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# ASSESSMENT OF NURSES' KNOWLEDGE AND PRACTICE TO GASTROINTESTINAL ENDOSCOPY CARE TO ENSURE SAFETY IN A MILITARY HOSPITAL

By
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**Abstract**

Gastrointestinal endoscopy (GIE) is effective and safe for the screening, diagnosis, and treatment of gastrointestinal disease. However, issues regarding nursing care of patients undergoing (GIE) and endoscope-transmitted infections are emerging. The study aimed to assess nurses' knowledge and performance related to care of patients undergoing upper gastrointestinal endoscopy and recommend guidelines to ensure those patients' safety. Design: A descriptive exploratory study was carried out to achieve the aim of this study. Setting: This study was conducted in gastrointestinal endoscopy unit at a military hospital. Subject: A convenient sample included 35 nurses who are the whole number of nurses working in gastrointestinal endoscopy unit. Tools: A structured self –administered questionnaire sheet, and nurses' performance observational checklists.

The results showed that less than half of the nurses had unsatisfactory knowledge related to care of patient undergoing gastrointestinal endoscopy and more than half of them had unsatisfactory level of practice, regarding their role in care of patient (pre, during, post) gastrointestinal endoscopy procedure and reprocessing of equipment.

**Keywords**: Nurses, Knowledge, Performance, Endoscopy, Patient's safety.

## Introduction

Undoubtedly, the gastrointestinal diseases and gastroenteritis are increasing Worldwide including Egypt with the climatic changes (Morsy *et al,* 2023). Acute upper gastrointestinal bleeding, overall the United Kingdom Hospitals caused mortality rate up to 10% (Lau *et al,* 2020). Gastrointestinal tract (GIT) endoscopy is one of the most performed invasive procedures in the clinical practice for either diagnostic and/or therapeutic purposes to simplify imaging, assessing, and treating GIT infectious diseases, which were categorized as the upper or lower endoscopy (Gomez and, Llach, 2013).

Nurses are responsible for many activities prior to an endoscopy examination, includeng preparing the endoscopic room with the appropriate instruments and devices for the examination of upper or lower gastrointestinal tract (Mohamed, 2018). 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. Besides, the nurse assisted the endoscopist and anesthetist when needed during the procedure. He/she must continue with the reprocessing of the endoscopic equipment and devices after the procedure completing (AbdElgaphar *et al,* 2019).

Endoscopic retrograde chalongio pancreatography (ERCP) was first introduced as a realistic endoscopic procedure in the early 1970s (Kozarek, 2017). Since then, the diagnostic and therapeutic clinical applications have changed significantly in parallel with improvements in noninvasive and invasive visualization of the biliary and pancreatic ductal systems (Subhash *et al,* 2021). What was once predominantly a combined diagnostic endoscopic and radiographic modality, ERCP has taken on new roles as a more sophisticated diagnostic and therapeutic set of procedures including direct visualization of the ducts, tissue interrogation and sampling, and treatment of a wide variety of biliary and pancreatic disorders (Kim and Carr-Locke, 2015).

The nurse endoscopist should offer a holistic package of care to patients undergoing the GI

endoscopy, encompassing the psychological, physiological, and sociological needs of the patient. Also, the nurse already has the skills and knowledge to assess the needs of each individual attending for endoscopy from admission to discharge. She provides appropriate care before, during and after the procedure, gives advice on admission and discharge, and ensures safe delivery of endoscopic equipment has access to relevant members of the multidisciplinary team (Campo et al, 1999). Also, the nurse must teach some important points for the patient and family members for manage GIT disease successfully after endoscopy, patient was instructed about the factors that would help or aggravate condition, reviewed the information about medication to be taken at home and instructs him to avoid certain medications and foods that increase symptoms**.** It is important to counsel the patient about dietary and other lifestyle measures. The nurse reviewed with the patient and his/her family the signs and symptoms of complications to be reported. The nurse should reinforce the importance of follow-up care after upper GIT endoscopy (Anwar *et al,* 2018).

The safety of the patient must be paramount, and each patient has the right to be treated by staff that are appropriately trained and are competent to carry out procedures as clinically indicated. Therefore, endoscopy departments must have adequately trained and well trained staff to ensure that patients were not suffers from any risk (Neumann and Campbell, 20014).

Study significance: Endoscopy plays an important role in the diagnosis and treatment of digestive diseases. The benefits are maximized when procedures are performed at an optimal level of quality. Gastroenterology nurses work with a wide range of patients from those suffering from minor and acute gastrointestinal (GI) disorders through the chronic conditions to those requiring major surgery. Nurses' staff requirements for the performance of the GI endoscopy should be based on what is needed to ensure safe and proficient performance of the procedure. Endoscope procedures are becoming more and more complex and therefore the need for highly qualified nurses 'staff, those follow the evidence base guidelines are increasing. Having trained nurses available will improve services' delivery and patient safety.

## Materials and Methods

Technical design: The study included research design, setting, subjects, inclusion and exclusion criteria and tools for collecting data.

