



## Risks of General Anesthesia, Nursing Care and Postoperative Outcome among Patient undergoing Gastrointestinal Surgery

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### Abstract:

**Background:** The incidence of perioperative risks and mortality related to anesthesia increased and involved multiple factors. Early identification and effective management in the initial stages increase rate of survival among these patients, so nurses' play a core role in perioperative care through closely monitoring of patients and providing quality nursing care. **The study was aimed to** assess risks of general anesthesia, nursing care and postoperative outcome among patients undergoing gastrointestinal surgery. **Setting:** The present study was conducted in gastrointestinal surgical unit, surgical operation and post anesthetic care units at Zagazig university hospitals, Egypt. **Study subjects:** A convenience sample of all available nurses (30) working in the mentioned setting and a purposive sample of (70) patients who fulfilling the inclusion criteria. **Tool of data collection:** Three tools were used for collecting data. **Tool I:** A self-administrated questionnaire about studied nurses. **Tool II:** An observational questionnaire for perioperative nursing care. **Tool III:** Interview assessment questionnaire for patients **Results:** Majority of studied nurses (80%) had unsatisfactory total knowledge, nearly three quarter (73.3%) had unsatisfactory total practice regarding care of patient undergoing general anesthesia, nearly two third of patients transfer from critical phase to continued recovery after anesthesia and more than half had moderate postoperative surgical outcome. **Conclusion:** Majority of studied nurses had unsatisfactory knowledge and practice regarding care of patients undergoing general anesthesia, there were statistical significant positive correlation between patients' recovery from anesthesia and their postoperative outcome, there were statistical significant positive correlation between patients' recovery from anesthesia and total nurses' practice and there were negative statistical significance correlation between nurses' total knowledge and total practice and intra-postoperative risks of general anesthesia as respiratory, cardiovascular, general and gastrointestinal risks. **Recommendation:** training program are highly recommended to improve nurses' performance, immediately postoperative care must be given by training and professional nurses, establishing a data base for those patients who experienced adverse effect from general anesthesia is necessary.

**Keywords:** Risks of General anesthesia, Nursing care, Postoperative outcome, Gastrointestinal surgery.

### Introduction:

Gastrointestinal (GI) surgery encompasses a large number of surgical and procedural interventions to diagnose, treat, and prevent spread of pathologic conditions. Curative procedures coupled with palliative techniques which can assist with alleviating debilitating symptoms of disease, allowing for comfort and nutritive capabilities while promoting quality of life and death with dignity (Rothrock., 2019).

GI surgery encompasses surgical management throughout the GI tract, which includes the esophagus, stomach, small and large intestines, and rectum. Surgery may be used to remove a cancerous or noncancerous growth or damaged part of the body, such as the intestine. It may also be used to repair a problem like a hernia. Minor surgical procedures are used to screen and diagnosis problems of the digestive system (Sun et al., 2020).

General anesthesia is necessary for procedures that require complete immobility and reversible unconsciousness, analgesia and autonomic reflex block whose components are hypnosis, analgesia, muscle relaxation and neurovegetative block. It can be classified in three ways, as total venous, when only venous drugs are infused, such as propofol and etomidate. General inhalation, when administration of inhalational anesthetics like sevoflurane, desflurane. The association between venous and inhalational anesthetics is defined as general balanced anesthesia. After the surgery was completed, reversal agents were administered before extubation and transferred to post anesthesia care unit (PACU) depending on the patients' physiologic status and the clinical judgment of the responsible senior anesthetist (**Smith et al.,2018**).

Several risks can occur when you receive general anesthesia for surgery or a treatment. Anesthesia causes a range of reactions, from moderate discomfort to potentially life-threatening consequences. The risks associated with anesthesia depend on the surgery is elective or emergent, and the age and pre-existing conditions of the patient. Anesthesia itself carries a very low risk of long-term consequences or death. A patient's general health and the surgical procedure itself determine any possible complications. The most common risks include allergic reaction to the anesthesia, respiratory, cardiovascular, hypothermia, pain, postoperative nausea and vomiting (PONV), urinary retention, sleep disturbance and central nervous system-related adverse events, and the worst scenario among risks is death (**Abofila et al.,2021**).

