Effect of Educational Guidelines on Nurses' Knowledge and Patients' Airway Risks and Complications Using Laryngeal Mask versus Endotracheal Tube

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Abstract

Background: Some severe complications among patients undergoing general anesthesia may be related to poor visualization of tracheal structures. Subjectively, the bronchoscopic view obtained via a laryngeal mask airway (LMA) seems to be better than that obtained with an endotracheal tube (ETT). The quality of ventilation and airway-related complications are also reported. This may cause oxygenation impairment and further contribute to postoperative pulmonary complications**.** Assessing these complications is crucial for optimizing patient care. **The aim was to** evaluate the effect of educational guidelines on nurses' knowledge regarding airway risks and complications and to decrease patients' airway risks and complications by using a laryngeal mask and endotracheal tube. **Research design:** To complete this study a quasi-experimental research design was used. **Setting**: The study was conducted in the Intensive care unit at Sohag University Hospital. **Sample:** A convenient sample of 50 nurses who worked at the previously selected setting and 50 patients undergoing surgical operation was included within six months. **Tools: Tool (I)** Nurses' personal data assessment sheet**, Tool (II):** Nurses' knowledge about risk factors assessment sheet**, Tool (III):** Nurses' knowledge about complication assessment sheet, **Tool (IV):** Patients assessment questionnaire**. Results: The result of the current study revealed that there were** statistically significant differences and improvements were observed between nurses' knowledge mean scores after one month of the educational guidelines application. **Conclusion:** The application of educational guidelines regarding airway risks and complications for patients using laryngeal masks and endotracheal tubes has positive effects on improving patients' knowledge. Also, has a significant effect on decreasing the frequency of risks and complications of the Laryngeal mask airway and endotracheal tube. Believe that the laryngeal mask has fewer risks and complications than the endotracheal tube. **Recommendations:** Preparing patients before surgery and giving patients health education. Providing nurses with continuous in-service training programs that help increase their knowledge.

Keywords: Educational Guidelines, Complications, Endotracheal tube & Laryngeal mask, Risks.

Introduction

Providing a controlled, transient loss of feeling or awareness that is induced for medical reasons, such as a surgical procedure, is the domain of anesthesiology. Amnesia, muscular relaxation, analgesia, and unconsciousness are some of the components that may be included in a combination. A medically induced condition of unconsciousness characterized by the relaxation of skeletal muscles and the lack of protective reflexes is known as general anesthesia. General anesthesia is often induced by intravenous sedatives and analgesics and is thereafter sustained with volatile anesthetics (**Jones et al., 2023**).

According to **Obsa et al. (2020**), laryngeal mask airway and endotracheal intubation are two of the most important

artificial airway technologies utilized in the delivery of general anesthesia. Endotracheal tubes, which come into direct contact with the respiratory tract's interior, are meant to keep patients' ventilations open. They serve as a tool to help in respiratory exchange (**Saad et al., 2022**).

When it comes to handling airway emergencies, endotracheal intubation is the gold standard. The difficulties associated with endotracheal intubation are numerous and frequent. Our study found that endotracheal intubation was associated with the following complications: endobronchial intubation, regurgitation, and aspiration of stomach contents, improper placement of the endotracheal tube in the esophagus or hypopharynx, hypoxia, hypotension, dysrhythmia, cardiac arrest, hypertension, tachycardia, and bradycardia **(Taş., et al 2021)**

Over the past 20 years, the laryngeal mask airway (LMA) has become a more popular substitute for the endotracheal tube in head and neck surgery. It preserves upper airway patency without requiring direct vocal cord visualization and may help avoid potential trauma during the tracheal intubation procedure (**Hung et al., 2022).**

The effectiveness and safety of anesthesia and surgery may also be compromised by adverse airway reflexes including coughing, gagging, and airway blockage brought on by LMA placement. Using muscle relaxants during LMA installation is not contraindicated because they can facilitate the procedure and reduce the risk of adverse airway reflexes such as coughing, choking, and laryngospasm **(Ye., 2024)**

According to **Lekens et al. (2023**), a surgical patient is an individual who needs a lot of care and treatment because they are in a vulnerable situation. Nurse anesthesia is a planned, goal-directed response to the special needs of surgical patients. During the anesthesia process, nurses are always available to quickly assess and adjust to the patient's situation. They work with other medical professionals to provide all three phases of perioperative anesthesia care (pre-, intra-, and postoperative). They also facilitate surgery, trauma care, advanced life support, and other emergency cases.

