of practice, and total scores of $< 60\%$ was considered unsatisfactory level of practice.

Sessions about nursing guidelines:

It included (3 sessions) which composed of all theoretical knowledge about GI endoscopy such as definition, uses, Indications,

Types, complication, and benefits of GIT endoscopy, role of nurse in every stage of GI endoscopy procedure (pre, during and after) and finally their role in GI endoscope during disinfectant and sterilization. Educational booklet written by simple language and illustrative pictures was prepared by the researcher was given to the studied sample.

Practical part: 6 sessions for practical, it composed of the application of patient preparation before procedure, care during procedure, and care after procedure, endoscopy reprocessing

(II) Operational Design:

Preparatory phase

It included reviewing of recent related literature, different studies and theoretical knowledge of various aspects of the problems using, articles, textbooks, medical websites, periodicals and magazines that concern with the topic of GI endoscopy and role of nurse in every phase of care, in addition to preparing the tool used in the study.

A. Content tool Validity:

It was ascertained by a Jury consisting of academic medical surgical nursing experts (6), medical experts in GI endoscopy unit (3), head nurse of GI endoscopy unit (1) and endoscopy unit nurse (3) to make sure that the tools used are measuring the content of the study. Changes were done according to opinions of the experts. This phase was carried out in a period of two months before starting data collection.

B. Reliability:

Reliability of tools was done using Cronbach Alpha Test. The tools of the study were applied to 20 patients undergoing GI endoscopy and 7 nurses. Reliability coefficient for tool I was 0.8 and for tool II was 0.7.

C. Pilot study:

A pilot study had been undertaken before starting the data collection phase. It was carried out in November (2020) on 10 % of participants (20 patients undergoing GI endoscopy and 7 nurses) to test the applicability of the tools and to estimate the

time needed to complete the tools. Necessary modifications were done according to the pilot study. The subjects included in the pilot study were not included in the study sample.

D. Field of work: The study was carried out through the following phases:

(1) Assessment:

Assessment of nurse knowledge and practice, was done by using tool II and III, respectively. The implementation of the nursing guidelines using teaching aids (pictures, handouts) according to schedule based on the contents of these guidelines.

The researcher collect data related to Patients' demographic data and complications using tool I and nurses' knowledge and practice related to GI endoscopy were assessed by using (tool II and tool III) before and after implementing nursing guidelines.

(2) Implementation Phase:

Based on the first assessment done for the participated nurses in phase I started from the first of November 2020 1 month pre test the researcher implemented the nursing guideline in sessions (9 sessions) 2 months from first of December to the end January of 2021. Each interview took approximately 20 minutes in each theoretical session and 30 minutes in each practical session. Nurses were divided into in small groups (3-5 nurses/session) each group perceived the same program content using the same teaching strategies and handout.

(3) Evaluation Phase:

The researcher evaluate the participated nurses and the studied patients after implementing the nursing guidelines using tool I, tool II and tool III after one day.

(III) Administrative Design

A written permission was obtained from the director of gastrointestinal unit at Alazhar university hospital through an official formal letters from the dean of The Faculty of Nursing, Damietta University to carry out the study after explaining aim and significance of the study.

Ethical Consideration:

After obtaining the official permission to conduct the study, both patients and nurses were informed with the aim and nature of the study. It

was emphasized that the participation is voluntary and confidential and anonymity of the subject was assured through coding of data.

(IV) Statistical Design:

The raw data were coded and transformed into coding sheets. The results were checked. Then, the data were entered using SPSS version 20.0 statistical software package. Output drafts were checked against the revised coded data, percentage and percentage distribution and X^2 was used to compare between variables, using P.0.05 as the level of significant. Paired " τ " test (to compare between different outcomes in the same group) and Spearman's (R test) rank correlation coefficient.

Limitation of the Study:

1. It was difficult to include the same study group (patients undergoing endoscopy) before and after intervention, since this study compare the results of endoscopy patients before intervention with those patients after intervention. To overcome these limitations, the researcher was selecting a matched group of patients regarding the age, sex and duration of disease.
2. It was difficult to gather all the nurses at the same time to attend the guidelines sessions.