Perioperative nurses must be identify risks of general anesthesia and potential problems in advance and direct nursing interventions toward prevention of undesirable outcomes, such as cardiovascular and respiratory risks. Based on an individual patient assessment, the perioperative nurse identifies risks and relevant nursing diagnoses. This information guides nursing interventions for each patient from admission through discharge and home follow-up. Monitoring leads to prevention, early recognition and treatment of possible complications. Different equipment is used in monitoring of the patient. Observation is done by seeing, hearing, perceiving, asking, feeling and by recording and analyzing information. All of these make up one big picture (**Nestler., 2019**).

#### **Significance of the study:**

Approximately one in 25 individuals (representing between 187 million and 280 million cases globally) undergoes major surgery annually for the treatment of disease, injury or illness. 230 million major surgical procedures are being carried out under anesthesia worldwide every year. 46.6% of all deaths were associated with an anesthesia overdose. 42.5% of deaths were due to adverse effects of anesthetics that had been administered at therapeutic dose (**Ahmed et al.,2019**).

Current nursing literature supports the fact that the practice of registered nurses increases positive health outcomes in the form of decreased complications and an increase in client safety & plays an important part in the care of surgical patients. Good patient outcome has become exceedingly important and the primary treatment goal of hospitals, therefore this study will be carried out in attempt to assess

risks of general anesthesia, nursing care and postoperative outcomes among patients undergoing gastrointestinal surgery.

**Aim of the study:** Was to assess risks of general anesthesia, nursing care and postoperative outcome among patients undergoing gastrointestinal surgery.

**Research Question:**

- What are risks of general anesthesia for patients undergoing gastrointestinal surgery?
- What are levels of perioperative nursing care for patients undergoing general anesthesia?
- What are postoperative outcomes among patients undergoing gastrointestinal surgery?

**Research design:** A descriptive research design was carried out in this study.

**Setting:** The study was carried out in gastrointestinal surgical unit, surgical operation, post anesthetic care units at Zagazig University Hospital, Zagazig Governate, Egypt.

**Subjects and methods**

**Subjects:** A convenience sample of all available nurses (30) working at the previous mentioned setting and a purposive sample of patients (70) who fulfilling inclusion criteria at Zagazig university hospitals, Zagazig Governate, Egypt.

**Inclusion criteria:**

Patients who are undergoing gastrointestinal surgery, who will be take general anesthesia, male and female, between 20 and 60 years and agree to participate in the study.

**Tools of data collection:**

**Tool I: Self-administered questionnaire of nurses:** Composed of two parts:

**Part I:** Used to assess demographic characteristics as: age, gender, marital

status, educational qualifications, residence, income, total years of experience and attendance of any training courses (9 closed ended questions).

**Part II:** Used to assess nurses' knowledge regarding general anesthesia and perioperative care for patients undergoing general anesthesia including four different sections, nurses' knowledge about general anesthesia and its risks(**Gropper et al.,2019**), nurses' knowledge about preoperative care(**Hassan et al.,2023**), nurses' knowledge about intraoperative care (**Rothrock., 2022**) and nurses' knowledge about postoperative care (**Lemos & Poveda, 2022**). It was adapted and modified by the researcher (52 MCQ questions)

**Scoring system:** The total score for the knowledge was 52 grades (100%). Each correct answer scored one grade, zero for incorrect answer or don't know. For each area of knowledge, the score of the items was summed- up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. Knowledge was considered satisfactory if the percent score was equal or above 80% and unsatisfactory if less than 80% based on statistical analysis.

**Tool II: Observational checklists for nurses:** It was used to assess nurses' practices regarding care of patients undergoing general anesthesia. Attenuated observational checklist was developed by the researcher. It consists of three parts.

**Part I:** Preoperative Nursing Care Checklist which composed of 19 items (**Indra & Kulsum.,2020**).

**Part II:** Intraoperative Nursing Care Checklist which composed of 15 items (**Lemos & Poveda.,2022**).

**Part III:** Postoperative Nursing Care Checklist which composed of 17 items (Halterman et al., 2019).

**Scoring system:** The items observed to be done correctly were scored one and the items not done or incorrectly were scored zero for each area. The score of the items were summed-up and the total divided by the number of the items. These scores were converted into percent scores. The nurses had satisfactory level of practice when the total score equal or above 80% and unsatisfactory if it below 80% based on statistical analysis.