Significance of the study

For airway control during general anesthesia, either an endotracheal tube (ETT) or a laryngeal mask airway (LMA) may be utilized. Compared to ETT, LMA has been shown to improve hemodynamic stability, decrease the need for anesthesia, and shorten operation and recovery periods in a variety of surgical populations. It has also been shown to reduce airway issues, postoperative nausea, and vomiting, all of which have a major effect on overall patient satisfaction (**Obsa, 2020).**

Research indicates that LMAs are equally effective as other methods of airway management. Blind intubation success rates with an LMA can vary from 60% to 99%, depending on the device and the operator's technical proficiency. Flexible fiberoptic guidance is the best technique when it can be used; however, the Fast Rach LMA (ILMA) has the greatest rate of blind intubation among supraglottic devices.

Aim of the study:

To evaluate the effect of educational guidelines on nurses' knowledge regarding airway risks and complications and to decrease patients' airway risks and complications use a laryngeal mask and endotracheal tube

Research hypothesis:

H1: Nurses' knowledge regarding airway risks and complications is expected to improve post-educational Guidelines application more than pre-application.

H2: Patients' airway risks and complications using laryngeal masks are expected to be less than in those who use an endotracheal tube

Subjects and Method:

Research Design:

To complete this study a quasi-experimental research design was used

Setting:

The study was conducted in the Intensive care unit at Sohag University Hospital.

Sample:

A convenient sample of 50 nurses worked at the previously selected setting and 100 patients undergoing surgical operation were included within six months; 50 patients with endotracheal tubes and 50 patients with laryngeal masks.

Tools of data collection:

Tool (I) Nurses' data assessment sheet, included data related to nurses' age, sex, residence, educational level, years of experience, and previous training programs all included

Tool (II): Nurses' knowledge about airway risk factors of laryngeal mask and endotracheal tube assessment sheet: It was developed by the researchers after examining recent and related literature (**Taş et al., 2021; Saad., et al 2022**) and written in the Arabic language to assess nurses' knowledge about risk factors, which consisted of ten items; long duration of surgery, Type of airway, respiratory disease, cardiovascular disease, anesthesia drug-related, hypothermia, habits, Obesity and chronic disease.

Nurses' knowledge score, where a correct response earned a score of 1 and an incorrect response a score of 0. The mean total scores, which were converted into a percent score, were calculated by adding up all of the point scores and dividing the total by the number of items. Means, standard deviations, and medians were also calculated. If the study group's knowledge score was ≥60%, it was deemed satisfactory; if it was less than 60%, it was deemed unsatisfactory.

Tool (III): Nurses' knowledge about airway complications of laryngeal mask and endotracheal tube assessment sheet:

It was developed by the researchers after examining recent and related literature **(Obsa, 2020, Lekens et al., 2023; Ye., 2024) to assess nurses' knowledge about airway complications** during anesthesia and after anesthesia.

1- During anesthesia: It includes two parts: The purpose of this section was to evaluate the patient's complication during anesthesia which consisted of sixteen items as (Hypoxia, Damage teeth or lips, Endotracheal tube malfunction, Gagging, hypotension, Hypothermia, Abnormal heart rate, Difficult recovery (prolonged duration, dysphoria), Arrhythmias (sinus tachycardia, sinus bradycardia, others, hypoventilation, High

Airway pressures (kinked or obstruction tube, pulmonary compliance), end bronchial intubation, Laryngospasm, Oropharyngeal intubation, Aspiration and Anesthesia awareness).

2: Immediately postoperative: Was used to assess complications after anesthesia: it includes 10 items such as (nausea or vomiting, chills and shivering, disorientation and memory loss, bladder issues, lightheadedness, bruises and soreness, sore throat, oral or dental damage, hoarseness, and other symptoms.

