

# Nurses Knowledge and Practice Regarding Gastrointestinal Endoscopy and Suggested Nursing Guidelines

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**Background and study aim:** The increased of demand for GIT endoscopies necessitates the assistance of highly trained endoscopy nurses to perform her role to take care of patients undergoing different GIT endoscopies through the whole phases of endoscopy. The aim of this study is to assess knowledge and practice of nurses regarding to Gastrointestinal Endoscopy procedure and suggested nursing guideline.

**Methods:** The present study conducted in Gastrointestinal Endoscopy Unit at Zagazig University Hospitals. The study subject includes all available endoscopy 35 nurses. Three tools were used for collection of data, first questionnaire sheet to collect knowledge about socio demographic characteristics of study nurses and questions to assess nurses' knowledge regarding endoscopy as definition, structure, complications, nursing role, guidelines and types of endoscopy and her role in the pre-procedure, during procedure and post- procedure. Second tool was nursing attitude. Third tool was an observational checklist to assess nurses' practice in the pre procedure, during procedure and post procedure in endoscopy and Suggested nursing guideline.

**Results:** The study revealed that more than half of the nurses had their age equal 25 years or less and most of them had diploma degree and that more than half of nurses had their working experience range from 8 years to less than 28 years.

Most of studied nurses had satisfactory level of nurses' knowledge regarding Gastrointestinal Endoscopy. The majority of nurses had positive attitude. The majority of nurses had unsatisfactory nurses' level of practice before, during and after GI endoscope, discharge instructions and manual disinfection of endoscopy. Also, there were statistical significant relationship between total nurses' knowledge regarding GI endoscopy and their age, training and work duration and not significant with nurse qualification.

**Conclusion:** We can conclude that the nurse age, training and working duration are affecting the level of nurses' knowledge regarding gastrointestinal endoscopy including; general precautions, basic steps to clean and disinfection in endoscopy unit. The majority of nurses had positive attitude. While training and qualification can affect dealing with patients in addition to nurses' level of practice before, during and after GI endoscope, discharge instructions and manual disinfection of endoscopy. So, we recommend adequate education and training of all nurses working with gastrointestinal endoscopy unit, with continuous evaluation of nurses' work practice. Periodic evaluation may help to take decision regarding training programs to increase theoretical and practical experience. Further studies are necessary to identify effects of educational programs on nurses' performance in gastrointestinal endoscopy unit.

## INTRODUCTION

Gastrointestinal (GI) endoscopy is an important tool for the identification and treatment of disorders of the gastrointestinal tract. Gastrointestinal endoscopy aids in there diagnosis and allows minimally-invasive therapeutic techniques to replace more aggressive

interventions such as surgery. These advances have reduced mortality and hospital stay of patients with gastrointestinal disorders undergoing these procedures. All staff in any setting where gastrointestinal endoscopy is performed must adhere to infection control principles that will maintain a safe environment, free from the possibility of spreading disease to patients and

co-workers. This is true regardless of the setting (Hospital Clinic, Ambulatory Care Center and Office), all types of gastrointestinal (GI) procedures performed. Nursing professionals who work in endoscopy units, providing patients with the care required before (pre procedure), during and after the procedure (post procedure), should have specific training to be able to carry out their duties in these units and to be able to manage the materials and equipment required, so that they may contribute to the success of these procedures. The specific knowledge and the development of the functions of these nurses aims to establish a close collaboration with the endoscopist to minimize the complications of the technique, reduce the patient's potential anxiety, and improve the applicability and results of gastrointestinal endoscopy [1]. Endoscopy nurses play a critical role in the provision of safe, high quality Preparing endoscopy. Nurses have many tasks. Preparing the endoscopic room, with the right instrument and necessary devices for examination of the upper or lower GI tract, is very important. It is also crucial that the nurse gives 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 must help the endoscopist and when indicated, the anesthetist. After the completion of the procedure, the nurse must carry-on with the reprocessing of the endoscopic instrument and of the devices. Specialized and dedicated nurses who attended courses to keep up-dated are indispensable in this field because of the constant evolution of the endoscopic instruments and techniques. Possible complications must be kept in mind to be recognized and to be treated in an early phase. The endoscopy-trained nurse must know the anatomy of the examined segments but should however integrate this knowledge with the care of the patients. Nurses should also contribute to clinical research regarding endoscopy [2].

The Gastrointestinal Endoscopy Center at Zagazig University Hospital offers a highly specialized medical service for many clients suffering from different GIT problems. The monthly reports of that center indicated that during the first four months of 2013, more than 500 GIT endoscopy are performed each month (Registration Department of Gastrointestinal center, Zagazig University, 2013). This high frequency of GIT endoscopies necessitates the assistance of highly trained endoscopy nurses to perform her role for care of

patients undergoing different GIT endoscopies through the whole phases of endoscopy according to the American Society for Gastrointestinal Endoscopy 2013. These phases are: the pre-procedure: (the period of time prior to beginning of the endoscopy) the procedure :(the period from initiation of sedation and analgesia till the completion of the endoscopic intervention) and the post-procedure: (the period from the completion of the endoscopic intervention till patient discharge). So, we aimed to assess knowledge and practice of nurses regarding gastrointestinal endoscopy and suggested nursing guideline.

#### **Aim of the Work :**

To assess knowledge and practice of nurses regarding gastrointestinal endoscopy and suggested nursing guideline.

## **SUBJECTS AND METHODS**

This descriptive exploratory study was conducted in Endoscopy Unit at Zagazig University Hospitals. Field work of this study was executed in six months from January 2014 to the end of September, 2014.