Results

The study result shows that (60.9%) of the studied nurses were in age group 20 to less than 30 years and (90.3%) were females and (96.7 %) married. There were (80.3%) coming from urban areas. It also revealed that (77.3%) had secondary nursing school and (40.0%) had 5 to less than 10 years as well as more than 10 years' experience in nursing. Moreover (56.7%) had more than 5 years' experience in endoscopy unit and all of them didn't attend training courses before working in endoscopy unit .

Table (1) shows that (41.7%) and (50.0%) of the studied patients were aged 40 years and less than 50 years before and after guidelines implementation respectively and (58.3% and 59.3 %) were females before and after guidelines implementation respectively. There were (58.3%

& 50.0 %) coming from rural areas before and after guidelines implementation respectively. Regarding the level of education, it revealed that (44.2% & 36.7%) of the studied patients were illiterate before and after guidelines implementation respectively and (55.8% & 57.5%) of the studied patients were workers before and after guidelines implementation respectively.

Table (2) shows that there was a statistical significant difference between knowledge of the studied nurses related to (benefits of endoscopy, role of nurse before endoscopy & complications of endoscopy) before and after the guidelines implementation at (p- value = 0.0001, Mac Nemar test) respectively.

Table (3) shows that there were statistical significant difference at (P= 0.0001) in nurses practice in relation to patients general preparation for GI endoscopy before and after the guidelines implementation regarding the following items (introduce herself to the patient, Assess patient's demographic data, obtains an informed consent from the patient or from his relatives, all endoscopic parts are totally immersed in disinfected solution ,all endoscopic parts immersed in disinfected solution for required time and at (p= 0.02) in the following item, ensure removal of dentures ,jewelry, nail varnish and make up and ask the patient about complications for drugs allergy.

Table (4) shows that there were statistical significant difference in nurses' practice in relation to psychological preparation for GI endoscopy before and after the guidelines implementation regarding the following items (explains procedure to patient before starting, explain the benefits of endoscopy procedure and promote contact with other GIT endoscopy patients) at (p- value = 0.01, 0.02 & 0.0001) respectively.

Table (5) shows that there were a statistical significant difference regarding nurses total score practice pre and post nursing guidelines at (P=

0.000) related to (general preparation (pre procedure) items, preparation for lower GIT, during procedure items, post procedure items & patient's discharge items).

Table (6) shows that there were positive significant correlation between nurses knowledge and practice before and after guidelines implementation in the following items (general preparation (pre-procedure), post procedure items & total practice score) at (p- value = 0.00, 0.02 & 0.04) respectively.

Table (7) reveals that there was an statistically significant improvement in knowledge and practice regarding the care of patients undergoing GIT endoscopy (before and after implementation of nursing guidelines) at (p – value = 0.002 & 0.0001) respectively

Table (8) shows that there were a statistically significant difference before and after guidelines implementation related to patients' complications (allergy from sedation drugs, vomiting & nausea, elevated body temperature, decreased blood pressure & abdominal distension) at (P-value = 0.0001, 0.002, 0.0001, 0.0001 & 0.014) respectively.

Table (1): Socio-demographic characteristics of the studied patients before and after implementation of nursing guidelines (n=120*)

Demographic characteristics	Before guidelines implementation (N = 120 *)		After guidelines implementation (N = 120*)	
	No.	%	No.	%
Age:				
-20-<30	10	8.3	11	9.2
-30-<40	15	12.5	20	16.6
-40-<50	50	41.7	60	50.0
-50 or more	40	36.0	29	24.2
Gender				
-female	70	58.3	71	59.1
-Male	50	41.7	49	40.9
Marital status:				
-Single.	20	16.6	9	7.5
-Married	60	50.0	63	52.5
-Widow	35	29.2	46	38.3
-Divorced	5	4.2	2	1.7
Residence :				
- Rural	69	57.5	60	50.0
- Urban	51	42.5	60	50.0
Educational level :				
-Illiterate	53	44.2	44	36.7
-Literate	30	25.0	39	32.5
-Secondary school	28	23.3	29	24.1
- High level	9	7.5	8	6.7
Occupation				
-Not work	67	55.8	69	57.5
-Work	53	44.1	51	42.5
- Hand working	9	16.9	9	17.6
-Technical job	20	37.7	17	33.3
-Administrative job	24	45.3	25	49.1

Table (2): Difference between knowledge of the studied nurses before and after implementation of nursing guidelines (N= 40)