**Tool III: Interview Assessment Questionnaire for Patient:** This questionnaire divided into four parts:

**Part I: Demographic characteristics of the studied patients:** Which were composed of nine closed ended questions including "patient's age, gender, marital status, educational qualification, residence, job/occupation, weight, height, body mass index.

**Part II: A questionnaire to assess past medical and surgical data:** This consisted of 58 closed ended questions (Sharma., 2019).

**The scoring system:-**

Each items with (Yes) was scored one and the (No) scored zero. The score of the items were summed- up and the total divided by the number of the items. These scores were converted into percent score.

**Part III: A questionnaire to assess perioperative risks of general anesthesia which include three sections.**

**Section A: American Society of Anesthesiologists (ASA) Physical Status classification system:**

Used in preparation for surgery to help predict risks in a given patient which

consists of the 6 class (De Cassai et al., 2019)

**Section B: Assessment of intraoperative risks of general anesthesia:** Which consists of 26 items covered respiratory risks, cardiovascular risks, neurological risks and general risks. (Rothrock, 2022).

**Section C: Assessment of postoperative risks of general anesthesia:** Which consists of 27 items covered respiratory risks, cardiovascular risks, neurological risks, gastrointestinal risks and general risks. (Ribeiro et al., 2017).

**Scoring system:**

Each risk was occurred scored one and was not occurred scored zero. The score of the items were summed- up and the total divided by the number of the items. These scores were converted into percent scores.

**Part IV: Questionnaire to assess patient's postoperative outcome which assessed by two scales:**

**First: Aldrete scale (phase I):** It is measured by evaluating five criteria, including patient's activity, respiration, circulation, consciousness and oxygen saturation. (Roelandt et al., 2021)

**Scoring system:**

Total scores was summed up for each criteria. Patients was scores (9 -10) can be safely discharged from the PACU. Aldrete score of 8 or lower indicate the need for continuous closed observation.

**Second: QoR-15 scale (Phase II):** It is scale consisting of horizontal line for estimation of postoperative outcome which including of two part. Part A, consists of 10 items each items from 0 to 10 where: 0 = none of the time [poor] and 10 = all of the time [excellent]. Part B, composed of 5 items each item from (10 to 0, where: 10

= none of the time [excellent] and 0 = all of the time [poor]). (Rahman et al., 2017)

**Scoring system:**

QoR -15 scores were divided into four broad categories, the score of the items were summed- up, these scores were converted into percent score, and the mean, standard deviation were calculated.

**Administrative and ethical consideration:**

An official permission for data collection in Zagazig University was obtained from the hospital administrative personnel by the submission of a formal letter from the Dean of the faculty of Nursing Zagazig University explaining the aim of the study in order to obtain permission and help. At the interview, each subject was informed about the purpose, benefits of the study, and they were informed that participation is voluntary, and they have right to withdraw from the study at any time without given any reason. In addition, confidentiality, and anonymity of the subjects were assured through coding of all data. The researcher assured that the data collected will be confidential and would be used only to meet the purpose of the study.

**Pilot study:**

Was carried out in order to check and ensure the clarity, applicability, relevance and feasibility of the tools. For this study, the researcher selected three nurses and seven patients (10%) an random to participate in the pilot testing of the questionnaire and checklist from gastrointestinal surgical unit, surgical operation and post anesthetic care units and not excluded from the study sample because of no modifications in the tools.

**Field work:**

The researcher used to go to the study setting for interviewing the study subjects, each nurse was met individually, got a full

explanation about the aim of the study and was invited to participate. The nurse who gave his/her verbal informed consent to participate was handed the self-administered questionnaire and was instructed during the filling. The same was done with patients. The time needed to complete the checklist varies between 30-45 minute. Once the approval was granted to progress in the study, the researcher started to organize a schedule for collecting the data. The researcher visited study setting to be familiar with work process, time of work and observe study subjects attending the study settings to a set schedule for data collection. The data were collected two days a week (Saturday and Sunday) in the morning and afternoon shifts, lasted for 6 months during the period from the beginning of August 2022 to the end of January 2023.