Research design: Descriptive exploratory study was carried out to achieve the aim of this study. Setting*:* This study was conducted in the Gastrointestinal Endoscopy Unit in A Military Hospital. A convenient sample included 35 nurses who were the whole number of nurses working in gastrointestinal endoscopy unit were recruited in this study.

Tools for data collection included first and second tool. First tool: The tool was divided into two parts: First one included the sociodemographic characteristics of nurses, such as their sex, age, education level, experience's years, previous training courses…etc. Second part: Assessment of their knowledge related to care of patients undergoing gastrointestinal (GIT) endoscopy gastrointestinal endoscopy.

Questionnaire consisted of 27 questions as multiple-choice questions, true/false questions, and complete questions as the following: 1- Definition and indications of upper GIE and ERCP (13questions), 2- Complications, patient care during anesthesia and laboratory investigation of upper GIT endoscopy and ERCP (7questions), & 3- Sterilization and storage of GI endoscopy (7 questions). These were adopted by American Society for Gastrointestinal Endoscopy (ASGE), 2012; Society of Gastroenterology Nurses and Associates (SGNA), 2016; National Health Service, 2014) and modified to achieve the Egyptian objectives. Second one included observational checklist to assess nurses' performance related to management of patients undergoing gastrointestinal endoscopy, and the adopted questionnaire.

This tool was divided into two sheets: First observational checklist concerned with assessment of nurses' performance related to management of patients undergoing gastrointestinal (GIT) endoscopy, formulated to assess nurses' performance related to these dimensions: 1- Pre-procedure included general preparation, preparation of equipment, patient preparation, and drug preparation, 2- During procedure, & 3- Post procedure included post procedure nursing care, health education to patient and his family, and documentation after procedure

Second observational checklist concerned with audited nurses' preparation and reprocessing of GIT endoscopy which included: 1- Immediately following completion of endoscopy procedure, 2- Cleaning procedure, 3- Disinfection /sterilization, 4- Accessories (e.g., biopsy forceps, brushes) that break the mucosal barriers, 5- Automated Endoscope Preprocessor (AER), & 6- Endoscope drying and storage.

Operational design included preparatory phase, pilot study, validity and reliability, and fieldwork: A -Preparatory phase: It included reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazines to become acquainted with research problem and to develop study tools. B - Pilot study: A pilot study was conducted to test feasibility and applicability of the study tools used in this study. It was carried out on 10 % of total study subjects (4 nurses). C -Validity and Reliability: Validity test of face and content validity of the questionnaire and the two observational checklists was assessed by three experts in the field of Nursing, and Tropical Medicine. Face validity aimed at inspecting the items to determine whether the tools measure what supposed to measure. Content validity was conducted to determine whether the content of tools cover the aim of the study. Reliability analysis for the research purpose the reliability test was done to determine how strongly the attributes were related to each other. The reliability test was done by using the internal consistency reliability test (Cronbach's alpha). The reliability coefficients for each questionnaire were as followed: 1- Knowledge questions: cronbach's alpha = 0.844, 2- Performance observational checklist: Cronbach's alpha = 0.954, & 3- Reprocessing observational checklist: Cronbach's alpha = 0.948. D- Field work: To carry out the study, approval was obtained from the Hospital Directors, Directors of Gastrointestinal Endoscopy Unit and the Hospital Nursing Director at the Military Hospital. A letter was issued to them from the Military Medical Academy explained the aim of the study to obtain permission and cooperation to conduct the study. Data was collected in four months. Each nurse was observed by the authors during performance of any procedure when dealing with gastrointestinal endoscopy about 30-45 minutes.

Administrative design and Ethical consideration: An official permission to conduct the proposed study was obtained from The Military Institute of Health and Epidemiology, Military Medical Academy. Permission was obtained from the Hospital General Manager to start the study. Participation in the study was voluntary and based on the nurse's agreement to participate by verbal approval after reading; the ethical issue considerations (Helsinki Declaration, 2008) included the purpose and nature of the study, stating the confidentiality of the information was grunted, that participation is with no risk.

Statistical analysis: Data were revised, coded, tabulated and introduced to a PC using statistical package for social sciences (IBM SPSS 20.0). Data was presented and suitable analysis was done according to the type of data obtained for each parameter.

Questionnaire scoring system of nurses' knowledge: Correct =1, and Incorrect" =0

All items related to certain dimension were summed up and a mean score was calculated for each dimension, total mean score of knowledge questionnaire was calculated by summing up the score for all dimensions. Mean % Score= Mean Score/No. of Items*100.

Knowledge score was then converted into levels and ≤60.0% was considered as low level, 60.0%-75.0% was considered moderate level, and >75.0% was considered high Knowledge levels.

Scoring system: One mark was given for the practice item when correctly done and zero when practice item was not done or not correctly done. All items related to dimensions were summed up and a mean score was calculated for each, total mean score of observational checklist was calculated by summing up all dimensions score. Mean % Score= Mean Score/No. of Items*100

Practice score was then converted to practice levels: ≤60.0% was considered Low performance levels, 60.0%-75.0% was considered Moderate performance levels, >75.0% was considered High performance levels.