The knowledge score of nurses, where a correct response was worth one point and an incorrect response was worth zero. After adding together all of the point scores and dividing the total by the number of items, mean total scores were calculated. These were then converted into percent scores, means, standard deviations, and medians. If the percentage score was sixty percent or more, the study group's knowledge was deemed satisfactory; if it was less than sixty percent, it was deemed unsatisfactory.

Tool (IV): Patient assessment questionnaire. It was designed and developed by the researcher based on the relevant national and international literature and writtenin the Arabic language, which divided into three parts:

Part I: Patient's Demographic Data Assessment Tool

The purpose of this section was to evaluate the patient's demographic data which consisted of four items of demographic data (age, gender, level of education, occupation)

Part II: Risk factors assessment tool:

The purpose of this section was to

evaluate the patient's Risk factors: which were mentioned before.

Part III: Complications' assessment tool:

This tool was developed by research to assess complications mentioned above during anesthesia and after anesthesia.

Method:

Preparatory phase:

This phase included the following; reviewing the available literature and different studies related to a research problem, and theoretical knowledge of its various aspects of the study, using textbooks, evidence-based articles, internet periodicals, and magazines to collect tools for this study.

- After explaining the purpose and scope of the study, permission to perform it was granted by the dean of the nursing faculty at Sohag University as well as by the hospital's competent authorities, the head of the anesthesia department, and the head of operations.
- Tools for collecting data were developed by the researcher based on a survey of relevant books, papers, journals, publications, and references from the past, present, and worldwide in a variety of fields.

- **A Pilot study:**

It was carried out before data collection on five patients, or 10% of the total patients and nurses, in order to assess the applicability and clarity of the tools and gauge the amount of time needed to complete the data-collecting forms. The study included the same sample that was chosen for the pilot study since the data from that investigation was examined and no modifications were made to the instruments used.

The content validity of the study tools was reviewed by a jury of 5 experts in the field (2 critical care nursing staff, one expert in medical-surgical nursing & two anesthesiologists in the faculty of medicine sohag to assess the clarity, The tools' viability, applicability, and content validity were assessed, and no adjustments were made.

Reliability:

The internal consistency of the tool's parts was assessed using Cronbach's Alpha test to determine the reliability of the tools, the reliability of the tools was 0.899 which was accepted.

Ethical considerations:

The scientific research ethics committee at the faculty of nursing Sohag University of nursing gave this project ethical approval. The participating patients and nurses were fully informed about the purpose and methodology of the study before providing their informed consent. The researcher guaranteed the complete anonymity and confidentiality of the participants 'data. Additionally, the participants were assured of their right to withdraw from the study at any phase.

Field of work: The process of data collection extended 6 months from the beginning of March 2023 to the end of August 2023 within six months.

The study was carried out through four phases: assessment, planning, implementation, and evaluation.

Assessment Phase:

The researchers visited the previously selected setting two days weekly during the morning shift to collect the data by using previous tools. The researchers interviewed the available nurses in previous settings, introduced themselves to initiate communication, explained the aim of the study, and took their verbal approval to participate in the study before data collection. The researchers assessed the nurses' knowledge using tool II and tool III. The average time needed for the completion of a questionnaire by the nurse was between 25–30 minutes.

Planning Phase:

The educational guidelines were developed by researchers based on nurses' needs assessment, literature review, researchers' experience, and opinions of experts. The researchers designed a booklet and videos, the booklet was written in the Arabic language with illustrations.

Content of the educational guidelines including the following

1. Introduction, meaning, indications of laryngeal mask and endotracheal tube.
2. Airway risk factors of laryngeal mask and endotracheal tube.
3. Advantages and disadvantages of laryngeal mask and endotracheal tube
4. Airway complications of laryngeal mask and endotracheal tube.

Implementation Phase:

The **educational guidelines** were given to nurses with clarification related to how the **educational guidelines** are to be used. The researcher attended the mentioned setting three days per week from 9 am to 12 pm to collect the data from the patients. The researcher greeted the patients, gave a brief explanation of the study's objective before any data was collected, and obtained the patients' verbal consent to participate in the study voluntarily. Data was obtained in an operation room unit from each patient who underwent an operation during morning shifts, and patients were monitored until discharge. Data collection related to the demographic characteristics of the patients under study was conducted by using Tool IV, Part (1). Data collection related to Hemodynamic assessment was conducted before, during, and after anesthesia by using Tool IV, Part (II and III). Data collection related to the patient's risk factor was conducted using Tool IV (part II). Data collection related to complications of endotracheal tube and laryngeal mask were assessed during and after general anesthesia by using Tool IV, part (III). The researcher monitored the patients during and after the anesthesia procedure.