#### **Subjects:**

All available endoscopy nurses (35) were recruited in the study setting . Newly graduated nurses less than one year experience were excluded.

**Tools for data collection:** three tools were used for data collection

**1-Nurses' knowledge interviewing questionnaire sheet :** it consisted of five parts:

**Part I :** Socio demographic characteristics of the nurses

**Part II:** Questions to assess nurses' knowledge regarding gastrointestinal endoscopy and nursing care for haematemesis cases in the form of open-end question and multiple choice question (MCQs).

**Part III:** Questions to assess nurses' knowledge regarding practice before, during and after Gastrointestinal Endoscopy. It included open-end question and (MCQs).

**Part VI:** Questions to assess nurses' knowledge regarding general precaution in endoscopy unit in the form of true/ false questions.

**Part V:** Questions to assess nurses' knowledge regarding basic steps to clean and disinfect GI Endoscopy in the form of true/ false questions.

Subjective nurses' attitude towards gastrointestinal endoscopy was assessed with questionnaire.

## 2- Nurses' practice observational checklist 1:

**Part I :** It is concerned with gastrointestinal endoscopy insertion. It is composed of 28 questions to cover four parts:-

- A- Before insertion of GI endoscope.
- B- During insertion of GI endoscope.
- C- After insertion of GI endoscope.
- D- Discharge instructions of GI endoscope.

**Part II:** It is concerned with a checklist to assess nurses' practice before reprocessing for GI Endoscopes. It is composed of 16 items to cover six parts:

- A- Pre-procedure, during and post procedure and pre-cleaning for infection control.
- B- Leakage Testing.
- C- Manual Cleaning
- D- High Level Disinfectant (HLD)
- E- Manual Disinfecting

The nurses had satisfactory level of practice when the total score equal or above 60 % and unsatisfactory if it is below 60%.

### Content validity and reliability :

It was established for to assure the content validity by a panel of 5 expertise's, in medicine and medical surgical nursing at Zagazig University, who revised the tools for clarity, relevance, comprehensiveness, understanding, and ease for implementation. According to their opinion minor modification were applied and reliability test was done for Thai stress test. The reliability analyses were conducted for the two scales and the total scale of the TST by using Cronbach's Alpha and Split Half Method (Odd-Even technique). The Alpha coefficient of the TST total test was 0.84. The values of the two scales were ranged from 0.83 to 0.86. The Split Half coefficient of the TST total test was 0.88. The values of the two scales were ranged from 0.85 to 0.91. This showed that the reliability coefficients are in the middle to high values.

The researcher met of them individually and explained the purpose of the study and their role in filling the questionnaire sheet, then giving them the questionnaire sheet to fill it. Distribution of the questionnaire sheet was done every day at the end of morning shift for nurses working who was in the morning shift. The researcher was interviewed with each nurses

individually to fulfill the questionnaire sheet, the time required for completion of the questionnaire sheet was ranged from 30- 45 minutes. Observation was done continuously, every day. Each nurse was observed in the morning shift, for pre-procedure, during procedure and post-procedure GIT endoscopy, three times and the mean (SD) of these observation was done to assess her performance. Also the researcher was observing nurses practical skills about studied procedures. The time needed to complete the checklist ranged from 45 minutes-1 h.

### Statistical Design :

After the collection of data, Data were checked, entered and analyzed using SPSS version 19 for data processing. All the quantitative data were expressed as mean  $\pm$  SD and were analyzed by independent t-test, while, qualitative data were expressed as number and percentage and analyzed by Chi-square test. Statistic- P value of  $<0.05$  indicates significant results and  $P<0.001$  indicates highly significant results.

## RESULTS

The first part of our results was the socio demographic characteristics of the nurses in the study including; gender, age, work duration, years of experience, training and HBV vaccination (Table 1).

The second part of our results was concerned with the level nurses knowledge, most of the included nurses had satisfactory level of knowledge regarding gastrointestinal endoscopy and nursing care for heamatemesis cases (80%). Moreover, all of them were aware with purpose of endoscope (100%), more than three quarters of nurses had satisfactory level of total knowledge regarding practice before, during and after GI endoscopy. All nurses were aware with documenting emergency signs after GIT endoscopic insertion and knowledge about the guideline was satisfactory. All of them were aware with hand washing, wearing surgical gloves during endoscopy, continuous hand washing in contact with patients, keep clean and short nail, Needle must be put in container, avoiding smoking in endoscopy unit. Most of them (80%) had satisfactory level of knowledge regarding general precautions in endoscopy unit. All nurses had satisfactory level of knowledge regarding endoscope disinfection to kill bacteria, notification to maintenance unit in case of leakage after

disinfection, use cidex for disinfection and sterilization of endoscope. The majority of nurses (80%) had satisfactory level of knowledge regarding basic steps to clean and disinfect GI Endoscope. Otherwise, unsatisfactory level of knowledge were reported regarding use 70% of alcohol for disinfection and endoscope in disinfectant solutions for 10 min between patients (60%, 40%, respectively) (Tables 2,3,4,5).

The third part of our results was concerned with the attitude of the nurses towards the provided care in endoscopy unit. It revealed that The majority of nurses (80%) had satisfactory attitude, all of them agreed on the importance of providing comfortable place for patients, necessity to take HBV vaccine after injury by endoscope (100%). On the other hand, some of them showed unsatisfactory attitude regarding dealing with heamatemesis and melena of patients during endoscopy, satisfied when dealing with patients during endoscopy and necessity to explain to patients procedure of endoscope (Table 6).