Knowledge items		Studied nurses (n=40)				X ² p-value
		Before (n=40)		After (n=40)		
		No.	%	No.	%	
1. Meaning of GIT endoscopy.	Incorrect	2	5.0	0	0.0	2.069
	Correct	38	95.0	40	100.0	0.492
2. Purpose of GIT endoscopy.	Incomplete	5	12.5	4	10.0	0.131
	Correct	35	87.5	36	90.0	1.0
3. Types of GIT endoscopy.	Incomplete	1	2.5	0	0.0	1.017
	Correct	39	97.5	40	100.0	1.0
4. Benefits of GIT endoscopy.	Incomplete	34	85.0	0	0.0	40.0
	Correct	6	15.0	40	100.0	<0.0001*
5. Nurse's role before endoscopy.	Incomplete	34	85.0	0	0.0	40.0
	Correct	6	15.0	40	100.0	<0.0001*
6. Nurse's role after endoscopy.	Incomplete	1	2.5	0	0.0	1.017
	Correct	39	97.5	40	100.0	1.0
7. Nurse's role during endoscopy procedure.	Incorrect	2	5.0	0	0.0	2.069
	Correct	38	95.0	40	100.0	0.492
8. Nurse's role in ERCP endoscopy procedure.	Correct	40	100.0	40	100.0	NA NA
9. Complications of endoscopy procedure.	Incomplete	37	92.5	5	12.5	32.411
	Correct	3	7.5	35	87.5	<0.0001*
10. Steps of endoscopy disinfection and sterilization.	Incomplete	4	10	0	0.0	4.286
	Correct	36	90	40	100.0	0.112
	Unsatisfactory	0	0.0	0	0.0	
Total knowledge score	Satisfactory	40	100.0	40	100.0	
	Min-Max	75.0-100.0		80.0-100.0		t=3.447
	Mean±SD	89.7±4.7		95.8±7.3		P=0.002*

X²: Mac Nemar test t- test: Paired t-test *significant at P≤0.05

Table (3) Difference between studied nurses' practice about patients' general preparation for GIT endoscopy before and after implementation of nursing guidelines (n=40).

nurses practices regarding general preparation)		Studied nurses				X ² P- value
		Before guidelines implementation (n=40)		After guidelines implementation (n=40)		
		No.	%	No.	%	
1. Introduce his/herself to the patient.	Not done	40	100.0	25	62.5	12.0 0.001*
	Done	0	0.0	15	37.5	
Assess:						
1.1. Demographic data of patients.	Not done	30	75.0	8	20.0	19.461 <0.0001*
	Done	10	25.0	32	80.0	
1.2. Allergic to medication that will be given.	Not done	28	70.0	22	55.0	0.271 0.602
	Done	12	30.0	18	45.0	
1.3. History (medical – surgical – medications).	Not done	0	0.0	0	0.0	NA NA
	Done	40	100.0	40	100.0	
1.4. History about reason(s) for endoscope.	Not done	1	2.5	0	0.0	1.017 1.0
	Done	39	97.5	40	100.0	
1.5. Vital signs and pulse oximetry.	Not done	3	7.5	0	0.0	3.158 0.237
	Done	37	92.5	40	100.0	
2. Informed consent from the patient or from his or her relatives.	Not done	31	77.5	30	75.0	13.125 <0.0001*
	Done	9	22.5	10	25.0	
3. Ensures that every requested lab is fulfilled.	Not done	0	0.0	0	0.0	NA NA
	Done	40	100.0	40	100.0	
4. Ensures that every requested radiographic investigation is fulfilled.	Not done	1	2.5	0	0.0	1.017 1.0
	Done	39	97.5	40	100.0	
Ensure that all endoscopic equipment are sterilized or disinfected:						
4.1. All endoscopic parts are totally immersed in disinfected solution.	Not done	40	100.0	9	30.0	32.308 <0.0001*
	Done	0	0.0	31	70.0	
4.2. All endoscopic parts immersed in disinfected solution for required time	Not done	40	100.0	15	37.5	30.0 <0.0001*
	Done	0	0.0	25	62.5	
4.3. The disinfected solutions are changed according to disinfected solutions instruction.	Not done	1	2.5	0	0.0	1.017 1.0
	Done	39	97.5	40	100.0	
4.4. Ensure the expired date of disinfected solutions.	Not done	1	2.5	0	0.0	1.017 1.0
	Done	39	97.5	40	100.0	
5. Ensure removal of dentures (jewelry, nail varnish and make up.	Not done	6	2.5	0	0.0	6.667 0.02*
	Done	34	97.5	40	100.0	
6. Administer analgesic, sedation and medications	Not done	0	0.0	0	0.0	NA NA
	Done	40	100.0	40	100.0	
7. Instruct the patient for discontinuation of aspirin products and iron preparation for one to two weeks before examination.	Not done	0	0.0	0	0.0	NA NA
	Done	40	100.0	40	100.0	
8. Ask the patient about complications for drugs allergy.	Not done	6	15.0	0	0.0	6.667 0.02*
	Done	34	85.0	40	100.0	
9. Insert IV line.	Not done	4	10.0	0	0.0	4.286 0.112
	Done	36	90.0	40	100.0	