It included information about airway risk factors of laryngeal mask and endotracheal tubes such as risk factors, which consisted of ten items; long duration of surgery, Type of airway, respiratory disease, cardiovascular disease, anesthesia drug-related, hypothermia, habits, Obesity and chronic disease And knowledge about airway complications of laryngeal mask and endotracheal tube. The comparison was done pre and post-test to assess complications of the laryngeal mask and endotracheal tube.

Evaluation phase:

To evaluate the effect of educational Guidelines on nurses' knowledge and patients' airway risks and complications use of laryngeal masks and endotracheal tube were done post one month of implementing the Guidelines and using the same tools.

Statistical analysis

The collected data were organized, coded, computerized, tabulated, and analyzed by using the Statistical Package for Social Science (SPSS) version (20). Data were presented using descriptive statistics in the form of frequencies, and percentages. The chi-square test(X2) was used for comparisons between qualitative variables to find out relations. Correlation coefficient (r) was used to test the relation between quantitative data. Statistical significance was considered to be:

- P value > 0.05 non-significant.
- P value ≤ 0.05 significant.
- P value < 0.01 is highly significant.

Results:

Table (1) Shows that 72% of the studied nurses were ≥30 years old. The majority 76% of them were female. More than half had a technical institute education and three-fifths had ten or more years of experience (52% and 60%) respectively.

Figure (1): Illustrates that only 5% attended educational training related to airway risk factors and complications of laryngeal mask and endotracheal tube.

According to **Table (2),** all knowledge items showed statistically significant gains and differences before and after a month of implementing guidelines ($P < 0.05$).

The majority of the nurses in the study (96%) had unsatisfactory overall knowledge scores during the pre-test phase, but following the application of guidelines, 82% of them obtained total satisfactory knowledge scores regarding the airway risk factors of

endotracheal tubes and laryngeal masks **(Figure 2).**

Table (3) illustrated that there was a highly statistically significant difference between studied nurses' knowledge pre and post-one month of guidelines implementation regarding airway complications of laryngeal mask and endotracheal tube (P=<0.000). Also, there was a highly statistically significant difference between the studied total nurses' knowledge as pre and post-one month of guidelines implementation regarding airway complications of laryngeal mask and endotracheal tube.

The majority (84 %) of the study group had an unsatisfactory total knowledge level regarding airway complications of laryngeal mask and endotracheal tube in the pre-test phase, compared to 8 % post-educational guidelines implementation **(Figure, 3).**

Table (4): Represent the patient in the laryngeal mask group with a mean of 36.12±16.22 years old compared to 42.22±16.33 among the endotracheal tube group. Regarding sex, 54% of the laryngeal mask patients were male, while 62% in the endotracheal tube group were female. The majority of studied patients (66.7%) were married. Regarding age and gender, it was found that there was no significant difference between the two groups.

Table (5): Represent that Habits, smoking, and type of inhalation differed significantly between the two groups (p-value: 0,002, 0.001, 0.044), but other risk factors did not differ significantly.

Table (6) illustrated that there was a highly statistically significant difference regarding airway complications of patients in laryngeal masks and endotracheal tubes during anesthesia (P=<0.001).

Table (7) illustrated that there was a highly statistically significant difference regarding airway complications of patients in laryngeal masks and endotracheal tube post-anesthesia (P=<0.001).

Table (8): illustrated that there was a statistically significant relationship between the educational level of the studied nurses and overall knowledge throughout the phases of the educational guidelines at p<0.001.