Descriptive Statistics: Mean ±SD), and ranges for parametric numerical data while the Median and Inter quartile range (IQR) for non-parametric data, Frequency and percentage of non-numerical data. Chi square test examined the relationship between two qualitative variables but when the expected count was less than 5 in more than 20% of cells; Fisher's Exact Test was used. Pearson Correlation Coefficient (r) measured the strength of a linear association between two quantitative variables. Also, it took a range of values from +1 to -1. A value of 0 = no association between the two variables. A value greater than 0 = positive association as the value of one variable increased, so value of the other variable. A value less than 0 = negative association; as the value of one variable increased, the value of the other variable decreases.

## Results

The results were shown in tables (12, 2, 3, 4, 5, 6, 7, 8, 9 & 10) and figures (1, 2, 3 & 4).

Table 1: Sociodemographic characteristics of nurses (n=35)

| Sociodemographic characteristics of nurses | | No. | Percent |
|---|---|---|---|
| Sex | Female | 29 | 82.9 |
| | Male | 6 | 17.1 |
| Age | < 25 years | 18 | 51.4 |
| | 25-30 years | 11 | 31.4 |
| | > 30 years | 6 | 17.1 |
| Age | | Mean ±SD | |
| | | 25.00 | 4.93 |
| Educational Level | Nursing Diploma | 18 | 51.4 |
| | Technical Nursing Institute | 11 | 31.4 |
| | Bachelor Degree of Nursing | 4 | 11.4 |
| | Post Graduate Studies | 2 | 5.7% |
| Years of Experience | < 5 years | 27 | 77.1 |
| | 5-<15 years | 8 | 22.9 |
| | 15 years or more | 0 | 0.0 |
| total | | 3.63 | 1.22 |

Nurses (82.9%) were females, and (51.4%) < 25 years, with mean ages of (25±4.93); nurses (51.4%) with nursing diploma, and (77.1%) have experience less than 5 years.

Table 2: Knowledge of nurses regarding care of patients undergoing gastrointestinal endoscopy (n=35).

| Dimensions | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square | P-value |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| Definition and uses of GIT endoscopy | 16 | 45.7 | 5 | 14.3 | 14 | 40.0 | 5.886 | 0.053 |
| Complications and patient care during anesthesia | 24 | 68.6 | 7 | 20.0 | 4 | 11.4 | 19.943 | 0.000** |
| Sterilization and storage of GIT endoscopy after use | 23 | 65.7 | 6 | 17.1 | 6 | 17.1 | 16.514 | 0.000** |
| Total Knowledge level | 18 | 51.4 | 11 | 31.4 | 6 | 17.1 | 6.229 | 0.044* |

*Significant at P<0.05, **Highly significant at P<0.01

Nurses (51.4%) had low total knowledge levels as to care of patients undergoing GIT endoscopy (68.6%) have low knowledge levels as to patient care during anesthesia, and (65.7%) have low knowledge levels as to sterilization and storage of GIT endoscopy after usage, but (45.7%) have low knowledge levels as to definition and GIT endoscopy usage.

Table 3: Nurses' knowledge mean score related to care of patients undergoing GIT endoscopy (n=35).

| Items | Mean ±SD |
|---|---|
| Definition and uses of GIT endoscopy | 65.63±16.66 |
| Complications and patient care during anesthesia | 55.71±19.29 |
| Sterilization and storage of GIT endoscopy after usage | 52.99±19.41 |
| Total Knowledge Percent score | 61.30±15.12 |

Total Knowledge scores (61.30±15.12), mean score (65.63±16.66). Complications & anesthesia patient caring (55.71±19.29), mean score (52.99±19.41).

Table 4: Total performance levels of nursing staff care of patients undergoing gastrointestinal endoscopy.

| Observational checklists of Nursing performance | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square test | P-value |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | | |
| Levels pre, during & post GIT endoscopy | 23 | 65.7 | 10 | 28.6 | 2 | 5.7 | 19.257 | 0.000** |
| Levels related to reprocessing endoscopy equipment | 21 | 60.0 | 12 | 34.3 | 2 | 5.7 | 15.486 | 0.000** |
| Total performance levels | 23 | 65.7 | 10 | 28.6 | 2 | 5.7 | 19.257 | 0.000** |

Nurses (65.7%) had care of patients undergoing GIT endoscopy, (65.7%) had low levels pre, during & post GIT endoscopy, but (60.0%) had low levels to reprocessing of endoscopy equipment. High significant difference in total levels as to care of patients (P<0.01), and high significant difference between them as to pre, during & post endoscopy, and reprocessing endoscopy equipment (P<0.01).

Table 5: Total performance mean % score of nursing staff as to care of patients undergoing GIT endoscopy.

| Observational checklists of Nursing performance | Mean ±SD |
|---|---|
| Mean % score pre, during &post gastrointestinal endoscopy | 49.86 ±17.27 |
| Mean % score related to reprocessing endoscopy equipment | 44.52 ±25.10 |
| Total performance mean % score | 48.45 ±18.65 |

Total nursing performance (48.45±18.65), with score pre, during & post GIT endoscopy (49.86±17.27), but as to reprocessing endoscopy equipment (44.52±25.10).