X²: Mac Nemar test NA: Test not applicable *significant at P<0.05

Table (4): Difference between studied nurses' practice in relation to patients' psychological preparation for GIT endoscopy before and after implementation of nursing guidelines (n=40)

nurses' practice regarding (Psychological preparation)		Studied nurses				X ² p-value
		Before (N=40)		After (N=40)		
		No.	%	No.	%	
1. Explains procedure to the patient	Not done	36	90.0	23	57.5	6.648
	Done	4	10.0	17	42.5	0.01*
2. Explain the benefits of endoscopy	Not done	35	87.5	23	57.5	5.079
	Done	5	12.5	17	42.5	0.02*
3. Administer anti-anxiety agents.	Not done	5	12.5	1	2.5	2.963
	Done	35	87.5	39	97.5	0.195
4. Promote contact with other GIT endoscopy patients.	Not done	22	55.0	1	2.5	18.468
	Done	18	45.0	39	97.5	<0.0001*
5. Encourage the patient to ask questions and give him appropriate answer.	Not done	1	2.5	0	0.0	1.017
	Done	39	97.5	40	100.0	1.0
6. Teach the patient relaxation techniques as deep breathing technique.	Not done	1	2.5	0	0.0	1.017
	Done	39	97.5	40	100.0	1.0

*significant at $p < 0.005$

Table (5): Difference between total scores for practice of studied nurses regarding the care for patients undergoing GIT endoscopy before and after implementation of nursing guidelines (N=40).

Performance items		Studied nurses		Paired t-test
		Before (n=40)	After (n=40)	P-value
General preparation	Unsatisfactory	7 (17.5%)	0 (0.0%)	
	Satisfactory	33 (82.5%)	40(100.0%)	9.111
	Min-Max	54.2-83.3	62.5-100.0	<0.000*
	Mean±SD	65.9±6.7	84.4±10.0	
Preparation for lower GIT score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	2.971
	Min-Max	100.0-100.0	80.0-100.0	0.000*
	Mean±SD	100.0±0.0	95.3±8.6	
Specific preparation for ERCP score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	NA
	Min-Max	100.0-100.0	100.0-100.0	NA
	Mean±SD	100.0±0.0	100.0±0.0	
During procedure score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	5.757
	Min-Max	60.0-100.0	80.0-100.0	<0.000*
	Mean±SD	78.0±12.1	94.0±9.3	
Post procedure score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	7.946
	Mean±SD	66.7-83.3	66.7-100.0	<0.000*
	Min-Max	75.6±8.4	93.9±9.3	
Patient's discharge score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	3.038
	Min-Max	81.3-100.0	81.3-100.0	0.000*
	Mean±SD	90.8±6.1	95.6±6.4	
Total practice score	Unsatisfactory	0 (0.0%)	0 (0.0%)	
	Satisfactory	40(100.0%)	40(100.0%)	8.467
	Min-Max	73.3-90.0	80.0-100.0	<0.000*
	Mean±SD	79.7±4.3	90.6±6.3	

NA: Test not applicable

*significant at $P < 0.05$

Table (6): Correlation between knowledge and practice regarding the care of patients undergoing GIT endoscopy of the studied nurses before and after implementation of nursing guidelines (N=40):