Table (1): Nurses ' data (n=50)

Variables	N	%
Age		
< 30 years	14	28
≥30	36	72
Gender		
Male	12	24
Female	38	76
Level of education		
Secondary Nursing school	26	52
Technical Institute	24	48
Number of experience years		
< five years	9	18
5 – 10 years	11	22
Ten years	30	60

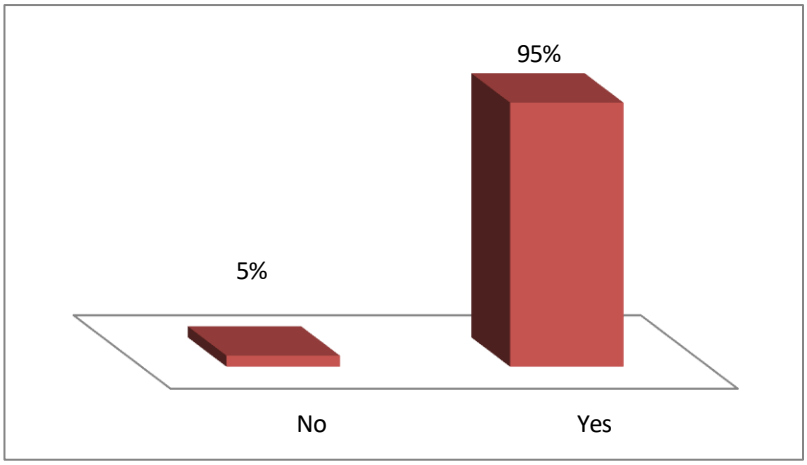

Figure (1): Attendance of educational training airway risk factors and complications of laryngeal mask and endotracheal tube among the studied nurses (n=50).

Table (2): Frequency and percentage distribution of the studied nurses to their knowledge about airway risk factors of laryngeal mask and endotracheal tube as pre and post-one-month educational guidelines implementation (n=50).

Correct knowledge	Pre		Post onemonth		X2 test	p-value
	No.	%	No.	%		
Long duration of surgery	8	16	46	92	59.05	<0.001*
Type of airway	6	12	42	84	57.95	<0.001*
Respiratory disease	15	30	47	94	50.72	<0.001*
Cardiovascular disease	12	24	152	54	89.89	<0.001*
Anesthesia drug-related	14	28	41	82	75.37	<0.001*
Hypothermia, habits	10	20	43	86	60.64	<0.001*
Obesity and chronic disease.	13	26	49	98	66.70	<0.001*

(*) Statistically significant at p<0.05

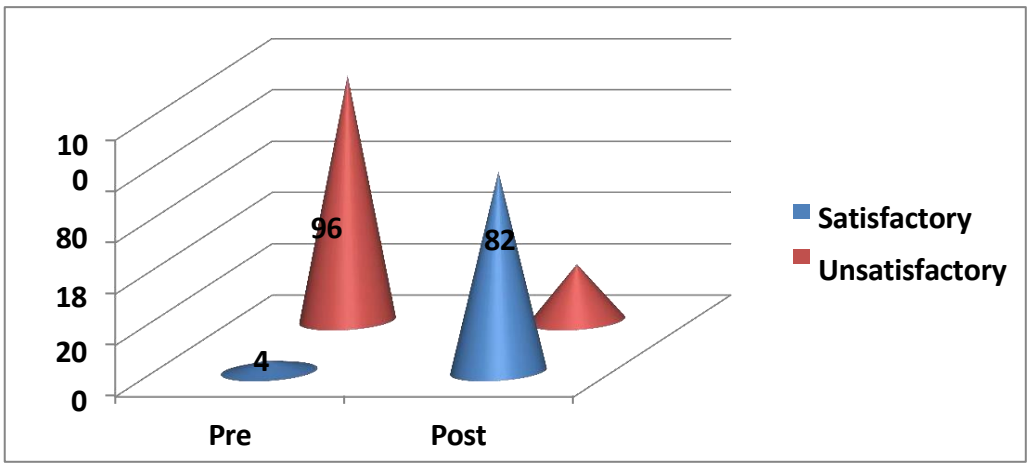

Figure (2): Total knowledge scores of the studied nurses through pre and post-educational guidelines phases (n=50).