Table 6: Relation between nurses' performance in caring of patients (pre, during & post) GIT endoscopy and demographic characteristics.

| Nurses' demographic characteristics | | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square | P-value |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | | |
| Sex | Female | 18 | 62.1 | 9 | 31.0 | 2 | 6.9 | 0.799 FE (#) | 0.755 |
| | Male | 5 | 83.3 | 1 | 16.7 | 0 | 0.0 | | |
| Age | Less than 25 years | 13 | 72.2 | 4 | 22.2 | 1 | 5.6 | 2.440 FE (#) | 0.742 |
| | 25-30 years | 7 | 63.6 | 3 | 27.3 | 1 | 9.1 | | |
| | More than 30 years | 3 | 50.0 | 3 | 50.0 | 0 | 0.0 | | |
| Educational Level | Nursing Diploma | 14 | 77.8 | 3 | 16.7 | 1 | 5.6 | 16.190 FE (#) | 0.002** |
| | Technical Nursing | 9 | 81.8 | 2 | 18.2 | 0 | 0.0 | | |
| | Bachelor Degree | 0 | 0.0 | 4 | 100.0 | 0 | 0.0 | | |
| | Post Graduate | 0 | 0.0 | 1 | 50.0 | 1 | 50.0 | | |
| Experience years | < 5 years | 20 | 74.1 | 6 | 22.2 | 1 | 3.7 | 4.128 FE (#) | 0.148 |
| | 5-15 years | 3 | 37.5 | 4 | 50.0 | 1 | 12.5 | | |
| | >15 years | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Training courses | Yes | 0 | 0.0 | 1 | 33.3 | 2 | 66.7 | 11.809 FE (#) | 0.002** |
| | No | 23 | 71.9 | 9 | 28.1 | 0 | 0.0 | | |

Highly significant relationship between nurses' performance levels in pre, during & post GIT endoscopy, educational level and attendance of training courses (P<0.01). However, insignificant relationship between their performance levels in pre, during & post GIT endoscopy and sex, age, and experience's years (P>0.05).

Table 7: Relation between nurses' knowledge caring of GIT patients undergoing endoscopy & demographic characteristics:

| Nurses' demographic characteristics | | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square | P-value |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | | |
| Sex | Female | 15 | 51.7 | 9 | 31.0 | 5 | 17.2 | 0.296 FE(#) | 1.000 |
| | Male | 3 | 50.0 | 2 | 33.3 | 1 | 16.7 | | |
| Age | < 25 years | 10 | 55.6 | 5 | 27.8 | 3 | 16.7 | 4.374 FE(#) | 0.389 |
| | 25-30 years | 6 | 54.5 | 2 | 18.2 | 3 | 27.3 | | |
| | > 30 years | 2 | 33.3 | 4 | 66.7 | 0 | 0.0 | | |
| Educational Level | Nursing Diploma | 11 | 61.1 | 5 | 27.8 | 2 | 11.1 | 13.418 FE(#) | 0.010* |
| | Technical Institute | 7 | 63.6 | 4 | 36.4 | 0 | 0.0 | | |
| | Bachelor Degree | 0 | 0.0 | 2 | 50.0 | 2 | 50.0 | | |
| | Post Graduate | 0 | 0.0 | 0 | 0.0 | 2 | 100.0 | | |
| Experience years | Less than 5 years | 15 | 55.6 | 7 | 25.9 | 5 | 18.5 | 1.628 FE (#) | 0.558 |
| | 5-15 years | 3 | 37.5 | 4 | 50.0 | 1 | 12.5 | | |
| | 15 years or more | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Training courses | Yes | 0 | 0.0 | 1 | 33.3 | 2 | 66.7 | 5.253 FE (#) | 0.053 |
| | No | 18 | 56.2 | 10 | 31.2 | 4 | 12.5 | | |

Significant relationship between knowldege levels to caring of GIT patients & educational levels (P<0.05), But insignificant relationship between levels in caring of patients and sex, age, experience's years and training courses attendance (P>0.05).

Table 8: Relation between nurses' performance levels in reprocessing endoscopy equipment and demographic characteristics:

