Nurses' Knowledge and Performance for the Care of Patients Undergoing Gastrointestinal Endoscopy

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Abstract

Background: *Gastrointestinal tract (GIT) endoscopy is one of the most commonly performed invasive procedures in the clinical practice for either diagnostic or therapeutic purposes. Endoscopy nurses play a critical role in ensuring that endoscopy is both safe and of high-quality.* ***Objective:*** *To assess nurses' knowledge and performance for the care of patients undergoing gastrointestinal endoscopy.* ***Settings:*** *The study was conducted at three settings at Alexandria, Main University Hospital, Medical Research Institute in the Gastrointestinal Endoscopy Units, another private hospital (specialized hospital for gastroenterology & Hepatology).* ***Subjects:*** *All available nurses (n=70) at the time of data collection and are providing direct care for patients undergoing gastrointestinal endoscopy working in the above-mentioned settings.* ***Tools:*** *Two tools will be used to collect the necessary data, Tool I: Self-administered Nurses' Knowledge for Gastrointestinal Endoscopy interview schedule, Tool II: Nurses' Performance Observational Checklist.* ***Results:*** *The results show the frequency distribution of the studied nurses according to their overall knowledge score regarding the gastrointestinal endoscopy. It was observed that 61.4% of the studied nurses had fail level of knowledge related to the gastrointestinal endoscopy, 15.7% of them had fair level knowledge, while 5.7% of them had good level of knowledge. In addition, only 5.7% of them had very good level of knowledge and 11.4% of them had excellent knowledge level. According to infection control for GI Endoscopes; the result shows that the majority of studied nurses 75.7% had fail performance level, while 2.9% of them had fair performance level and 21.4% had very good performance level. Overall Nurses' Performance for Gastrointestinal Endoscopy Observational revealed that, the majority of the studied nurses 88.6% had fail performance level, on the other hand 11.4% fair performance level. The study revealed that statistically significant relation between the nurses' knowledge level and the attendance of gastrointestinal endoscopy training program(s), The study revealed that no statistically significant relation between the overall nurses' performance level and their socio-demographic characteristics, and The study revealed that highly statistically significant relation between the overall nurses' knowledge and over all nurses' performance.* ***Conclusion****: the study revealed highly statistically significant relation between the overall nurses' knowledge and over all nurses' practice.* ***Recommendations:*** *Periodic assessment of nurses' knowledge and performance regarding the care of the patients undergoing gastrointestinal endoscopy to continuously updating their knowledge and performance and Periodic in services training to maintain the good level of knowledge and performance.*

Keywords: Nurses' Knowledge, Nurses' Performance, Gastrointestinal Endoscopy.

Introduction

Gastrointestinal tract (GIT) endoscopy is one of the most commonly performed invasive procedures in the clinical practice for either diagnostic or therapeutic purposes. It allows the physician to image, assess, and treat gastrointestinal (GI) illnesses. It can be categorized as upper or lower endoscopy (**AboBakr, Abd Allah, Mohamed, & Ameen, 2019**). Retrograde cholangiopancreatography (ERCP) for major papillae, bile ducts, and pancreatic duct. Furthermore, endoscopic ultrasound (EUS) for ultrasound (US) images using an endoscope with a built-in US transducer (**Metwally, Abou Donia & Aziz, 2016**). The upper GI endoscopy for esophagus, stomach, duodenum, and jejunum. While, the lower for rectum, colon, and terminal ileum (**Banks, Webster, & Wee, 2012).**

Endoscopy nurses play a critical role in ensuring that endoscopy is both safe and of high-quality. Endoscopy unit nurses are responsible for a number of tasks, including pre-operation, procedure, and post-treatment care for patients. They must have specialized training in order to perform their duties in these units and handle the necessary supplies and equipment (**Amer, Taha, & Zaton, 2015**)

Significance of the study

One of the most prevalent medical emergencies requiring gastrointestinal endoscopy is acute upper gastrointestinal hemorrhage. After acute upper gastrointestinal bleeding, overall hospital mortality in the United Kingdom (UK) is projected to be 10 % (**Lau, Yu, Tang, Chan, Yip, Chan, & Sung, 2020).**