Table (3): Comparison of the studied nurses' level of knowledge related to airway complications of laryngeal mask and endotracheal tube aspre and post-one-month educational guidelines implementation

Items	**Pre-** educational guidelines		**st-**educational guidelines		**P-value**
	No.	%	No.	%	
Satisfactory≥60%	3	6	44	88	<0.000
Unsatisfactory less than 60%	47	94	6	12	<0.000
Total practice	**12.22±1.77**		**26.06±2.55**		

** Highly statistically significant difference at (P<0.001)

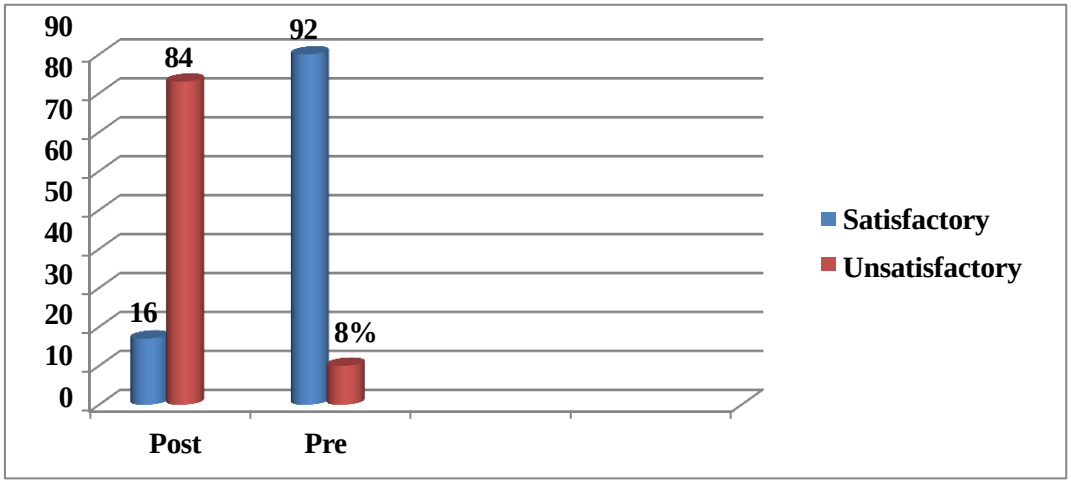

Figure (3): Total knowledge scores of the studied nurses regarding airway complications of laryngeal mask and endotracheal tube **through pre and post-educational guidelines phases (n=50).**

Table (4): Distribution of personal data among studied nurses (n=100).

Personal data	ETT (n=50)		laryngeal mask (n=50)		P. value
	No	%	No	%	
Sex					
Male	19	38	23	46	0.197
Female	31	62	27	54	
Age					
Less than 30 years	11	22	20	40	0.115
From 30- 40 years	18	36	8	16	
More than 40 years	21	42	22	44	
Mean±SD	42.22±16.33		36.12±16.22		0.493
Educational level					
Illiterate	26	52.0	14	28	0.189
Diploma	19	38.0	27	54	
Bachelor's	5	10.0	9	18	
Residence					
Urban	31	62	34	68	0.467
Rural	19	38	16	32	

Table (5): Distribution of risk factors related to Endotracheal tube and laryngeal mask among the studied group (n=100)

Items	ETT (n=50)		laryngeal mask (n=50)		P. value
	No	%	No	%	
long duration of anesthesia (1.5h-3h)	44	88	36	72.0	0.125
Respiratory Disease	24	48	17	34	0.283
Chest infection	18	36	12	24	0.549
Chronic obstructive pulmonary disease	19	38	10	20.0	0.279
Bronchitis	0	0.0	0	0.0	0.0
Asthma	4	8	2	4	0.982
Cardiovascular	17	34	10	20.0	0.252
Hypotension	12	24	7	14	0.479
Hypertension	6	12	4	8	0.988
Congestive heart failure	0	0.0	0	0.0	0.0
Myocardial infarction	0	0.0	0	0.0	0.0
Type of Inhalation					
Halothane	32	64	10	20.0	0.001**
Isoflurane	19	38	41	82.0	
Hypothermia	0	0.0	0	0.0	0.0
Habits	4	8	21	42.0	0.002**
Smoking	4	8	16	32.0	0.044*
Drug abuse	0	0.0	6	12.0	0.128
Obesity	9	18	17	34	0.145
endocrine disease	7	14.0	12	24	0.179
Diabetes	6	12.0	11	22	0.276