| Nurses' demographic characteristics | | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square | P-value |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | | |
| Sex | Female | 18 | 62.1 | 9 | 31.0 | 2 | 6.9 | 0.987 FE (#) | 0.757 |
| | Male | 3 | 50.0 | 3 | 50.0 | 0 | 0.0 | | |
| Age | < 25 years | 11 | 61.1 | 6 | 33.3 | 1 | 5.6 | 1.647 FE (#) | 0.902 |
| | 25-30 years | 7 | 63.6 | 3 | 27.3 | 1 | 9.1 | | |
| | > 30 years | 3 | 50.0 | 3 | 50.0 | 0 | 0.0 | | |
| Educational Level | Nursing Diploma | 12 | 66.7 | 5 | 27.8 | 1 | 5.6 | 9.218 FE (#) | 0.100 |
| | Technical Institute | 8 | 72.7 | 3 | 27.3 | 0 | 0.0 | | |
| | Bachelor Degree | 1 | 25.0 | 3 | 75.0 | 0 | 0.0 | | |
| | Post Graduate | 0 | 0.0 | 1 | 50.0 | 1 | 50.0 | | |
| Experience years | < 5 years | 18 | 66.7 | 8 | 29.6 | 1 | 3.7 | 2.895 FE (#) | 0.246 |
| | 5-15 years | 3 | 37.5 | 4 | 50.0 | 1 | 12.5 | | |
| | >15 years | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Training courses | Yes | 0 | 0.0 | 1 | 33.3 | 2 | 66.7 | 11.353 FE (#) | 0.002** |
| | No | 21 | 65.6 | 11 | 34.4 | 0 | 0.0 | | |

Highly significant between endoscopy processing and training courses (P<0.01). But, insignificant one between these levels and demographic characteristics (P>0.05).

Table 9: Relation between performance levels in care of patients undergoing GIT endoscopy and demographic characteristics.

| Nurses' demographic characteristics | | Low (<60%) | | Average (60%-75.0%) | | High (>75.0%) | | Chi square | P-value |
|---|---|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % | | |
| Sex | Female | 18 | 62.1 | 9 | 31.0 | 2 | 6.9 | 0.799 FE (#) | 0.755 |
| | Male | 5 | 83.3 | 1 | 16.7 | 0 | 0.0 | | |
| Age | < 25 years | 13 | 72.2 | 4 | 22.2 | 1 | 5.6 | 2.440 FE (#) | 0.742 |
| | 25-30 years | 7 | 63.6 | 3 | 27.3 | 1 | 9.1 | | |
| | > 30 years | 3 | 50.0 | 3 | 50.0 | 0 | 0.0 | | |
| Educational Level | Nursing Diploma | 14 | 77.8 | 3 | 16.7 | 1 | 5.6 | 16.190 FE (#) | 0.002** |
| | Technical g Institute | 9 | 81.8 | 2 | 18.2 | 0 | 0.0 | | |
| | Bachelor Degree | 0 | 0.0 | 4 | 100.0 | 0 | 0.0 | | |
| | Post Graduate | 0 | 0.0 | 1 | 50.0 | 1 | 50.0 | | |
| Experience years | < 5 years | 20 | 74.1 | 6 | 22.2 | 1 | 3.7 | 4.128 FE (#) | 0.148 |
| | 5-15 years | 3 | 37.5 | 4 | 50.0 | 1 | 12.5 | | |
| | >15 years | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Training courses | Yes | 0 | 0.0 | 1 | 33.3 | 2 | 66.7 | 11.809 FE (#) | 0.002** |
| | No | 23 | 71.9 | 9 | 28.1 | 0 | 0.0 | | |

Highly significant relationship between performance levels to care of patients undergoing GIT endoscopy, educational level and attendance of training courses (P<0.01), but insignificant relationship between levels in caring of patients undergoing GIT endoscopy and nurses demographic characteristics (P>0.05).

Table 10: Correlation between knowledge & performance dimensions score in care of patients undergoing GIT endoscopy.

| Variation | | Definition and uses | Complications & care during anesthesia | Endoscopy sterilization & storage oafter usage | Total knowledge score |
|---|---|---|---|---|---|
| Pre, during & Post GIT endoscopy | Pearson Correlation | .868 | .585 | .418 | .835 |
| | Sig. (2-tailed) | .000* | .000** | .012* | .000** |
| Reprocessing GIT equipment | Pearson Correlation | .897 | .569 | .526 | .878 |
| | Sig. (2-tailed) | .000** | .000** | .001** | .000** |
| Total performance score | Pearson Correlation | .911 | .601 | .472 | .881 |
| | Sig. (2-tailed) | .000** | .000** | .004** | .000** |

Highly statistically positive between nurses' total score and related dimensions (P<0.01).

## Discussion

Sheran (2017) mentioned the first step was use of the nursing process to help structure deliberations about when to pursue, justify, and target a challenge to existing law to create desired outcomes. The second step was the important process of building the case for change and the broad base of support needed to push against resistance to change. Neilson *et al.* (2020) in UK detected six key themes encapsulating GI patient experience procedures, which were evident for all procedures and across multiple procedure stages. These were used to inform the development of the Newcastle ENDOPREM™

In the present study, 35 of nurses (51.4%) were in the age category < 25 years with mean of (25±4.93) of whom (82.9%) were females. This agreed with Shah *et al.* (2021) in USA, who reported that the responding nurses were predominantly female (90.4%) The present study showed also that participants (51.4%) have nursing school diploma, experience years (77.1%) have less than five years of experience. Chan (2013) in Hong Kong reported that nurse educators played a vital role in identifying and implementing learning modifications in acquiring CT, besides focusing on innovative methods of teaching. As to training and attended training courses, the present study showed that the majority of them (91.4%) didn't attend any training courses while only (8.6%) attended training courses, all of the 3 nurses who attended the training courses ensured that these training courses were very beneficial. This agreed with Ragab *et al.* (2013) in Upper Egypt who, reported improvement in the practice scores levels obtained by nurses by training practice. Also, this agreed with Shereif *et al.* (2017) in the Nile Delta who, reported that nursing management intervention guidelines significantly improved nurses' performance for patients with GIT submitted to endoscopy.