The fourth part of our results showed that nurses' practice pre, during and post GI endoscopic procedure in addition to discharge instructions was satisfactory. Regarding assessing patient's demographic data, explanation of the procedure to patient, fulfilling the requested investigations, assessing the vital signs and time passed after the procedure, giving the patients the follow up plan and discharge instructions. Otherwise, the majority of studied nurses had unsatisfactory nurses' level of practice pre, during and post GI endoscopic procedure, apart from unsatisfactory level of practice as regarding how to prepare for of Sungkstagen intubation , perform enema at in the morning before procedure, insertion nasogastric tube at night before procedure, ensure blood transfusion, Provides emotional support, Connected with IV line, keep patient in a side lying position, documents patient's level of consciousness, checks patient swallowing and record the discharge of the patient from hospital (alone or accompanied), mention the type diet, common symptoms and complications (Tables 7,8,9,10).

Also, this part illustrated the practice of the nurses regarding infection control measures, manual cleaning and disinfection of the endoscope, all the nurses had satisfactory level of practice before reprocessing for GI Endoscopes for

wearing the mask and sterile gloves and performing leakage testing, immersing endoscope in enzymatic detergent, manual disinfecting of endoscope, removing all valves and removable parts, storing the endoscope with the angulations locks, hanging the endoscope with the insertion tube, ensure the insertion tube is set to maximum flexibility and disinfected scopes were properly hunged and dried. While almost all nurses had unsatisfactory level of applying infection control measures regarding wearing overshoes, perform pre-cleaning in the procedure room immediately after each procedure, wear appropriate (PPE), connect the leakage tester connector to the output socket on the light source, manipulate the angulations knobs and video switches and dry the leakage tester connector cap, practice for manual cleaning and disinfecting of endoscopy (Tables 11,12,13).

Over all we can say that nearly 70% of our nurses had satisfactory level of knowledge, 80% of nurses had satisfactory level of attitude. With unsatisfactory level of practice in most of them (94.3%) (Table 14).

The fifth part of our results demonstrated that there was significant relationship between total nurses' knowledge about GI endoscopy and their age, training and work duration (P value 0.004, 0.001 and 0.004 respectively) but there was no significant relation with nurse Qualification (p=0.342), while, nurses practice showed statistical significant relationship between total nurses' practice and the attendance to training and nurses qualification, dealing with patients with GI Endoscopy and their personal characteristics (P value 0.367, 0.074 and 0.367) and qualification (P= 0.001). While there was no statistical significance differences between nurses practice and their age years of experience (P value 0.119, 0.009, 0.399 respectively) and qualification (P= 0.001). In addition to the statistical significance relationship between total nurses' knowledge, practice in dealing with patient, endoscopy reprocessing and qualification (Tables 15,16,17). There was no significant association between nurses regard knowledge and Practice in dealing with the patients or with endoscope. Also, there was no statistical significant correlation between total nurses knowledge and practice their total (p value 0.152,0.409).

**Table (1):** Socio demographic characteristics of nurses including age, gender, work duration, years of experience, and their training

Socio demographic data		No (n=35)	%
Age (years)	>25-	18	51.4
	35-	7	20.0
	<45	10	28.6
	Mean± (SD) Rang	39.7± 11.6 26-58	
Sex	Female	35	100.0
	Male	0	0.0
Qualification	Diploma degree	28	80.0
	Associate degree	4	11.4
	Bachelor degree	3	8.6
Work conditions & training		No (n=35)	%
Work duration (years)	8-	18	51.4
	18-	7	20.0
	>28	10	28.6
	Mean± SD Range	19.8 ± 11.1 8-38	
Experience (years) per departments			
Haematemesis	<10years	7	20.0
	≥10years	7	20.0
GIT Endoscopy	<10years	11	31.4
	≥10years	7	20.0
	Mean SD Range	19.8 ± 11.1 8-38	
Training	Yes	14	40.0
	No	21	60.0
Vaccination (HBV)	Yes	32	91.4
	No	3	8.6

**Table (2):** Distribution of nurses' level of knowledge regarding Gastrointestinal Endoscopy and nursing care for haematemesis cases (N = 35)

Items	Unsatisfactory		Satisfactory	
	No	%	No	%
Definition of endoscope	7	20.0	28	80.0
Types of diagnostic GI Endoscopy	7	20.0	28	80.0
Types of therapeutic GI Endoscopy	11	31.4	24	68.6
Composition of endoscope	7	20.0	28	80.0
Uses of endoscope	0	0.0	35	100.0
Purpose of endoscope	0	0.0	35	100.0
Complications of endoscope	14	40.0	21	60.0
Complications of endoscope procedure	14	40.0	21	60.0
Nursing care for haematemesis cases	11	31.4	24	68.6
Nurse duties with patient during haematemesis	31	88.6	4	11.4
keeping open airway during haematemesis	7	20.0	28	80.0
<b>Total knowledge</b>	<b>7</b>	<b>20.0</b>	<b>28</b>	<b>80.0</b>

**Table (3):** Distribution of nurses' level of knowledge regarding Practice before, during and after Gastrointestinal Endoscopy (N=35)

Items	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>Gastrointestinal Endoscopy</b>				
Before GIT EI	11	31.4	24	68.6
During GIT EI	4	11.4	31	88.6
After GIT EI	7	20.0	28	80.0
<b>Total knowledge</b>				
Knowledge about guideline	8	22.9	27	77.1
Nursing guidelines after GIT endoscope insertion	4	11.4	31	88.6
Documented emergency signs after GIT endoscope insertion	0	0.0	35	100.0
Written nursing guidelines in GIT endoscopy unit	18	51.4	17	84.6
<b>Total knowledge</b>	<b>10</b>	<b>28.6</b>	<b>25</b>	<b>71.4</b>