Table (6): Comparison between airway complications of patients in laryngeal mask and endotracheal tube during anesthesia

Items	Endotracheal tube		laryngeal mask		P-value
	No.	%	No.	%	
Hypoxia	20	40	10	20	<0.001
Damage to teeth or lips	16	32	0	0.0	<0.001
Endotracheal tube malfunction	8	16	0	0.0	<0.001
Gagging	43	86	30	60	<0.001
Hypotension	34	68	27	54	<0.001
Hypothermia	4	8	0	0.0	<0.001
Abnormal heart rate	19	38	28	28	<0.001
Difficult recovery	9	18	0	0.0	<0.001
Arrhythmias	0	0	3	6	<0.001
Aspiration and Anesthesia awareness	24	48	1	2	<0.001
Hypoventilation	16	32	6	12	<0.001
High airway pressures	11	22	1	2	<0.001
kinked or obstruction tube	12	28	5	10	<0.001

** Highly statistically significant difference at (P<0.001)

Table (7): Comparison between airway complications of patients in laryngeal mask and endotracheal tube post-anesthesia

Items	laryngeal mask		Endotracheal tube		P-value
	No.	%	No.	%	
Nausea or vomiting	40	80	25	50	<0.001
Chills and shivering	6	12	3	6	<0.001
Memory loss	0	0.0	0	0.0	1
Bladder issues	3	6	0	0.0	<0.001
Lightheadedness	41	82	49	98	<0.001
Bruises and soreness	11	22	2	4	<0.001
Sore throat	10	20	20	40	<0.001
Oral or dental damage	5	10	15	30	<0.001
Hoarseness	0	0.0	0	0.0	1

Table (8): Correlations between studied nurses' knowledge and demographic data (n=50).

Scores	Spearman's rank correlation coefficient (r)
	Knowledge
Pre-intervention	
Age	-.142
Education	.146
Years of experience	-.103
Crowding index	.065
Post-intervention	
Age	-.207
Education	.306**
Years of experience	-.139
Crowding index	.089
Overall	
Age	-.093
Education	.179*
Years of experience	-.074
Crowding index	.029

(*) Statistically significant at p<0.05 (**) statistically significant at p<0.01

Discussion:

The LMA can be beneficial, particularly in patients with severe stenosis where it may be impossible to position the ETT due to extreme airway narrowing. Additionally, mechanical trauma, swelling, bleeding, and subsequent airway occlusion are associated with endotracheal intubation; in contrast, the LMA does not put mechanical stress on the newly sutured airway and does not compromise its blood supply. Additionally, while the patient is coming out of anesthesia, the LMA reduces the chance that they will cough. **Menna, et al., (2021).** The current study was designed to evaluate the effect of educational guidelines on nurses' knowledge regarding airway risks and complications and to decrease patients' airway risks and complications by using laryngeal mask and endotracheal tube

According to the study's findings,

slightly less than three-quarters of the studied nurses were ≥30 years old. This outcome supported **Ahmed's (2023)** assertion that the majority of Egypt's nursing workforce was educated in diploma programs, and it is anticipated that they are currently engaged across all nursing services.

According to the study's findings, the majority of them were female. This may reflect the preponderance of women in nursing and the fact that there are more women than men working in the nursing industry. This might be because women made up a larger percentage of nurses in Egypt, and it may also be related to the fact that, until recently, only women were allowed to pursue nursing education in Egypt. According to **Mehrabi et al. (2023**), the majority of their study group was female, which may be because there were more female nurses. This conclusion is in line with their findings.

According to the study's findings, more than half had a technical institute education. This finding was not in the same line as that of **Sabry et al. (2020**), who found that most of the research participants had bachelor's degrees. Also, these findings are not consistent with **Bedier et al. (2019**) who found that over half of the nurses in the study had a nursing diploma. In contrast, **Ramya and Jose (2023**) discovered that two-thirds of the nurses in the study had a bachelor's degree in nursing.

According to the study's findings, three-fifths had ten or more years of experience. These findings are consistent with **Bedier et al. (2019)** who found that half of the sample had five to ten years of experience.