On the other hand, there are an estimated 600,000 gastrointestinal endoscopy cases and 360,000 mortality every year in the European Union. According to estimates for the years 2000–2007, overall 5-years survival was 41%, with variations depending on the site of

diagnosis.12 % for the esophagus, 24% for the stomach, 48% for colorectal cancer, and 6% for pancreas cancer (**Săftoiu, Hassan, Areia, Bhutani, Bisschops, Bories, & Ponchon, 2020).** According to the statistical records of Alexandria Main University Hospital at Alexandria, there were 15.000 patients annually performed gastrointestinal endoscopy in 2020 (**Statistical records of Alexandria Main University Hospital at Alexandria, 2020).**

Nurses are responsible for a variety of activities prior to an endoscopy examination, including preparing the endoscopic room with the appropriate instruments and devices for examination of the upper or lower gastrointestinal tract. In addition, the nurse plays a vital role in reducing anxiety by providing the patient and his family with accurate information regarding the surgery. In addition, she explains the endoscopic procedure's mode. Furthermore, the nurse assists the endoscopist and anesthetist as needed during the procedure. The nurse must continue with the reprocessing of the endoscopic equipment and devices after the procedure is completed (**AbdElgaphar, Kanona, & Ali, 2019).**

Endoscopy unit nurses are in charge of providing high-quality endoscopy nursing care to gastroenterology patients. They are in charge of all aspects of a patient's care from admission to discharge; they must be organized, able to set priorities, and have clinical experience in efficient endoscopy nursing care; they must also support patients, ensuring their privacy, comfort, and safety, as well as directing them about their care (**Mahdy, Arafat, Abd Elkader, & Mahfouz, 2019).**

Infection management during gastrointestinal endoscopy is a vast topic that covers a variety of endoscopic procedures. It's easier to think of it this way: endogenous infectious complications or those caused by the patient's own bacterial flora, exogenous infectious problems caused by pathogen transfer from patient to patient, and the risk

of infection among healthcare workers **(Ali, & Taha, 2014).**

No previous studies done at main Alexandria University Hospital to assess the nurses' knowledge and their performance for the care of patients undergoing gastrointestinal endoscopy. So, this study done to assess the nurse knowledge, performance and develop a protocol of care to the patients undergoing gastrointestinal endoscopy.

Aims of the Study

This study aims to assess nurses' knowledge and performance for the care of patients undergoing gastrointestinal endoscopy.

Research Questions

- What is the nurses' knowledge for the care of patients undergoing gastrointestinal endoscopy?
- What are the nurses' performances for the care of patients undergoing gastrointestinal endoscopy?

Materials and Method

Materials

Design: Descriptive research design was utilized to conduct the study.

Settings: The present study was conducted in three settings at Alexandria Main University Hospital, Medical Research Institute in the Gastrointestinal Endoscopy Units and another private hospital; Specialized Hospital for Gastroenterology & Hepatology.

Subjects: All available nurses (n=70) who are providing direct care for patients undergoing gastrointestinal endoscopy working in the above-mentioned settings.

Tools: Two tools were used to collect data of the study:

Tool I: Self-administered Nurses' Knowledge for Gastrointestinal Endoscopy interview schedule.

This tool developed by the researcher based on the recent review of literature **(Amer, et al., 2015; Abd-Elhamid, El-khashab, Taha, & Saleh, 2016).**

It was used to assess the nurses' knowledge for gastrointestinal endoscopy. It was consisted of four parts as the following:

Part I: Nurses' Socio-demographic Characteristics and Clinical Data

This part included the nurses' age, gender, marital status, level of education, occupation, and area of residence, years of experience in the gastrointestinal endoscopy unit, viral hepatitis B vaccination, and the attendance of gastrointestinal endoscopy training programs.

Part II: This part was included questions used to evaluate nurses' knowledge regarding gastrointestinal endoscopy apparatus, indication, and contraindication of GI endoscopy and the complication of GI endoscopy.