**Content validity & Reliability:**

The tools were revised by a panel of five experts from different specialties including, one assistant professor of anesthesiologist and four assistant professors of medical surgical nursing reviewed the tool's content for clarity, relevance, comprehensiveness, applicability, understanding, and ease for implementation. All recommended modifications were done. Cronbach's Alpha that used to measure the internal consistency (reliability of used tool) was 0.806 for Nurse's knowledge, Risks of general anesthesia among the studied patients was 0.793 and Postoperative patient's outcome was 0.822, while Cronbach's Alpha for observational check list for nurses' practice was 0.789, assessing recovery from anesthesia was 0.819.

**Statistical analysis:**

The statistical analysis of data was done by using the computer software of

Microsoft Excel Program and Statistical Package for Social Science (SPSS) version 25. Data were presented using descriptive statistics in the form of frequencies and percentage for categorical data, the arithmetic mean (X) and standard deviation (SD) for quantitative data. Qualitative variables were compared using chi square test (X) 2, P-value to test association between two variables, degrees of significance of results were considered as P-value > 0.05 Not significant (NS), P-value ≤ 0.05 Significant (S), P-value ≤ 0.01 Highly Significant (HS).

### Results:

**Table 1:** Showed demographic characteristic of studied nurses .Their age ranged from 21-42 with Mean ± SD= 25.73±5.57, nearly three quarters of nurses (70.0%) were females ,majority of nurses (80.0%) were single, regarded their qualification 10.0% had nursing diploma, 30.0% had technical institute, 60.0% had bachelor of nursing , more than half had hospital experience <5 years. furthermore; about three quarters (73.3%) of studied nurse hadn't attended training course regarding care of patients undergoing general anesthesia.

**Figure 1:** Showed total nurses' knowledge, majority of studied nurses (80 %) had unsatisfactory total knowledge regarding care of patient undergoing general anesthesia compared to 20% of studied nurses had satisfactory total knowledge.

**Figure 2:** showed nurses' practice, about three quarters of studied nurses (73.3%) had unsatisfactory total practice regarding to care of patient undergoing general anesthesia, compared to (26.7%) of them had satisfactory total practice.

**Table 2:** Showed demographic characteristics of the patients in the study sample , revealed that majority of patients >30 years with Mean ± SD= 43.56 ± 5.87, more than half (60.0%) were females, majority of patients (82.9 %)were married, more than two third living in rural area ,more than half (52,9%) did not working more than half (52.9%) didn't not working , (41.1%) of patients had overweight, more than two third (67.1%) had height between (165-175 cm).

**Figure 3 :** Showed level recovery from anesthesia , nearly two third of studied patient (64.3%) had ≥ 9-10 score according aldrete scale and transfer from critical phase (phase I) to continued recovery (phase 2).

**Figure 4:** As regard total postoperative outcome, less than two thirds of studied patients (60%) had moderate post-surgical outcome and nearly third (30%) had poor surgical outcome. While less percentage included good surgical outcome (7.1%) and excellent surgical outcome was (2.9%).

**Table 3:** As regard correlation between the Studied Patients' Recovery from Anesthesia and their Postoperative Outcome, there were highly significant statistical positive correlation between the studied patients' postoperative outcome and their recovery from anesthesia with P-value 0.000

**Table 4:** As regard correlation between risks of general anesthesia and postoperative outcome and recovery from anesthesia among the studied patients, there were statistical significant negative correlation between total recovery from anesthesia, total postoperative outcome and intraoperative risks from anesthesia as respiratory risks and general risks. While there were no statistically significance correlation with cardiovascular and

neurological risks. Regarding postoperative risks there were statistical significant negative correlation between total recovery from anesthesia, total postoperative outcome and postoperative risks as respiratory risks, cardiovascular risks and neurological risks. While there were no statistically significance correlation with gastrointestinal risks, general risk.

**Table 5:** As regard correlation between risks of general anesthesia among the studied patients and nurses' knowledge and practice, that there were statistical significant negative correlation between nurses' total knowledge and total practice and intra- postoperative risks of general anesthesia as respiratory risks, cardiovascular risks, general risks and gastrointestinal risks. While there were no statistical significance correlation between nurses' total knowledge and total practice and intra-postoperative neurological risks.