Practice score (%)	Knowledge score (%)			
	Before (N=40)		After (N=40)	
	r-test	P-value	r-test	P-value
General preparation score	0.251	0.181	0.466	0.00*
Preparation for lower GIT score	NA	NA	0.048	0.802
Specific preparation for ERCP score	NA	NA	NA	NA
During procedure score	0.020	0.917	0.093	0.625
Post procedure score	0.264	0.158	0.405	0.02*
Patient's discharge score	0.187	0.322	0.106	0.578
Total practice score	0.322	0.083	0.363	0.04*

r: Spearman Rho correlation coefficient *significant at $P \leq 0.05$ NA: test not applicable

Table (7) Difference between total knowledge and practice mean scores related to the care of studied patients undergoing gastrointestinal endoscopy throughout the of guidelines implementation (N=40):

Total mean scores	Implementation of guidelines		t- test P- value
	Before Mean± SD	After Mean± SD	
Knowledge	89.7±4.7	95.8±7.3	3.447 0.00*
Practice	79.7±4.3	90.6±6.3	8.467 0.00*

Table (8) Difference between studied patients' complications before and after nursing guidelines implementation (N= 240):

Patients' complications		Studied patients (n=216)				X ² p-value
		Before (No.=120)		After (No.=120)		
		No.	%	No.	%	
Allergy from sedation drugs.	Yes	40	33.3	12	10.0	21.0 <0.0001*
	No	80	66.7	108	90.0	
Hematemesis	Yes	9	7.5	3	2.5	4.673 0.065
	No	111	92.5	117	97.5	
Nausea & Vomiting.	Yes	28	23.3	11	9.2	9.854 0.002*
	No	92	76.7	109	90.8	
Blood pressure elevation.	Yes	5	4.2	0	0.0	3.042 0.247
	No	115	95.8	120	100.0	
Elevation of body temperature.	Yes	67	55.8	25	20.3	33.827 <0.0001*
	No	53	44.2	95	79.7	
Decreased blood pressure.	Yes	16	13.3	0	0.0	14.97 <0.0001*
	No	104	86.7	120	100.0	
Distension of the abdomen.	Yes	9	7.5	0	0.0	7.234 0.014*
	No	111	92.5	120	100.0	

X²: Chi-Square test

*significant at $P \leq 0.05$

Discussion

Endoscopy nurses has a vital role in providing safe and high quality endoscopy. Also have many tasks in endoscopy unit that composed of Preparation of endoscopic room with accurate instrument and devices used for examination of the upper or lower GI tract. In addition to giving the right information about the procedure to the patient, to relieve anxiety and to give explanations about the modality of the endoscopic procedure. During the procedure the nurse also help the endoscopist and, when indicated, the anesthetist. After procedure, the nurse reprocessing of the endoscopic instrument and devices used in the procedure **Petersen et al., (2011)**

According to socio-demographic characteristics of the study nurses, the study revealed that about half of the studied nurses were within the age range from 18 to less than 28 years and majority of the nurses were females, married and most of them lived in urban areas. It also revealed that more than half of them graduated from secondary nursing school. Moreover, not all of studied nurses had any training courses before working in GI endoscopy unit as they graduated from secondary nursing school and about more than half of them had more than 5 years' experience in endoscopy unit.

Regarding to demographic characteristics of the studied patients, the study demonstrated that more than half of patients their age ranged from 40 years and less than 50 years, more than half of them lived in rural. Most of studied patients were females and married, less than half of the patients were illiterate and more than half of the patients were not workers.

The current study revealed that nurses' level of knowledge, were unsatisfactory before implementing of the guidelines and increased significantly after guidelines implementation. This might be because providing care to the patient undergoing gastrointestinal endoscopy needs special skills, knowledge and nursing specialty or may be attributed to insufficient courses related to endoscopic procedure included in their undergraduate curriculum of

nursing education with lack of continuous education and in-service training program.

These results are in agreement with **Prochaska & Velicer (2012)** who noted that nurse's knowledge and practice improved immediately after receiving to the training program. In addition, **Mohamed, (2016)** who mentioned that total mean knowledge score of the patients increased significantly, after the structured teaching programmed

After implementation of the nursing guidelines, scores were higher among younger and newly graduated nurses. Nurses' knowledge score levels regarding caring of patient undergoing GIT endoscopy were improved. This improvement might be related to the fact that half of nurses were in young age i.e. they might have less responsibilities and more capacity of learning.