Part III: This part was contained questions used to assess nurses' knowledge regarding pre practice, during, and post gastrointestinal endoscopy.

Part IV: This part was included questions used to assess nurses' knowledge regarding general and standards precaution in the endoscopy unit.

Scoring System of Knowledge:

Nurses' responses to knowledge will be scored through three-point Likert scale. A score of two points will be given to correct and complete answer, one point will be given to correct and incomplete answer and zero will be given to incorrect answer or don't know. The total score for every nurse will be summed up and converted into percentage. For each area of knowledge, the score will be summed and the total divided by the number of this items. give the mean score for the part. This score will be converted into percentages. Total nurse's score % = (the response score / the maximum score) x 100. The nurses' knowledge competency level will be based on Benners' stages of competency (Benner, 2001) that is described as follow:

Total scores	Category	Level of competency
≥ 90%	Excellent	Expert
80% to 89%	Very good	Proficient
70% to 79%	Good	Competent
60% to 69%	Fair	Advanced beginner
< 60%	Fail	Novice

Tool II: Nurses' Performance Observational Checklist.

This tool was adapted by the researcher based on the recent of review of literature (**Taylor, Lynn & Bartlett, 2018; Wittren, Gregor & Niesen, 2019).**

It was used to assess the nurses' performance for gastrointestinal endoscopy. It was consisted of two main parts as the following

Part I: It was concerned with the gastrointestinal endoscopy insertion.

It was cover four sections that were
Part

Part I-a: Pre gastrointestinal Endoscopy Insertion:

Part I-b: intra gastrointestinal Endoscopy Insertion

Part I-c: Post-gastrointestinal Endoscopy Insertion

Part I-d: Patients' Health Teaching and Discharge Instructions of Gastrointestinal Endoscopy.

Part II: It was included a checklist to assess nurses' practice regarding infection control for GI endoscopes. It was covered five parts:

Part II-a - Pre-procedure, during and post-procedure, and pre-cleaning for infection control.

Part II-b: Leakage testing.

Part II-c: Manual cleaning

Part II-d: High-level disinfectant (HLD)

Part II-e: Manual disinfecting

<u>Scoring System for Nurses' performance</u>

Nursing performance will be scored through three-point Likert scale. A score of two points will be given to correct and complete performance, one point will be given to correct and incomplete performance and zero will be given to incorrect or not done performance. The total score for every nurse will be summed up and converted into percentage. For each area of knowledge, the score will be summed and the total divided

by the number of this items. which give the mean score for the part. This score will be converted into percentages. Total nurse's score % = (the response score / the maximum score) x 100. The nurses' performance competency level will be based on Benners' stages of competency (Benner, 2001) that is described as follow**:**

Total scores	Category	Level of competency
≥ 90%	Excellent	Expert
80% to 89%	Very good	Proficient
70% to 79%	Good	Competent
60% to 69%	Fair	Advanced beginner
< 60%	Fail	Novice

Method

Method

The study was accomplished as follows:

- An official letter to conduct the study was presented to head of the departments of the selected hospital settings to obtain their permission to carry out the study.
- Two tools were developed to collect data. Tool I was developed by the researcher based on the recent review of literature (**Amer, et al., 2015; Abd-Elhamid, El-khashab, Taha, & Saleh, 2016).**
- Tool II was adapted by the researcher based on the recent of review of literature (**Taylor, Lynn & Bartlett, 2018; Wittren, Gregor & Niesen, 2019**).
- Content validity of the study tools was tested by five experts in the field of Medical-Surgical Nursing, Faculty of Nursing-University of Alexandria.
- Reliability of study tools was estimated using the Cronbach's Alpha test. It was 0.760 for Tool I, 0.937for Tool II.
- A Pilot study was conducted on 7 nurses to ascertain the clarity, feasibility, and applicability of the study tools.
- The endoscopic nurses were interviewed individually once by the researcher, the time of each interview within approximately 30-45 minutes to collect the necessary data using tool I after explanation of the purposes of the study.