**Table 6:** As regard correlation between the studied patients' recovery from anesthesia, their postoperative outcome and nurses' knowledge and practice, that there were statistical significance positive correlation between total recovery from anesthesia and total nurses' practice with P-value was 0.046.

### Discussion:

Regarding to the age of studied nurses, the result of present study showed that nearly to three quarters of studied nurses  $\leq$  30 years. These results were matched with **Elsayed et al., (2021)** who showed that nearly to three quarters of nurses less than 30 years. While this finding was controversy with that **Mohamed.,(2019)**who reported that more than half of nurses  $>$  30 years.

As regard to qualifications, the current study results revealed that more than half of

studied nurses were bachelor of nursing. This finding was on the same line with that of **Arzani et al (2016)** who reported that more than half of nurses were had bachelors' degree in nursing. While this finding was controversy with that **Mohamed et al., (2022)** who reported that more than half of nurses were diploma.

As regard the correlation between nurses' total knowledge and total practice, the finding of current study indicated that there was highly a statistical positive relation between nurses' total knowledge and total practice. This finding was gone in line with **Gouda et al.,(2019)** who stated that statically positive relation between nurses' total knowledge and total practice.

Regarding to the age of studied patients, the result of present study showed that majority of studied patients more than 30 years. These results were matched with **Afroz et al.,(2023)** who showed that majority of patients more than 30 years . While this result was controversy with that **Pascal et al.,(2021)** who showed that more than half of patients less than 30 years. This might be due to surgical operations carried out in specific age according to progress of disease and patient' condition changes.

As regard previous history of surgery, the current study results revealed that more than quarter had previous surgery. This finding on the same line with that **Pascal et al.,(2021)** who showed that about third of patients had previous surgery. While this finding was controversy with that **Gümüs., (2021)** who clarified that more than half of patients had previous surgery.

As regard recovery from anesthesia and discharge from PACU, The result of current study revealed that about two third of studied patient who scored  $\geq$ 9-10 according aldrete scale and discharged from

critical phase to continued recovery. This finding was on the same line **Bizuneh et al.,(2020)** who reported that nearly three quarters who scored  $\geq 9-10$ . This also agree with **Hajmour et al.,(2016)** who reported that more than third of patients prolonged stay in PACU and more than half discharged from PACU.

As regard to total postoperative outcome, more than half of studied patients had moderate surgical outcome. This finding was on the same line with **Campfort et al.,(2022)** who showed that nearly half of patients had total moderate outcome. While This finding was controversy with that **Qiu et al.,(2022)** who reported that more than half of patients had good surgical outcome.

As regard the relation between postoperative outcome and age of patients. The finding of current study indicated that there was highly a statistical significance relation between postoperative outcome and age of patients. This finding was gone in line with **Laurenza et al.,(2020)** who stated that statistical significance relation between outcome after surgery and age of patients. Increasing age may have greater difficulty recovering from surgery because of decreased physiologic reserve.

As regard the correlation between level of recovery from anesthesia and postoperative outcome, the finding of current study indicated that there was highly a statistical significance positive correlation between level of recovery from anesthesia and postoperative outcome. This finding was gone in line with **Ferraz et al.,(2016)** who stated that a statistical significance positive relation between level of recovery and postoperative outcome.

As regard the correlation between anesthesia risks and recovery from anesthesia, the finding of current study indicated that there was a statistical significance negative correlation between intraoperative respiratory risks and total recovery. This finding was gone in line with **Laporta et al., (2021)** who stated that respiratory depression represent a substantial risk for later in-hospital adverse events. All patients should be monitored for signs of decreased respiratory drive. Healthcare providers should be aware that early signs of respiratory depression are associated with increased risk for pulmonary complications on the wards.

As regard correlation between postoperative cardiovascular risks and total recovery. The finding of current study indicated that there was a statistical significance negative correlation between postoperative cardiovascular risks and total recovery. This finding was gone in line with **Sellers et l.,(2018)** who stated that cardiac complications remain the leading cause of delayed recovery, morbidity and mortality after non-cardiac surgery.

As regard correlation between postoperative neurological risks and total recovery. The finding of current study indicated that there was a statistical significance negative correlation between postoperative neurological risks and total recovery. This finding was gone in line **Saito et al., (2013)** who stated that neurological risks associated with poorer general health.