**Table (4) :** Distribution of nurses knowledge regarding general precautions in endoscopy unit (N = 35)

Items	Unsatisfactory		Satisfactory	
	No	%	No	%
Hand washing after toilet	0	0.0	35	100.0
Hand washing before drinking and eating	0	0.0	35	100.0
Hand washing after contact with blood & discharge	0	0.0	35	100.0
Hand washing after contact with infected articles	0	0.0	35	100.0
Hand washing after each patient	0	0.0	35	100.0
Hand washing after each endoscopy	0	0.0	35	100.0
Nurse can transmit infection to patients	0	0.0	35	100.0
Wear mask during endoscopy	4	12.9	31	87.1
Wear gown during endoscopy	7	20.0	28	80.0
Wear surgical gloves during endoscopy	0	0.0	35	100.0
Wear thick gloves in contacts with infected blood	11	31.4	24	68.6
Continuous hand washing in contact with patients	0	0.0	35	100.0
Wear gloves in contact with blood and discharges	0	0.0	35	100.0
Necessary hand washing after glove removal	0	0.0	35	100.0
Wear clean uniform	31	87.1	4	12.9
Keep clean and short nail	0	0.0	35	100.0
Needle must be but in contender	0	0.0	35	100.0
Follow up every 6 months	18	51.4	17	48.6
Not necessary avoiding patients with influenza	7	20.0	28	80.0
Eating and drinking in endoscopy unit	24	68.6	11	31.4
Avoid smoking in endoscopy unit	0	0.0	35	100.0
<b>Total knowledge</b>	<b>7</b>	<b>20.0</b>	<b>28</b>	<b>80.0</b>

**Table (5):** Distribution of nurses knowledge regarding basic steps to clean and disinfect GI Endoscope (N = 35)

Items	Unsatisfactory		Satisfactory	
	No	%	No	%
Disinfect endoscope to kill bacteria	0	0.0	35	100.0
Uses of disinfectants prevent infection	7	20.0	28	80.0
Clean endoscope with soaps before immersing in disinfectants	11	31.4	24	68.6
Remove valves of endoscope and clean separately	11	31.4	24	68.6
Use 70% alcohol for disinfection	21	60.0	14	40.0
Rinse endoscope with water from inside and outside after disinfection	4	11.4	31	88.6
Put endoscope in disinfectant solutions for 30 min in beginning and end of the day.	11	31.4	24	68.6
Use k-y Jelly or others for oiling valves	7	20.0	28	80.0
Notification to maintenance unit in case of leakage after disinfection	0	0.0	35	100.0
Use cidex for disinfection and sterilization of endoscope	0	0.0	35	100.0
Put endoscope in disinfectant solutions for 10 min between patients	14	40.0	21	60.0
<b>Total knowledge</b>	<b>7</b>	<b>20.0</b>	<b>28</b>	<b>80.0</b>

**Table (6) :** Distribution of attitude of nurses providing care in endoscopy unit. (N = 35)

	Attitude					
	Agree		Sometimes		Not agree	
	No	%	No	%	No	%
Importance of providing comfortable place for patients	35	100.0	0	0.0	0	0.0
Dealing with patients not affect my psychological state	18	51.4	10	28.6	7	20.0
Not necessary to take HBV vaccine after injury by endoscope	35	100.0	0	0.0	0	0.0
fairness of endoscopic patient blocks delay providing nursing care	25	71.4	10	28.6	0	0.0
Working not turn me harder	18	51.4	10	28.6	7	20.0
Hand washing only kill any organism	35	100.0	0	0.0	0	0.0
Sympathized with endoscopic patients with advanced cases	31	88.6	4	11.4	0	0.0
Necessary to leave endoscope in cidex for 20 minutes	35	100.0	0	0.0	0	0.0
Necessary to hand washing before dealing with patients	35	100.0	0	0.0	0	0.0
Patient has right to know used articles and endoscope environment	25	71.4	4	11.4	6	17.1
Necessary to explain to patients procedure of endoscope	18	51.4	7	20.0	10	28.6
Disinfecting tongue depressor not transmit infection	31	88.6	4	11.4	0	0.0
Not satisfied when deal with melena of patients during endoscopy	25	71.4	10	28.6	0	0.0
Necessary to clean endoscope with water and soap before but in cidex	28	80.0	0	0.0	7	20.0
I feel happy in case of stopping of patients bleeding	28	80.0	7	20.0	0	0.0
Important to improve nurse , patients and relative relationships	21	60.0	7	20.0	7	20.0
Not satisfied when deal with heamatemesis of patients during endoscopy	25	71.4	10	28.6	0	0.0
<b>Total attitude</b>	<b>+ve</b>				<b>-ve</b>	
	<b>28</b>		<b>80.0</b>		<b>7 20.0</b>	