- The interview schedule was conducted every day at the end of the morning shift for nurses working who were in the morning shift.
- The endoscopic nurse was observed at the endoscopy unit by the researcher to collect the data related to nurses' performance in the care of patients undergoing gastrointestinal endoscopy using tool II.
- Observations were continuous, every day. Each nurse was observed in the morning shift, for pre-procedure, during the procedure and post-procedure GIT endoscopy, three times, and the mean (±SD) of these observations was estimated to assess the nurse's performance. Also, the researcher observed the nurses' practical skills about studied procedures. The time needed to complete the observational checklist was ranged from 45 to 60 minutes.
- After data collection these data were checked, entered, and analyzed by SPSS statistical test to assess nurses' knowledge and performance for the care of patients undergoing gastrointestinal endoscopy.

Ethical considerations:

- Informed written consent obtained from each patient after the explanation of the aim and purpose of the study.
- Patient's privacy respected.
- Data confidentiality assured.
- Patients can withdraw at any time

Statistical Analysis

Data were fed to the computer and analyzed. The used statistical tests were: ANOVA, Friedman test, Marginal Homogeneity Test, and Paired t-test.

Results

Table (1) illustrates the frequency distribution of the studied nurses according to their socio-demographic characteristics. Results revealed that the majority (41.4%) of the studied nurses were in the age group ranged from 30>40 years old, while 21.4% were in the age group (40>50) years old, and 37.1% of them were in the age group (18>30) years old, with mean age (32.70 ± 7.92) years. Concerning the educational level, it was evident that most of them had diploma degrees (55.7 %), while 44.3% of them had bachelor degree. In relation to years of experience in the gastrointestinal endoscopy unit, it was found that 22.9% of the studied nurses had less than five years of experience, while 54.3% of them had years of experience from 5 to 10. In addition, it was observed that 17.1% (10>20) years of experience, and only 5.7% of them had more than 20 years of experience. Also, this table reveals that the majority (74.3%) of the studied nurses did not attend any gastrointestinal endoscopy training programs, and only 25.7% of them have attended training programs about the gastrointestinal endoscopy. Also, most of the studied nurses (83.3%) nurses were attended those training programs during in-service. According to improve nurse's performance after attending training programs, it was noticed that (100%) of them improve performance after attending training programs

Table (2) shows the frequency distribution of the studied nurses according to their overall knowledge score regarding the gastrointestinal endoscopy. It was observed that 61.4% of the studied nurses had fail level of knowledge related to the gastrointestinal endoscopy, 15.7% of them had fair level knowledge, while 5.7% of them had good level of knowledge. In addition, only 5.7% of them had very good level of knowledge and 11.4% of them had excellent knowledge level.

Also, this table showed that the mean± SD of the overall knowledge regarding gastrointestinal endoscopy (19.17 ± 5.93), Min. – Max (9.0 – 32.0), median (18). Also, this table revealed that the mean± SD percent score of overall knowledge regarding gastrointestinal endoscopy (59.91 ± 18.53), Min.-Max percent score was (28.13 – 100) and median percent score was (56.25).

Table (3) illustrates the frequency distribution of overall the studied nurses according to their performance score

regarding the gastrointestinal endoscopy In relation to the pre insertion of the gastrointestinal endoscopy; the table shows that more than half of studied nurses 67.1% had fail performance level, while 21.4% of them had fair performance level, 5.7% had good performance level and 5.7% had very good performance level. According to intra insertion gastrointestinal endoscopy; the table shows that the majority of studied nurses (84.3%) had fail performance level, while 14.3% of them had fair performance level and 1.4% had good performance level. According to the post insertion gastrointestinal endoscopy; the table shows that all of studied nurses (100%) had fail performance level. Considering patients' health teaching and discharge instructions of gastrointestinal endoscopy; the table shows that all of the studied nurses (100%) had fail performance level. And finally, overall part I of the table revealed that, the majority of the studied nurses98.6% had fail performance level, on the other hand 1.4% had fair performance level. According to infection control for GI Endoscopes; the table shows that the majority of studied nurses 75.7% had fail performance level, while 2.9% of them had fair performance level and 21.4% had very good performance level.