### **Conclusion:**

Based on the findings of the present study, it can be concluded that, There is lack of nurses' knowledge and practice regarding perioperative care for patients undergoing general anesthesia. Nearly two



third of studied patients had  $\geq 9$  and transfer from critical phase to continued recovery after general anesthesia and more than half of patients had moderate surgical postoperative outcome. There was statistically significant positive correlation between total nurses' knowledge and total nurses' practice. There was statistically significant positive correlation between total recovery from anesthesia and total nurses' practice, there was statistically significant positive correlation between the studied patients' postoperative outcome and their recovery from anesthesia and there were statistical significant negative correlation between nurses' total knowledge and total practice and intra- postoperative risks of general anesthesia as respiratory

risks, cardiovascular risks, general risks and gastrointestinal risks.

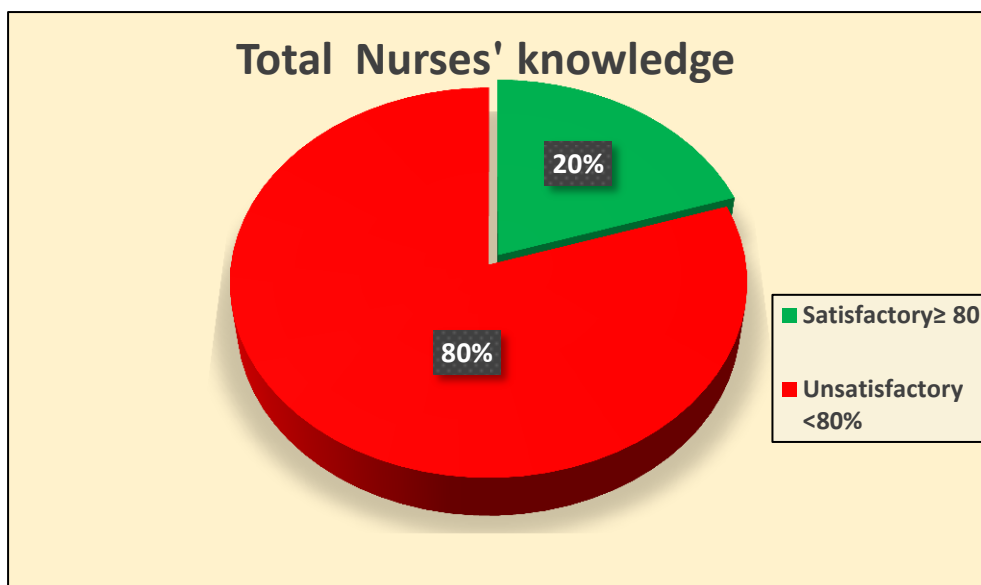
#### Recommendations:

In view of the main results of the study the following recommendations were derived and suggested, training program are highly recommended to improve nurses performance regarding care of patients undergoing gastrointestinal surgery, immediately postoperative care must be given by training and professional nurses, establishing a data base for those patients who experienced adverse effect from general anesthesia is necessary, study should be replicated on large sample and in different hospital setting in order to generalize the result.

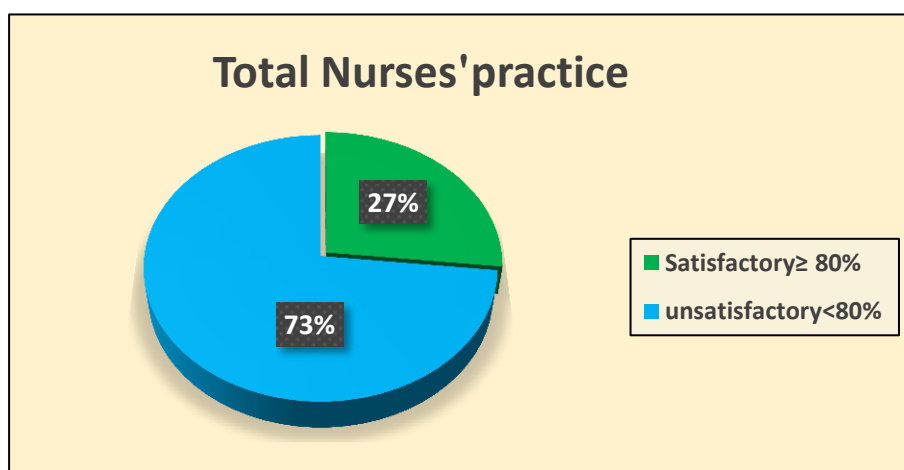
**Table 1:** Distribution of Demographic Characteristics of Studied Nurses (n=30)