These results are in the same line with **Bertleff et al., (2009)** who noted that nurse's knowledge and practice improved immediately after attending to the training programs, the outcome of these programs was higher among younger ages

In addition, these results are in agreement with **Meyer & Elliott, (2010)** who noted that nurse's knowledge scores were higher among younger and newly graduated nurses who are attending a training nursing program. Moreover, **Endevelt, (2009)** which indicated that the younger nurses, are more knowledgeable than old ones. This may be due to the designed teaching protocol make refreshment in their knowledge and skills, which gained over the time.

The present study revealed improvement in the practice score levels obtained by nurses' post guidelines implementation. This has been concluded by the presence of significant differences between results of pre and post guidelines implementation. This finding indicated that skills could be easily improved, especially if linked with their relevant scientific base of knowledge. **Friese et al., (2012)** reported that, continuing education must result in practice change to be effective. Integration of knowledge occurs when information is combined with performance. Moreover, **Abd-Alla, (2010)** documented that the in service training has a beneficial effect in improving the nurse's

knowledge and skills. Therefore, they recommended that according to the needs of nurses with continuous evaluation the educational programs should be organized. In addition to **Mansour, (2012)** agree with the current study and mentioned that, continuing education is required to maintain competence in practice.

According to complications of GIT endoscopy, this study revealed that there were a statistically significant difference before and after guidelines implementation related to these complications (allergy from sedation drugs, vomiting & nausea, elevated body temperature, decreased blood pressure & abdominal distension).

These results in contrast with **Ali, (2013)** In Assuit University in medical Audit of Upper GIT) that show that the complications present in 8% of the studied groups and the type of the complications were (failure of control of upper GIT bleeding 37.5%, syncope in 37.5%, respiratory arrest 12.5% and myocardial infarction in 12.5%). In addition, hematemesis occurs during the procedure due to failure in the management of the upper GIT bleeding.

The study showed that most of the studied patients (before and after guidelines implementation) are complaining from body temperature elevation after endoscopy. These disagree with **Mohamad, (2014)** who reported that there were no cases of infection complication post-gastrointestinal tract endoscopy.

The present study demonstrated that, minority of the studied patients show blood pressure elevation. These results agree with **Majeski, (2009)** who state that; professional endoscopic nurse observe the level of conscious until the sedation off and observe signs and symptoms of risks associated with GI endoscopy include , vomiting bloody or very dark stool , fever bleeding from biopsy accidental puncture of the upper GI tract, abnormal reaction to sedatives, swallowing difficulties and throat, chest, and abdominal pain. Moreover **Herbert et al., (2011)** demonstrate that diagnostic endoscopy of the gastrointestinal tract is safe, with a complication rate of less than 1 per 5000 cases. Approximately one complication occurs for every 1000 EGD procedures.

There were positive significant correlation between nurse's knowledge and practice before and after guidelines implementation in the following items (general preparation (pre-procedure), post procedure items & total practice score). This study is in the same line with **Amer et al., (2015)** who mad a study entitled nurses knowledge and practice regarding gastrointestinal endoscopy and suggested nursing guidelines mentioned that; there was statistically significant relationship between total nurses' practice regarding dealing with patients with GI Endoscopy, attendant to training and nurses qualification.

Also **Hamid et al., (2010)** and **Eskander, Morsy, & Elfeky, (2013)** they revealed statistically significant positive correlation between knowledge and practice of universal precautions. Moreover **Gijare, (2012)** reported similar results regarding correlation between knowledge and practice.

On the other hand **Askarian, McLaws, & Meylan, (2007)** who found that there was no correlation between knowledge and practice. In addition, **Najeeb & Taneepanichsakul, (2010)** who mad a study regarding infection control among doctors and nurses, reported a weak, negative relationship between knowledge and practice

Conclusion

According to the results of the current study, there was significant improvement in nurse's knowledge and practice about care of patients undergoing GI endoscopy after implementation of nursing guidelines. As well as decreasing patient's complications.

Recommendations

1. Continuous and adequate education and training of nursing staff working at gastrointestinal endoscopy units with regular and continuous evaluation of nurses' practice
2. Further studies are necessary to identify impact of guideline's applications on nurses' performance in gastrointestinal endoscopy unit.

3. Upgrading nurses' knowledge and practice about caring of patients undergoing gastrointestinal endoscopy through:

- Encouraging nurses to attend national and international congresses, seminars and workshops regularly about GI endoscopy & care of patients undergoing GI endoscopy.
- GI endoscopy nursing guidelines should be mandatory for newly employed nurses.

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