Finally, Overall Nurses' Performance for Gastrointestinal Endoscopy Observation revealed that, the majority of the studied nurses 88.6% had fail performance level, on the other hand 11.4% had fair performance level.

Table (4) represents the relationship between the studied nurses' according to their overall knowledge regarding the gastrointestinal endoscopy and their socio-demographic characteristics. This table reveals that there was statistically significant relation between the nurses' knowledge level and their attendance of gastrointestinal endoscopy training program(s) (p= 0.002*).

Table (5) illustrates the relationship between the studied nurses according to their overall performance regarding the gastrointestinal endoscopy and their socio-demographic characteristics. This table

reveals that there was no statistically significant relation between the overall nurses' performance level and their socio-demographic characteristics

Table (6) illustrates the correlation between the studied nurses according to their knowledge, and performance regarding the gastrointestinal endoscopy This table illustrates that there was statistically highly significant correlation between the overall nurses' knowledge and over all nurses' practice, (p=<0.001).

Discussion

In gastroenterology, endoscopy is the most important tool for diagnosis and therapy. Endoscopy of the gastrointestinal tract is a diagnostic and therapeutic treatment that allows for a clear view of the mucosal surfaces. It's a crucial tool for diagnosing and treating a variety of gastrointestinal problems (Cotton, & Williams, 2013).

Regarding the socio-demographic characteristics of the studied nurses, the results of the study revealed that the most of the nurses aged from 30 to 39 years old. This result was consistent with Mahdy, et al., (2019) who reported in their studies that half of the nurses were in between 30-39 years old. This result disagreed with AboBakr, et al., (2019) who reported in their studies that about two third of them were more than 40 years old.

Regarding knowledge of the studied nurses regarding the gastrointestinal endoscopy, the current study revealed that more than half of studied nurses their response was correct and incomplete answer regarding the indication of diagnostic gastrointestinal endoscopy, the indications the therapeutic GI endoscopy , the most common indications for lower gastrointestinal endoscopy, emergencies which are the appropriate immediate nursing interventions, in addition to the important pre gastrointestinal endoscopy nursing interventions, the important intra gastrointestinal endoscopy nursing interventions, the important post

gastrointestinal endoscopy nursing interventions, and the five moments of hand hygiene, the components of the universal precaution. The reason for lack of nurses' knowledge may be due to lack of continuing educational programs or sessions about gastrointestinal endoscopy, inadequate supervision and guidance, deficiency continuous evaluation of nurses' knowledge and lack of cooperation between multidisciplinary health care team members also, they recommended that nurses must be motivated to continue education by several scholars to gain a good knowledge about gastrointestinal endoscopy.

Regarding the studied nurses' overall knowledge levels about gastrointestinal endoscopy, the current study revealed that sixty one percent of the studied nurses were novice "failed" about knowledge level for gastrointestinal endoscopy, fifteen percent of them fair knowledge level, five percent of them good and very good knowledge and eleven percent of them excellent knowledge level . This could be because there was a lack of previous in-service training and education among nurses, lack of incentives and motivation to update their knowledge after being settled in the clinical environment for a longer time.

These results agreed with Shehab, & Soultan, (2021) who reported that nurses' level of knowledge, were unsatisfactory. 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.

As regards nurses' performance regarding pre insertion of the gastrointestinal endoscopy, the present study showed that more than half of studied nurses was perform correct and incomplete regarding the reviewing the medical orders, performing hand hygiene, wearing the personal protective equipment, this may be due to lack

of availability and accessibility of equipment. Since accessibility of equipment is particularly significant, in addition to may be due to malpractice or negligence.

As regards nurses' performance regarding intra insertion of the gastrointestinal endoscopy, the present study showed that the majority of nurses didn't perform it regarding explaining each step during the procedure; providing emotional support, observing the patient closely, this may due to lack of practice, lack of time, work overload, lack of knowledge, training, qualification, and number of nursing staff, imbalance ratio between patients and nurses.

On the other hand, the current study revealed that; the majority of studied nurses perform it correct but incomplete regarding regular checking vital signs during the procedure, performing suctioning from the mouth in case of secretions, recording medication, vital signs, time of start and end of the procedure, this may due to improper training, malpractice, lack of time and lack of proper equipment.