Demographic characteristics of nurses	NO	%
Age (Years)		
20-<30	22	73.3
30-<40	5	16.7
$\geq 40$	3	10.0
Mean $\pm$ SD= 25.73 $\pm$ 5.57		
Gender		
Male	9	30.0
Female	21	70.0
Educational Qualification		
Diploma	3	10.0
Technical Institute	9	30.0
Bachelor of Nursing	18	60.0
Marital State		
Single	24	80.0
Married	6	20.0
Residence		
Rural	25	83.3
Urban	5	16.7
Income		
sufficient	17	56.7
Insufficient	13	43.3
Years of experiences		
< 5	16	53.3

≥ 5	14	46.6
Mean ± SD= 5.23 ± 4.90		
Attending a training course on care of patients undergoing general anesthesia and perioperative nursing care		
Yes	8	26.7
No	22	73.3



**Figure 1:** Distribution of the Studied Nurses according to their Total Knowledge about General Anesthesia and its Risks and Perioperative Nursing Care (n=30)

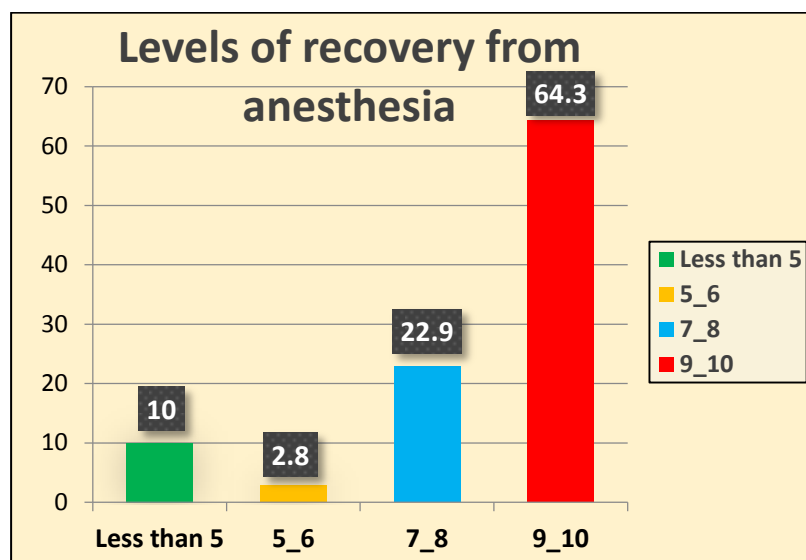


**Figure 2:** Distribution of the Studied Nurses according to their Total Practice about General Anesthesia and its Risks and Perioperative Nursing Care (n=30).

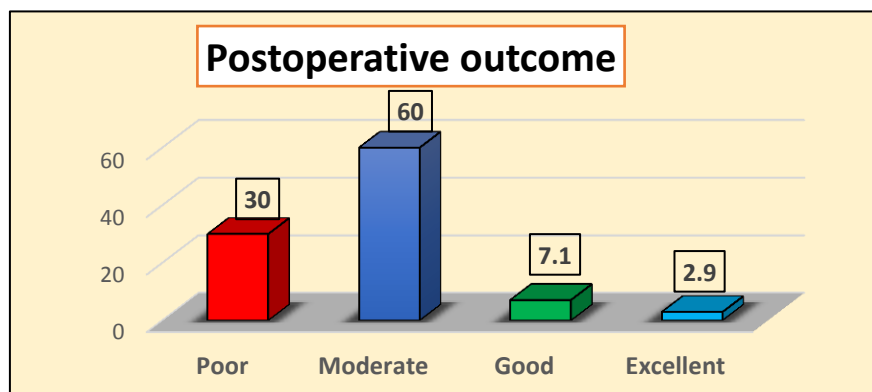
**Table 2:** Demographic Data of the Studied Patients (n= 70)