**Table (7):** Distribution of nurses' level of practice before GI endoscope insertion (N = 35)

A) Pre –Procedure	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>General preparation</b>				
Introduce herself to the patient	35	100.0	0	0.0
Assess Patient's demographic data	0	0.0	35	100.0
Assess Allergic to medication	35	100.0	0	0.0
Assess Patient's past history	0	0.0	35	100.0
Assess Patient's History about reason(s)for endoscope	0	0.0	35	100.0
Assess Patient's Vital signs and pulse oximetry	11	31.4	24	68.6
Explains procedure to patient prior to start it	0	0.0	35	100.0
Discusses guidelines given to patient before the procedure	0	0.0	35	100.0
Obtains an informed consent from patient	18	51.4	17	48.6
Fulfilled every requested lab and radiographic investigations.	0	0.0	35	100.0
Ensures removal of denture, jewels, nail varnish and make up.	11	31.4	24	68.6
Ensures that the patients wears gown.	18	51.4	17	48.6
Administers analgesic, sedation, anti-anxiety agents and medications	18	51.4	17	48.6
<b>Specific preparation of upper GIT</b>				
Ensure fasting for 6-8 hours before the procedure.	11	31.4	24	68.6
Ensure fasting extra hours in case of 'occlusion of oesophagus'.	0	0.0	35	100.0
<b>Specific preparation of lower GIT:</b>				
Ensure oral liquid diet for 24 hours before procedure.	0	0.0	35	100.0
Nasogastric tube at night before procedure.	18	51.4	17	48.6
Administer Rectal suppositories last night before procedure as described.	0	0.0	35	100.0
Perform Enema at the morning before procedure.	35	100.0	0	0.0
Perineal care after enema & chaving.	35	100.0	0	0.0
<b>Specific preparation of Endoscopy</b>				
Ensure Prepares for blood transfusion	18	51.4	17	48.6
Ensure Prepares for Sungkstagen intubation	35	100.0	0	0.0
<b>Total practice score</b>	<b>31</b>	<b>88.6</b>	<b>4</b>	<b>11.4</b>

**Table (8) :** Distribution of nurses' level of practice during GI endoscope (N = 35)

During procedure :	Unsatisfactory		Satisfactory	
	No	%	No	%
Positioning the patient Properly according to each procedure.	35	100.0	0	0.0
Explain each step during procedure.	0	0.0	35	100.0
Provides emotional support.	18	51.4	17	48.6
Regular checks vital sign during procedure.	11	31.4	24	68.6
Observes patient closely.	35	100.0	0	0.0
Connected with IV line.	18	51.4	17	48.6
Perform suctioning from mouth in case of secretions.	35	100.0	0	0.0
Records medication, vital signs, time of start and end of the procedure,- reports of the procedure	11	31.4	24	68.6
<b>Total practice score</b>	<b>30</b>	<b>85.7</b>	<b>5</b>	<b>14.3</b>

**Table (9) :** Distribution of nurses' level of practice after GI endoscope (N = 35)

Post-procedure	Unsatisfactory		Satisfactory	
	No	%	No	%
Keep patient in a side lying position	35	100.0	0	0.0
Documents patient's level of consciousness.	35	100.0	0	0.0
Assess vital signs every 30 minutes for 2 hours.	0	0.0	35	100.0
Report abnormalities immediately.	11	31.4	24	68.6
Checks patient is swallowing.	35	100.0	0	0.0
Record discharge of patient from hospital (alone or accompanied).	18	51.4	17	50.6
Record patient's discharge as regard to:				
Time after the procedure by two to three hours.	0	0.0	35	100.0
Physical condition.	11	31.4	24	68.6
Psychological condition.	35	100.0	0	0.0
Complications detected or not.	11	31.4	24	68.6
<b>Total practice score after endoscopy</b>	<b>31</b>	<b>88.6</b>	<b>4</b>	<b>11.4</b>

**Table (10) :** Distribution of nurses' level of practice regarding Discharge instructions (N= 35)

Discharge instructions	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>Notified the patient about :</b>				
Notifies the patient about the follow up plan.	0	0.0	35	100.0
Types of activities	30	85.7	5	4.3
The types of diet	35	100.0	0	0.0
Medications schedule.	18	51.4	17	48.6
Common symptoms and sensations	35	100.0	0	0.0
The referral place.	31	88.6	4	11.4
Signs of complications	35	100.0	0	0.0
Give the patient written discharge instruction	0	0.0	35	100.0
<b>Total practice score</b>	<b>30</b>	<b>95.7</b>	<b>5</b>	<b>4.3</b>



**Table (11) :** Distribution of nurses' level of practice regarding infection control for GI Endoscopes (N = 35)

A):Apply Infection Control Pre –Procedure	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>Nurses application of ICP before procedure:-</b>				
Wear overshoes.	35	100.0	0	0.0
Wearing the mask and goggles	0	0.0	35	100.0
Wash hands	30	85.7	5	4.3
Wear sterile gown	11	31.4	24	68.6
Wear sterile gloves	0	0.0	35	100.0
<b>During Procedure</b>				
Adherence to infection control principles restrictedly	35	100.0	0	0.0
<b>Post procedure Pre-Cleaning:</b>				
Perform pre-cleaning in the procedure room immediately after each procedure.	35	100.0	0	0.0
Wipe the insertion tube with an enzymatic detergent	34	97.1	1	2.9
Suction enzymatic detergent through the instrument.	35	100.0	0	0.0
Suction air through the instrument channel for 10 seconds.	30	85.7	5	4.3
Attach the air/water channel cleaning adapter	35	100.0	0	0.0
Use the special cleaning adapters as recommended.	35	100.0	0	0.0
Discard disposable valves.	30	85.7	5	4.3
Place valves and removable parts in beaker of detergent solution.	33	94.3	2	5.7
Inspect and attach the water resistant cap	35	100.0	0	0.0
Cover the endoscope and transport to the reprocessing area.	11	31.4	24	68.6
<b>Leakage Testing:</b>				
Perform leakage testing.	0	0.0	35	100.0
Wear appropriate protective pariar (PPE).	35	100.0	0	0.0
Fill basin for leakage testing.	35	100.0	0	0.0
Connect the leakage tester connector to the output socket on the light source.	35	100.0	0	0.0
Check that the leakage tester is emitting air .	11	31.4	24	68.6
Attach the leakage tester's connector to the water resistant cap and endoscope is pressurized.	34	97.1	1	2.9
Immerse the entire endoscope in the water	33	94.3	2	5.7
Manipulate the angulations knobs and video switches	35	100.0	0	0.0
Remove the endoscope from the water.	34	97.1	1	2.9
Disconnect the leakage tester for the air supply	33	94.3	2	5.7
Disconnect the leakage tester from the water resistant cap.	34	97.1	1	2.9
Dry the leakage tester connector cap.	35	100.0	0	0.0