As regards nurses' performance regarding post insertion preparations of the gastrointestinal endoscopy, the present study showed that the majority of nurses didn't perform it regarding the documenting patient's level of consciousness, monitor and record vital signs frequently, taking vital signs every 15 minutes the first hour, every 30 minutes the next 2 hours, every hour for 4 hours, and finally every 4 hours, assessing the patient's respiratory status, assessing the patient's cardiovascular status, assessing skin color and condition, assessing the presence of nasogastric tube drains, Assessing for and relieve pain by administering medications ordered by physician, this may be due to shortage of job description to each category of the nursing staff, insufficient equipment, improper environment and work overload, overlapping of nursing activities especially in morning shifts, shortage of staff member, and lack of experience and knowledge.

As regards nurses' according to their performance infection control regarding the gastrointestinal endoscopy, the present study

showed that the majority of nurses perform it correct but incomplete regarding brushing channels with enzymatic detergent and then flushed with water, performing leaking test according to manufacturer's requirements, cleaning all detachable components individually using enzymatic solution;, high-level disinfection of the GI endoscopy, storing the endoscopy uncoiled, hanging vertically in a clean, dry, ventilated area; ensuring that allowable storage time before reprocessing is required is seven days, and overall nurses performance had fail level regarding infection control for gastrointestinal endoscopy .

This study agreed with ELKima, ELSawi, Youssef, & Anani, (2017); Abd-Elhamid et al.,(2016); Amer et al., (2015) who revealed that none of nurses had satisfactory practice in infection control, cleaning and manual disinfection of endoscope (wearing protective clothes, transferring endoscope for cleaning, pre-manual cleaning stage, test leak, manual cleaning stage, rinsing, sterilization and dryness, dangerous of inadequate endoscope disinfection, storage and documentation.

According to nurses' overall Performance for Gastrointestinal Endoscopy Observation the present study revealed that, the majority of the studied nurses had failed performance level. These results agreed with Amer et al., (2015) who reported that the majority of nurses had unsatisfactory level of practice before, during and after GI endoscope insertion. These results disagreed with Mohamed, (2018) who reported that nurses had satisfactory level of practice.

As regard correlation between the studied nurses according to their knowledge, and performance regarding the gastrointestinal endoscopy the present study revealed that there was statistically highly significant relation between the overall nurses' knowledge and over all nurses' performance, this study agreed with AboBakr et al., (2019);Mahdy et al., (2019) who reported that there was positive correlation between knowledge score and practice score. On the other hand, Shehab et al., (2021) who found that there was no correlation between knowledge and practice.

Finally, the researcher can conclude that the nurse age, training and working duration could affect the level of nurses' knowledge regarding gastrointestinal endoscopy including; general precautions, basic steps to clean and disinfection in endoscopy unit. While training and qualification can affect dealing with the patients in addition to nurses' level of practice before, during and after GI endoscope, discharge instructions and manual disinfecting of endoscopy. So, the researchers recommend Periodic assessment of nurses' knowledge and performance regarding the care of the patients undergoing gastrointestinal endoscopy to continuously updating their knowledge and performance, adequate education and periodic in-service training program of all nurses working with gastrointestinal endoscopy unit, with continuous evaluation of nurses' work practice. Further studies are necessary to study the effect of implementing educational training program for nurses on the clinical outcomes of patients undergoing gastrointestinal endoscopy. Study the impact of educational training program for nurses on the quality of life of patients undergoing gastrointestinal endoscopy

Conclusion

Based upon the findings of the current study, it could be concluded that there are highly statistically significant relation between the overall nurses' knowledge and over all nurses' practice

Recommendations

In line with the findings of the study, we recommend to study the effect of implementing educational training program for nurses on the clinical outcomes of patients undergoing gastrointestinal endoscopy.