In the present study, nursing in GI endoscopy units gave care patients with should be able to carry out their duties in these units, and were able to manage the materials and equipment required. The specific knowledge of them aimed to establish the close collaboration with the endoscopist to minimize the technique complications, to reduce the patients' potential anxiety, to improve applicability and ouitcome of the gastrointestinal endoscopy, and to get best patient satisfactions. This agreed with Gomez and Llach (2009) in Spain reported that the specific knowledge and the developmental functions of these nurses aimed to establish a close collaboration with the endoscopist to minimize the technical complications by reducing the patient's potential anxiety, and improving the applicability and the outcome of the gastrointestinal endoscopy.

The present study showed that the majority of the nurses (from 80% to 88.6%) were not aware about indications and contraindications of upper GI endoscopy. While more than half of them were aware about the

complications of upper gastrointestinal endoscopy, (48.6%) only were aware about the commonest methods used for anesthesia during GIE, and (5.7%) of them were able to differentiate between different methods used for anesthesia during GI endoscopy . Kim *et al.* (2014) in Australia reported that GI bleeding can be caused by a wide range of pathologies and they differ in onset, location, risk and clinical presentation. In patients with active GI bleeding who are unstable, acute resuscitation should precede any investigations. Accurate clinical diagnosis is crucial in determining the investigation of choice and specific treatment intervention ensuring that the complications including hematemesis occurred during the procedure due to failure in management of the upper GIT bleeding. They added the importance of the provided guidelines for nurses, as well as competence of procedure was required in some situations for the patient's safety. Amer *et al.* (2015) in Lower Egypt reported that more than three quarters of nurses had satisfactory level of knowledge about guidelines of GIT endoscope insertion.

In the present study, total knowledge related to care of patients undergoing gastrointestinal endoscopy was (51.4%) and mean % score was (61.30±15.73). This may be due lack of nurses' specific education related to GIT endoscopy. This was contradictory with Amer *et al.* (2015) they ensured that nurses' professionals who are working in the endoscopy unit 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 procedure. Hickey et al. (2018) in USA reported that Health literacy is strongly associated with patients being able to engage in complex disease management and self-care. They added that low health literacy was associated with older patients having limited education, lower income, chronic conditions, and those who are non-native English speakers. Approximately 80 million adults in the United States were estimated to have the limited or low health literacy.

In the present study, the pre gastrointestinal endoscopy preparation showed that nurses (54.3%) didn't wash their hands before the GIT patient's preparation. Kang and Hyun (2013) in Korea reported that patient evaluation and preparation was the first & mandatory step to ensure safety and quality of endoscopic procedures. Critical attention must be given to higher-risk patients with higher-risk condition undergoing the higher-risk procedure. This agreed with Moqbel *et al.* (2015) who found that most nurses had poor hand hygiene practice before the implementation of any program regarding the universal precaution practice.

In the present study, the nurses' practice in relation to patients' preparation showed that the majority of nurses had satisfactory level of practice such as introducing themselves, taking patient's history and revising the informed consent. However, their level was unsatisfactory as to explaining the procedure to the patients. Besides, the present results showed that almost they were able to perform nursing care items during endoscopy procedure except for (74.3%) who failed to regularly monitor patients' vital signs. Vargo *et al.* (2012) in USA reported that all patients undergoing endoscopy should be monitored, the frequency of which depending on procedural and patient factors (e.g., type of sedation, duration of procedure or patient's condition): a minimum monitoring must be performed before procedure, after sedatives, administration at regular intervals during procedure, during initial recovery, and before discharge.

The current study showed that most nurses didn't check skin color and pain reaction, as well as didn't perform patient and family teaching after conducting GI endoscopy. Majeski *et al.* (2009) in USA found that the esophageal perforation occurred during an esophagogastroduodenoscopy (EGD). The patient had an episode of retching and forceful vomiting just after an esophageal muco-

sal biopsy at the gastroesophageal junction and advice nurses must observe for signs and symptoms of risks associated with GI endoscopy. They concluded that a water-soluble esophageal swallow followed by a thin liquid barium swallow demonstrated that the esophageal perforation had sealed. The patient completely recovered with conservative medical therapy of clear liquid diet and antibiotics. Also, Amer *et al.* (2015) reported that the majority of nurses' level of practice regarding discharge instruction was unsatisfactory.

The current study showed that the majority of nurses (91.4%) didn't record the procedure, time of starting and ending, and (80%) didn't record patient status at the procedure end. However, more than half of them recorded other aspects such as medication given, equipment used and types of specimens. Nevertheless, the SGNA (2013) emphasized that all documentations must be clear and uniform reporting all details about the patient from the patient administration until his was discharged.