**Table (12):** Distribution of nurses' level of practice for manual Cleaning of endoscope (N= 35)

Manual Cleaning:	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>Manual cleaning :</b>				
Immerse endoscope in enzymatic detergent	0	0.0	35	100.0
What type of enzymatic detergent is being used?	35	100.0	0	0.0
Does the staff have manufacturer's instructions	35	100.0	0	0.0
Is enzymatic detergent beginning diluted	31	88.6	4	11.4
Is the sink marked for proper level of water	35	100.0	0	0.0
Is the enzymatic detergent freshly prepared	34	97.1	1	2.9
Brush biopsy/suction channel in the insertion tube	34	97.1	1	2.9
Brush biopsy/suction channel in the universal cord	34	97.1	1	2.9
Brush suction valve housing and instrument channel	34	97.1	1	2.9
Use suction channel cleaning adapter	34	97.1	1	2.9
Attach the channel plug and injection tube	34	97.1	1	2.9
Use all channel cleaning adapters and brushes.	35	100.0	0	0.0
Disconnect the channel plug, injection tube	34	97.1	1	2.9
Soak the endoscope in the detergent solution.	35	100.0	0	0.0
Brush and flush the valves.	35	100.0	0	0.0
Thoroughly dry the exterior of the endoscope.	34	97.1	1	2.9
Inspect the endoscope for residual debris.	35	100.0	0	0.0
Center use single use scope cleaning brushes?	35	100.0	0	0.0
Center use re-usable scope cleaning brushes	34	97.1	1	2.9
Prepare compatible valves and removable parts	34	97.1	1	2.9
<b>High Level Disinfectant (HLD) :</b>				
Name and type of high level disinfectant:	35	100.0	0	0.0
Verify the correct exposure time for HLD	35	100.0	0	0.0
Verify the temperature required	35	100.0	0	0.0
Center has a copy of all written mfr instructions	35	100.0	0	0.0
Confirm the HLD is labeled	35	100.0	0	0.0
HLD is discarded at the maximum days of re-use	35	100.0	0	0.0

**Table (13) :** Distribution of nurses' level of practice for manual Disinfecting of endoscope (N = 35)

Manual Disinfecting:	Unsatisfactory		Satisfactory	
	No	%	No	%
Test the HLD (MEC) with each use.	35	100.0	0	0.0
Immerse the entire endoscope in a basin of HLD	30	85.7	5	14.3
Attach the adapters	33	94.3	2	5.7
Flush the HLD solution to purge air	35	100.0	0	0.0
Disconnect the channel plug, injection tube,	35	100.0	0	0.0
Soak the endoscope in HLD solution	33	94.3	2	5.7
Flush air thru the endoscope channels	35	100.0	0	0.0
Immerse the endoscope in fresh sterile water.	35	100.0	0	0.0
Soak the valves and removable parts in HLD .	33	94.3	2	5.7
Confirm that endoscopes and channels are rinsed with sterile or filtered water after exposure to HLD, then with alcohol rinse per mfr instructions, and then forced air for drying.	35	100.0	0	0.0
<b>Rinsing:</b>				
Test the HLD efficacy	33	94.3	2	5.7
Properly place the endoscope in the basin	35	100.0	0	0.0
Attach the scope connectors/adapters to the AER	35	100.0	0	0.0
Run the AER and ensure the endoscope is soaked	33	94.3	2	5.7
Remove the endoscope promptly after cycle completed	35	100.0	0	0.0
Perform the terminal steps does not perform	33	94.3	2	5.7
The elevator-wire channel require manual disinfecting	35	100.0	0	0.0
<b>Endoscope Handling:</b>				
Ensure that the insertion tube is not coiled	35	100.0	0	0.0
Position the control knobs upright	33	94.3	2	5.7
Transport the endoscope using both hands.	33	94.3	2	5.7
<b>Endoscope Storage:</b>				
Ensure that an alcohol flush was performed	35	100.0	0	0.0
Remove all valves and removable parts	0	0.0	35	100.0
Store the endoscope with the angulation locks	0	0.0	35	100.0
Ensure the insertion tube is set to maximum flexibility.	0	0.0	35	100.0
Hang the endoscope with the insertion tube	0	0.0	35	100.0
Disinfected scopes are properly hung and dried	0	0.0	35	100.0
<b>Grand repos practice score</b>	<b>33</b>	<b>94.3</b>	<b>2</b>	<b>5.7</b>

**Table (14) :** Total knowledge, attitude and practice of nurses. (N = 35)

	Unsatisfactory		Satisfactory	
	No	%	No	%
<b>Total knowledge</b>	8	22.9	27	77.1
<b>Total attitude</b>	7	20.0	28	80.0
<b>Total practice</b>	33	94.3	2	5.7

**Table (15) :** Relation between total nurses' level of knowledge regarding GI endoscopy and their socio demographic characteristics, training, qualification and work duration. (N= 35)