Table (1): Frequency Distribution of the Studied Nurses according to their Socio-demographic Characteristics (n=70)

Nurses' socio-demographic characteristics	No.	%
Age in years		
▪ 18> 30	26	37.1
▪ 30 > 40	29	41.4
▪ 40 > 50	15	21.4
Min. – Max.	18.0 – 49.0	
Mean ± SD.	32.70 ± 7.92	
Gender		
▪ Female	70	100.0
Marital status		
▪ Single	17	24.3
▪ Married	50	71.4
▪ Widow	3	4.3
Educational level		
Diploma	39	55.7
Bachelor	31	44.3
Area of residence		
▪ Urban	64	91.4
▪ Rural	6	8.6
Years of experience in the gastrointestinal unit		
▪ (>5)	16	22.9
▪ (5 > 10)	38	54.3
▪ (10 >20)	12	17.1
▪ More than 20	4	5.7
Receiving Viral hepatitis B vaccination		
▪ Yes	67	95.7
▪ No	3	4.3
Attendance of gastrointestinal endoscopy training program(s)		
▪ Yes	18	25.7
▪ No	52	74.3
Time of training program(s) (n=18)		
▪ Pre-services	3	16.7
▪ In- services	15	83.3

n: Number of studied nurses

Table (2): Frequency Distribution of the Studied Nurses according to their Overall Knowledge score regarding the Gastrointestinal Endoscopy (n=70)

Nurses' Knowledge	No.	%
▪ Fail	43	61.4
▪ Fair	11	15.7
▪ Good	4	5.7
▪ Very good	4	5.7
▪ Excellent	8	11.4
Min. – Max.	9.0 – 32.0	
Mean ± SD.	19.17 ± 5.93	
Median	18.0	
% Score		
Min. – Max.	28.13 – 100.0	
Mean ± SD.	59.91 ± 18.53	
Median	56.25	

Table (3): Frequency Distribution of Overall the Studied Nurses' according to their Performance regarding the Gastrointestinal Endoscopy (n=70)

Nurses' Performance	Fail (< 60%)		Fair (60% to 69%)		Good (70% to 79%)		Very good (80% to 89%)		Excellent (≥ 90%)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Pre insertion gastrointestinal endoscopy.	47	67.1	15	21.4	4	5.7	4	5.7		
Intra insertion gastrointestinal endoscopy.	59	84.3	10	14.3	1	1.4				
Post insertion gastrointestinal endoscopy.	70	100.0								
Patients' health teaching and discharge instructions of gastrointestinal endoscopy.	70	100.0								
Overall Part I	69	98.6	1	1.4						
Infection control for GI endoscopes.	53	75.7	2	2.9			15	21.4		
Overall nurses' performance for gastrointestinal endoscopy observational.	62	88.6	8	11.4						

n: Number of studied nurses

Table (4): The Relationship between the Studied Nurses' according to their Overall Knowledge regarding the Gastrointestinal Endoscopy and their Socio-demographic Characteristics.

Nurses' Socio-demographic characteristics	Overall Nurses' Knowledge										χ^2	^{MC}p
	Fail (n=43)		Fair (n=11)		Good (n=4)		Very good (n=4)		Excellent (n=8)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Age in years												
18> 30	16	37.2	4	36.4			2	50.0	4	50.0	6.737	0.560
30 > 40	16	37.2	5	45.5	4	100.0	2	50.0	2	25.0		
40 > 50	11	25.6	2	18.2					2	25.0		
Gender												
Female	43	100.0	11	100.0	4	100.0	4	100.0	8	100.0	-	-
Marital status												
Single	10	23.3	2	18.2			1	25.0	4	50.0	5.742	0.661
Married	31	72.1	8	72.7	4	100.0	3	75.0	4	50.0		
Widow	2	4.7	1	9.1								
Educational level												
Diploma	27	62.8	6	54.5	2	50.0	1	25.0	3	37.5	3.628	0.476
Bachelor	16	37.2	5	45.5	2	50.0	3	75.0	5	62.5		
Area of residence												
Urban	37	86.0	11	100.0	4	100.0	4	100.0	8	100.0	2.208	0.723
Rural	6	14.0										
Years of experience in the gastrointestinal unit												
>5	12	27.9	1	9.1	0	0.0	1	25.0	2	25.0	7.667	0.816
5 > 10	19	44.2	8	72.7	4	100.0	3	75.0	4	50.0		
10 >20	8	18.6	2	18.2					2	25.0		
More than 20	4	9.3										