The present results regarding reprocessing of endoscopy equipment revealed that regarding reprocessing endoscopy equipment nearly half of the participants were able to do cleaning and disinfection procedure correctly but (100%) of the subjects didn't place the endoscope and accessories in a covered leak proof container after immediately use and flushing and they didn't rinse the endoscope and flush the channels following disinfection procedure. Also (85.7%) neither perform leakage test after each use nor identify damaged endoscopes and immediately remove from service. In the same regards the findings of current study indicated that all the studied nurses (100.0%) neither rinse the endoscope and flush the channels with sterile, filtered or tap water to remove the disinfectant solution after high-level disinfection, nor flush all channels with 70% isopropyl alcohol to aid in the drying process, or flush the channels with medical or filtered air. This may be due to there being no written policy and procedure related to endoscopy equipment's reprocessing available in the endoscopy unit. Hookey *et al*. (2013) in Canada mentioned that High-quality processes to ensure infection prevention and control in the delivery of safe endoscopy services are essential. They concluded that recommendations for infection prevention and control for flexible gastrointestinal endoscopy were intended for all individuals with responsibility for endoscopes in all settings where endoscopy is a must.

Labeau *et al.* (2009) in Belgium evaluated the nurses' knowledge of infection prevention guidelines, they added that opportunities exist to improve ICU nurses' knowledge about Prevention of surgical site infection was recommendations. Current guidelines should support their ongoing training and education. Gore *et al.* (2011) in Switzerland reported that young people aged 10-24 years represent 27% of the world's population. Although important health problems and risk factors for disease in later life emerge in these years. However, opportunities for prevention of disease and injury in this age group are not fully exploited, and adolescent health would benefit from increased public health attention. This result also agreed with Wick *et al.* (2012) in USA they stressed that nurses who received higher education had higher level of knowledge than those didn't receive.

In the present study, nurses' performance related to care (pre, during and post) GIT endoscopy and their demographic characteristics, without significant relation between the nurses' performance and their age, sex, and years of experience, but highly significant relation between nurses' performance as to care of patients undergoing GIE and the educational levels and training courses. This agreed with Elazazay *et al.* (2012), they didn't find significant relation between mean % score of nurses' practice and demographic characteristics, but there was a significant relation between nurses' practice and educational level. Besides, Abdelaziz and Elrzkey (2023) in Alexandria, who evaluated the nu-

rses' compliance to the GIT infection control didn't find significant differences in between nurses' training programs attendance and their mean compliance percent scores.

## Conclusion

Nurses less than 50% had unsatisfactory knowledge level caring for patient undergoing gastrointestinal endoscopy, but >50% of them had unsatisfactory level of practice in caring of patients (pre, during, & post) gastrointestinal endoscopy procedure and equipment re-processing.

Highly significant relationship was betwe en nurses' knowledge caring for patients' undergoing gastrointestinal endoscopy and educational level and between nurses' performance levels caring for patients, reprocessing endoscopy equipment, and educational level or training courses attendance.

There was a highly positive correlation between nurses' total knowledge and performance score and related dimensions.

## Recommendations

Hospital must plan and implement continuous educational and training programs for nurses working in endoscopic units to including: 1- Infection prevention and control in health care facilities, 2- Occupational health and safety, 3- Handling of flexible endoscopes and accessories, 4- Anesthesia and sedative drugs administrations, 5- Basic and advanced cardiac life support, 6- Simplified and comprehensive booklet with detailed guide lines concerned with gastrointestinal endoscopy, & 7- Written policies of drugs used in endoscopy unit must be available, and updated.