Socio demographic data	Unsatisfactory No=8		Satisfactory No.=27		X2	P
	No	%	No	%		
<b>Age (years)</b> 25-	0	0.0	18	66.7	11.05	0.04
35-	4	50.0	4	14.8		
45-	4	50.0	5	18.5		
<b>Training</b> Yes	0	0.0	14	51.9	14.97	<0.001
No	8	100.0	3	48.1		
<b>Qualification</b>					2.15	0.342
Diploma degree	8	100.0	21	77.8		
Associate degree	0	0.0	4	14.8		
Bachelor degree	0	0.0	2	7.4		
<b>Work duration (years)</b>					11.05	0.04
8-	0	0.0	18	66.7		
18-	4	50.0	4	14.8		
28-38	4	50.0	5	18.5		

**Table (16):** Relation between total nurses' level of practice regarding dealing with patients with GI Endoscopy and their some personal data. (N= 35)

Personal characteristic	Unsatisfactory No.=31		Satisfactory No.=4		X2	P
	No	%	No	%		
<b>Age (years)</b> 25-	14	45.2	4	100.0	4.27	0.119
35-	7	22.6	0	0.0		
45	10	32.3	0	0.0		
<b>Training</b> Yes	10	32.3	4	100.0	6.77	0.09
No	21	67.7	0	0.0		
<b>Qualification</b>					27.59	<0.001
Diploma degree	28	90.3	0	50.0		
Associate degree	3	9.7	1	25.0		
Bachelor degree	0	0.0	3	25.0		
<b>Work duration (years)</b>					1.83	0.399
8-	15	48.4	3	75.0		
18-	6	19.4	1	25.0		
28-38	10	32.3	0	0.0		

**Table (17) :** Relation between total nurses' level of practice regarding reprocessing GI Endoscope and their socio demographic characteristics. (N= 35)

Personal data	Unsatisfactory No.=33		Satisfactory No.=2		X <sup>2</sup>	P
	No	%	No	%		
<b>Age (years)</b> 25-	16	48.5	2	100.0	2.0	0.367
35-	7	21.2	0	0.0		
45-	10	30.3	0	0.0		
<b>Training</b> Yes	12	36.4	2	100.0	3.18	0.074
No	21	63.6	0	0.0		
<b>Qualification</b>					22.63	<0.001
Diploma degree	27	81.8	0	0.0		
Associate degree	5	15.2	0	0.0		
Bachelor degree	1	3.0	2	100.0		
<b>Work duration (years)</b>					2.0	0.367
8-	16	48.5	2	100.0		
18-	7	21.2	0	0.0		
28-38	10	30.3	0	0.0		

## DISCUSSION

Endoscopy nurses play a critical role in the provision of safe, high quality endoscopy. Nurses have many tasks. Prepare the endoscopic room with the right instrument and necessary devices for examination of the upper or lower GI tract, is very important. It is also crucial that the nurse gives 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 must help the endoscopist and, when indicated, the anesthetist. After the completion of the procedure, the nurse must carry-on with the reprocessing of the endoscopic instrument and of the devices [2].

So, we attempted to assess knowledge and practice of nurses regarding Gastrointestinal Endoscopy and suggested nursing guideline. The study included 35 nurses working in endoscopic Units at Zagazig University Hospitals. Two types of tools were used for collection of data. Nurses' knowledge questionnaire sheet developed by the researcher to assess nurses' knowledge regarding endoscopy as definition, structure, complication, nursing role, guidelines, types of endoscopy and their role in the pre-procedure, during procedure and post-procedure phases. Observational checklist for endoscopy to assess nurses practice in the pre procedure, during procedure and post procedure phases.

All the nurses included in this study were females and their age ranged from 26-58 years. Robinson, Moreau and McCann [3] reported that the common pattern representing nurses' characterized

with increased number of female nurse as compared with males.

This study revealed that 80% had of them diploma degrees. More than half of nurses had experience of working in gastrointestinal endoscopy unit range from 8-28 years. Two fifths of them attended training courses during their work in GIT Endoscopy and the majority of them had got (HBV) Vaccine. Ramsey and his colleague [4] founded in their study that, most of the nurses did not receive any special education or in-service training about endoscope reprocessing practices. Most of the authors reported that education and training, including competency testing, at least annually. This helps professional nurse to keep up to date on the most recent developments in nursing and to be able to manage the demands of nursing practice. Educational program and training courses are two components of staff development. It is recommended that continuous education in nursing is needed to promote development of knowledge, skills and attitudes of nurses and to improve the quality of care given for their patients. Also the formed training courses played an important role in enhancing and updating nurses' knowledge and performance [5-8].

In this study four fifths of nurses had satisfactory level of nurse's knowledge regarding Gastrointestinal Endoscopy and nursing care for hematensis cases. The low level of knowledge in the initial baseline data knowledge assessment for the nurses is reflected on practice of the nurse [9]. These results are in agreement with those of Bertleff et al. [10] 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.

This study revealed that the more than three quarters of nurses had satisfactory level of total knowledge before, during and after gastrointestinal tract endoscope insertion and their knowledge about guideline was satisfactory. This agree with Majeski [6] who that state professional endoscopic nurses should performed the nurse observe the level of conscious until the sedation off and observe for the signs and symptoms of risks associated with GI endoscopy including abnormal reaction. These results disagree with Ali [11]. In Assuit University in Medical Audit of Upper (GIT) that show that the complications including haematemesis occurs during the procedure due to failure in the management of the upper GIT bleeding. The importance of the provided guidelines for nurses as well as competence of the procedure is required in some situations for the safety of the patient. They consider it as a "necessary evil" as reported by California Department of Health Services (CDHS) [12]. Therefore, if they are forced to do it, they need to know how to do it properly without harming themselves by follow the Universal precaution during the procedure. So, healthcare facilities and healthcare providers should establish procedures to ensure that reusable devices are, cleaned, and sterilized according to the manufacturer's instructions [13].