Demographic Data of Studied Patients	No	%
Age (Years)		

20-< 30	5	7.1
30-<40	23	32.9
40-<50	21	30.0
50-60	21	30.0
Mean $\pm$ SD= 43.56 $\pm$ 5.87		
Gender		
Male	28	40.0
Female	42	60.0
Marital status		
Single	3	4.3
Married	58	82.9
Divorced	3	4.3
Widow	6	8.6
Residence		
Urban	23	32.9
Rural	47	67.1
Educational level		
Not read or write	15	21.4
primary or preparatory education	17	24.3
Secondary education	20	28.6
High education	18	25.7
Job /occupation		
Working	33	47.1
Not working	37	52.9
Weight (kg)		
60-<70	9	12.8
70-<80	20	28.6
80-<90	21	30.0
$\geq$ 90	20	28.6
Mean $\pm$ SD= 83.10 $\pm$ 11.11		
Height (cm)		
155-<165	14	20.0
165-<175	47	67.1
$\geq$ 175	9	12.9
Mean $\pm$ SD= 168.40 $\pm$ 5.08		
Body Mass Index (kg/m <sup>2</sup> )		
less than 18.5 (underweight)	2	2.9
18.5 to (normal weight)	9	12.9
25.0 to <30 (overweight)	29	41.4
30.0 to 34.9 (obesity class 1)	22	31.4
35.0 to 39.9 (obesity class 2)	8	11.4



**Figure 3:** Distribution of the Studied Patients according to their Level of Recovery from General Anesthesia (n=70).



**Figure 4:** Distribution of the studied patients according to their total postoperative outcome (n=70)

**Table 3:** Correlation between the studied patients' recovery from anesthesia and their postoperative outcome (n=70).

Variables	Total recovery from anesthesia	
	r	p-value
Total postoperative outcome	0.775	0.000**

**Table 4:** Correlation between Risks of General Anesthesia and Postoperative Outcome and Recovery from Anesthesia among the Studied Patients (n=70)

Variables	Total postoperative outcome	Total recovery from anesthesia
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	r	p-value	r	p-value
<b>Intraoperative risks assessment of general anesthesia</b>				
Respiratory Risks	-0.570	0.000**	-0.596	0.000**
Cardiovascular Risks	-0.172	0.154	-0.082	0.502
Neurological Risks	-0.157	0.194	-0.057	0.640
General Risks	-0.521	0.000**	-0.597	0.000**
<b>Postoperative risks assessment of general anesthesia</b>				
Respiratory Risks	-0.515	0.000**	-0.440	0.000**
Cardiovascular Risks	-0.301	0.011*	-0.253	0.035*
Neurological Risks	-0.231	0.045*	-0.221	0.047*
Gastrointestinal Risks	-0.075	0.536	-0.079	0.517
General Risks	0.022	0.855	0.022	0.855

**Table 5:** Correlation between Risks of General Anesthesia among the Studied Patients and Nurses' Knowledge and Practice (n=70)

Variables	Total knowledge		Total practice	
	r	p-value	r	p-value
<b>Intraoperative risks assessment of general anesthesia</b>				
Respiratory Risks	-0.417	0.001**	-0.432	0.001**
Cardiovascular Risks	-0.275	0.009**	-0.281	0.0007**
Neurological Risks	-0.310	0.251	-0.111	0.325
General Risks	-0.422	0.001**	-0.438	0.001**
<b>Postoperative risks assessment of general anesthesia</b>				
Respiratory Risks	-0.425	0.001**	-0.461	0.000**
Cardiovascular Risks	-0.286	0.010*	-0.266	0.013*
Neurological Risks	-0.310	0.251	-0.111	0.325
Gastrointestinal Risks	-0.310	0.006**	-0.299	0.007**
General Risks	0.344	0.004**	0.350	0.004**

**Table 6:** Correlation between the Studied Patients' Recovery from Anesthesia, their Postoperative Outcome and Nurses' Knowledge and Practice (n=70).

Variables	Total knowledge		Total practice	
	r	p-value	r	p-value
Total postoperative outcome	0.094	0.621	0.161	0.395
Total recovery from anesthesia	0.059	0.759	0.340	0.046*

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