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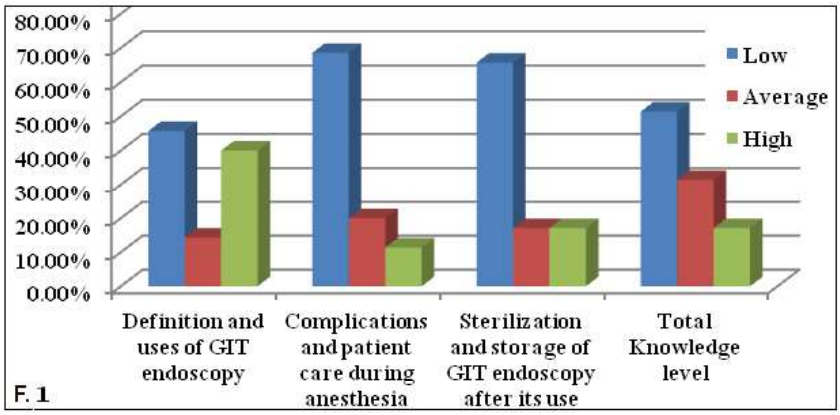
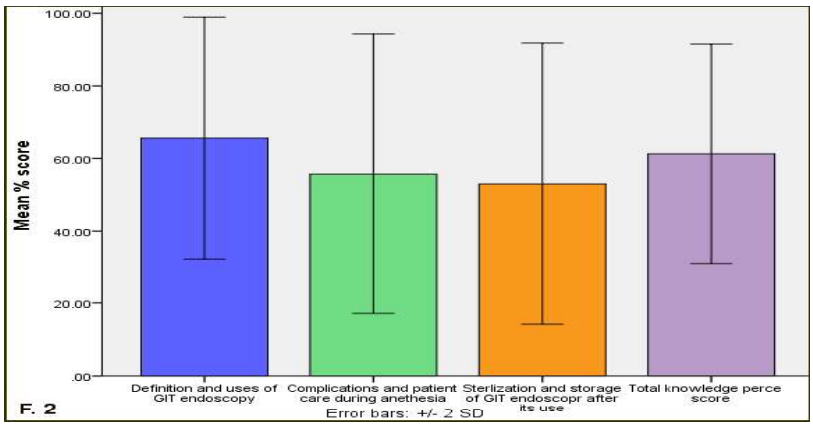
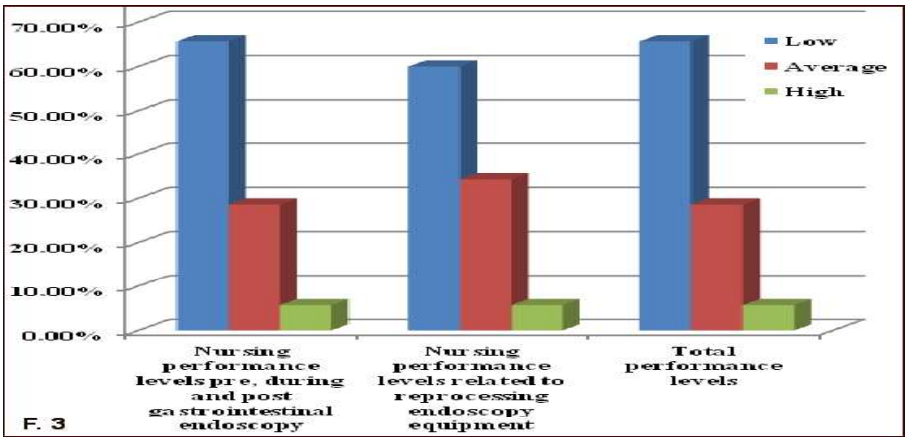
**Explanation of figures**

Fig. 1: Knowledge of nurses regarding care of patients undergoing gastrointestinal endoscopy.
Fig. 2: Nurses' knowledge mean percentage score related to care of patients undergoing gastrointestinal endoscopy.
Fig. 3: Total performance levels of nursing staff regarding care of patients undergoing gastrointestinal endoscopy.
Fig. 4: Total performance mean % score of nursing staff regarding care of patients undergoing gastrointestinal endoscopy


80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Low
Average
High
Definition and uses of GIT endoscopy
Complications and patient care during anesthesia
Sterilization and storage of GIT endoscopy after its use
Total Knowledge level
F. 1


Mean % score
100.00
80.00
60.00
40.00
20.00
.00
Definition and uses of GIT endoscopy
Complications and patient care during anesthesia
Sterlization and storage of GIT endoscopr after its use
Total knowledge perce score
Error bars: +/- 2 SD
F. 2


70.00%
60.00%
50.00%
40.00%
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20.00%
10.00%
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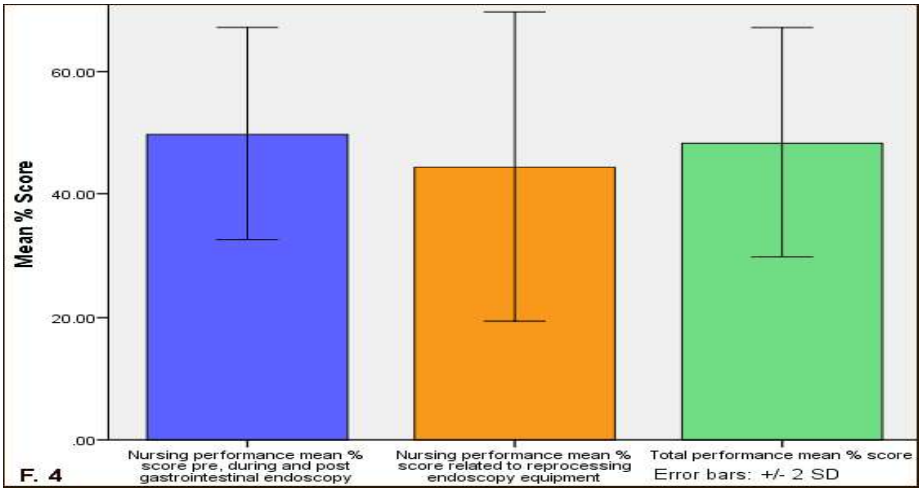
Low
Average
High
Nursing performance levels pre, during and post gastrointestinal endoscopy
Nursing performance levels related to reprocessing endoscopy equipment
Total performance levels
F. 3


Mean % Score
60.00
40.00
20.00
.00
Nursing performance mean % score pre, during and post gastrointestinal endoscopy
Nursing performance mean % score related to reprocessing endoscopy equipment
Total performance mean % score
Error bars: +/- 2 SD
F. 4