This study revealed that the majority of nurses had satisfactory level of knowledge regarding general precautions in endoscopy unit. Healthcare workers in developing countries inconsistently practice universal precautions and are regularly exposed to blood in the course of their work via needle stick injuries, splash incidents, and direct contact Cotton et al. [14], Kennedy et al. [15] and Sagoe et al. [16] examined occupational exposure to blood and risk of blood-borne virus infection among health-care workers.

The findings of the current study suggest that basic health care workers do not have sufficient knowledge of universal precautions. The majority of respondents (59%) did not answer universal precaution knowledge questions. Only 22% of the workers reported accurate knowledge of universal precautions as an effective barrier between care health workers and patients to prevent the transmission of infections. Hospital

based workers are washing their hands before and after attending to each patient. This hand washing practice was similar to that of western countries [17,18]. These levels of knowledge were very low compared to other parts of world [19].

This study revealed that the majority of nurses had satisfactory level of knowledge regarding basic steps to clean and disinfect GI Endoscope. Levels of knowledge among the nurses in the present study about (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). California Department of Health Services (CDHS) [12] stressed up on that nurses need to know how to do it properly without harming themselves by follow the Universal precaution during the procedure. This also was confirmed by Alfa et al. [13]. On the other hand this was not satisfactory for Ramsey and his colleagues [4], who recommended that, continues educational and training guideline program for endoscopies reprocessing will help in effective performance and control infection and they proved this by the significant improvements in the post-guidelines program phase.

This study revealed that the majority of nurses had a positive attitude towards providing care in endoscopy unit. These results are in agreement with those reported in a survey in the UK, which predicted an important albeit restricted role for nursing endoscopy. Clinicians from the UK considered diagnostic gastroscopy and sigmoidoscopy appropriate and diagnostic colonoscopy and therapeutic endoscopies inappropriate for NE. The UK audit however did not specifically investigate the attitude towards screening endoscopies [20].

The majority of nurses in our study had unsatisfactory level of practice before, during and after GI endoscope insertion, 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). Therefore, they have to know and follow the Universal precaution during the procedure. It was recommended that, healthcare facilities and healthcare providers should establish procedures and provide training for staff to ensure that reusable

devices are, cleaned, and sterilized according to the manufacturer's instructions [13]. Although, El-Shamaa [21] in her study, reported that, the majority of nurses have a satisfactory level of knowledge about universal Precautions and infection control policies in the endoscopic unite.

The lack in nurses' knowledge and practice for endoscope's contamination may lead to inadequate reprocessing. Carl, Alvarado and Mark [22] reported that the most common factors associated with disease transmission inadequate manual cleaning, inadequate exposure of surfaces to the disinfectant, inadequate rinsing and drying, and use of automated endoscope re-processors. Exogenous infections arise from microorganisms introduced into the patient's body by the flexible endoscope or by the accessories used in the procedure, such infections are preventable with strict adherence to accepted reprocessing guidelines [23]. Similar to this result, Weber and Rutala [24] reported that, outbreaks associated with flexible endoscopy have most often been associated with breaks in the cleaning and/or disinfection/sterilization stage of flexible endoscope reprocessing. The currently used reprocessing protocols provide a very narrow margin of safety and any slight deviation from the recommended steps may result in an increased risk of infection transmission by flexible endoscopes [25]. In the same consequence, and its relation to test leak, Canadian Standards Association [26] reported that, during the manual cleaning process, trained personnel should inspect devices for functionality and damage. It was recommended that, during the endoscopic procedure and while cleaning endoscopes, endoscopy personnel should wear protective attire (including gloves, masks, eye protection, and moisture-resistant gowns or aprons) as needed to protect themselves from exposure to blood and body fluids [13].

As regard, the nursing care for the patient undergoing upper endoscopy(pre, during and after a procedure) our results was in line with Majeski [6] who stated that professional endoscopic nurses should observe the level of consciousness until the sedation off and signs and symptoms of risks associated with upper GI endoscopy including abnormal reaction to sedatives, bleeding from biopsy accidental puncture of the upper GI tract swallowing difficulties, throat, chest, and abdominal pain that worsens, vomiting of bloody or passage of dark of stool, fever. However, it was reported that complications occurred 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%). Haematemesis which occurs during the procedure is due to failure in the management of the upper GIT bleeding. Myocardial infarction related to inappropriate selection of the patients and bad preparation before the procedure and respiratory arrest [11].

The present study demonstrated that total nurses' knowledge regarding GI endoscopy is significantly related to their age, training and work duration but it is not related to nurse qualification. There was statistically significant relationship between total nurses' practice regarding dealing with patients with GI Endoscopy, attendant to training and nurses qualification. While only training and qualification showed significant relation with the total nurses' practice regarding dealing with patients with GI Endoscopy, guidelines which improve nurses' knowledge and practice are attributed to the changes in nurses' practice which became adequate and based on satisfactory knowledge. Infection Control and Prevention is a critical part of the orientation continuing education and maintaining consistent excellence in [27,28].

Finally we 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. The majority of nurses had positive attitude. While training and qualification can affect dealing with the patients in addition to nurses' level of practice before, during and after GI endoscopy, discharge instructions and manual disinfecting of endoscopy. So, we recommend adequate education and training of all nurses working with gastrointestinal endoscopy unit, with continuous evaluation of nurses' work practice. Periodic evaluation may indicate interference with training programs should be included both theoretical and practical. Further studies are necessary to identify effects of educational programs on nurses' performance in gastrointestinal endoscopy unit.

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