Nurses' Socio-demographic characteristics	Overall Nurses' Knowledge										χ^2	MCp
	Fail (n=43)		Fair (n=11)		Good (n=4)		Very good (n=4)		Excellent (n=8)			
	No.	%	No.	%	No.	%	No.	%	No.	%		
Receive viral hepatitis B vaccination												
Yes	40	93.0	11	100.0	4	100.0	4	100.0	8	100.0	1.640	1.000
No	3	7.0										
Attendance of gastrointestinal endoscopy training program(s)												
Yes	**5**	**11.6**	**4**	**36.4**	**3**	**75.0**	**1**	**25.0**	**5**	**62.5**	15.124*	0.002*
No	38	88.4	7	63.6	1	25.0	3	75.0	3	37.5		
Time of Attending the gastrointestinal endoscopy training program(s) (n=18)												
Pre-services	2	40.0	1	25.0							3.762	0.503
In- services	3	60.0	3	75.0	3	100.0	1	100.0	5	100.0		

$\chi 2$: Chi square test   MC: Monte Carlo   :*Statistically significant at $p \leq 0.05$ n: Number of studied nurses

Table (5): The Relationship between the Studied Nurses according to their Overall Performance regarding the Gastrointestinal Endoscopy and their Socio-demographic Characteristics.

Nurses' Socio-demographic characteristics	Overall Nurses' Performance				χ^2	P
	Fail (n = 62)		Fair (n = 8)			
	No.	%	No.	%		
Age in years						
18> 30	24	38.7	2	25.0	0.730	MCp= 0.711
30 > 40	25	40.3	4	50.0		
40 > 50	13	21.0	2	25.0		
Gender						
Female	62	100.0	8	100.0		
Marital status						
Single	17	27.4	0	0.0	3.044	MCp= 0.205
Married	42	67.7	8	100.0		
Widow	3	4.8	0	0.0		
Educational level						
Diploma	35	56.5	4	50.0	0.120	FEp=1.000
Bachelor	27	43.5	4	50.0		
Area of residence						
Urban	57	91.9	7	87.5	0.178	FEp= 0.531
Rural	5	8.1	1	12.5		
Years of experience in the gastrointestinal unit						
>5	16	25.8	0	0.0	3.220	MCp= 0.309
5 > 10	32	51.6	6	75.0		
10 >20	10	16.1	2	25.0		
More than 20	4	6.5	0	0.0		
Receive viral hepatitis B vaccination						
Yes	59	95.2	8	100.0	0.404	FEp=1.000
No	3	4.8	0	0.0		
Attendance of gastrointestinal endoscopy training program(s)						
Yes	15	24.2	3	37.5	0.657	FEp=0.415
No	47	75.8	5	62.5		
Time of attending the gastrointestinal endoscopy training program(s) (n=18)						
Pre-services	3	20.0	0	0.0	0.720	FEp=1.000
In- services	12	80.0	3	100.0		

χ^2: Chi square test   MC: Monte Carlo   FE: Fisher Exact
*: Statistically significant at $p \leq 0.05$ n: Number of studied nurses

Table (6): The Correlation between the Studied Nurses' according to their Knowledge and Performance regarding the Gastrointestinal Endoscopy.

Nurses' Performance	Overall knowledge	
	R	**P**
Pre insertion gastrointestinal endoscopy	0.412*	<0.001*
Intra insertion gastrointestinal endoscopy	0.241*	0.045*
Post insertion gastrointestinal endoscopy	0.394*	0.001*
Patients' health teaching and discharge instructions of gastrointestinal endoscopy	0.190	0.115
Overall Part I	0.427*	<0.001*
Infection control for GI endoscopes	0.475*	<0.001*
Overall nurses' performance for gastrointestinal endoscopy observational	**0.455***	**<0.001***

r: Pearson coefficient   *: Statistically significant at p ≤ 0.05

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