Regarding nurses' attendance training programs, the current study revealed that only five percent attended educational training related to airway risk factors and complications of laryngeal masks and endotracheal tubes. According to the researchers' point of view, a lack of training programs may result from nurses' ignorance of the significance of airway risk factors and complications of laryngeal mask and endotracheal tube, the priority of nursing interventions. Additionally, an increase in workload may leave nurses with insufficient time to attend training sessions.

The current study found that there were highly statistically significant differences and improvements in all items of knowledge pre and post-one-month educational guidelines implementation. From the researchers' point of view, this reflects the positive effects of guideline implementation and the importance and effectiveness of guideline implementation, which is generally associated with improved knowledge and a better understanding of the research topic of care among the nurses studied.

The results of the current study showed that Most of the studied nurses had unsatisfactory total knowledge scores in the pre-test phase, while the majority had total satisfactory knowledge scores regarding to airway risk factors of laryngeal mask and endotracheal tube after educational guidelines implementation. From the researchers' point of view, this reflects the need to implement guidelines.

The results of the current study showed that there was a highly statistically significant difference between studied nurses' knowledge pre and post-one month of guidelines implementation regarding airway complications of laryngeal mask and endotracheal tube. Also, there was a highly statistically significant difference between the total nurses' knowledge studied as pre- and post-one month of guidelines implementation regarding airway complications of laryngeal mask and endotracheal tube. This result can be attributed to the sufficient content of the guidelines related to airway complications of laryngeal masks and endotracheal tubes and also, reflected the desire of the studied nurses to improve their education.

These findings were in the same line with **Chintada et al., (2020**), in a study about the "Effectiveness of Self-Instructional Module (SIM) on knowledge regarding care of patients with endotracheal intubation among staff nurses" who found that, more than half of studied nurses (55.0%) had moderately adequate knowledge about endotracheal tube.

The results of the current study showed that the majority of the studied nurses had a satisfactory level of knowledge after the educational guidelines level regarding airway complications of laryngeal mask and endotracheal tube. This improvement demonstrated that the implementation of

educational guidelines was a successful method of increasing nurses' knowledge. These findings were in the same line with **Hassan et al., (2018),** in a study titled "Effect of Educational Program on Nurses' Knowledge Regarding Care of Patients with Endotracheal Tube " who illustrated that total nurses' knowledge was unsatisfactory through preprogram, and continuous education lead to development in nurses' knowledge and performance about ETT.

The current study showed that patients in the laryngeal mask group with a mean of 36.12±16.22 years old compared to 42.22±16.33 among the endotracheal tube group. Regarding sex, 54% of the laryngeal mask patients were female, while 62% in the endotracheal tube group were female. The majority of studied patients (66.7%) were married. Regarding age and gender, it was found that there was no significant difference between the two groups. These results are in line with research done by **Lakshmi., et al (2023)** who found that most of the people of the study participants were between the ages of 31 and 50

The results of this study showed that women made up more than half of the sample. This may be attributed to this type of airway being more suitable for females than males. This observation is supported by the finding in a study carried out by **Liu., et al (2019)** who found that more than half of the studied patients were females and there was no significant difference in sex or age.

The results of the current study showed that habits, smoking, and type of inhalation differed significantly between the two groups (p-value: 0,002, 0.001, 0.044), but other risk factors did not differ significantly. These findings are similar to a study conducted by **(Nowak & Schemitsch, 2019)** who found that, an operating time of more than 90 minutes may be an independent predictor of major and minor complications and that an operating time of between 40 and 90 minutes may be ideal.

The study showed a positive correlation between the long duration of anesthesia and hypoventilation these findings are similar to a study conducted by **Tanveer et al., (2024)** who found that Long-duration procedures are associated with greater complication rates.

This finding is similar to a study done by **Menna., et al (2021)** This retrospective investigation showed that the LMA strategy required less time to operate than the ETT approach. Type of inhalation especially is occurrence for the patients who underwent laryngeal mask as he noticed about forty percent of these individuals' experiencing complications, and these outcomes were consistent with **Alshami., et al (2023)** who reported that when using isoflurane, the most occurring side effect which is hypotension with the percentage of 42.9%.

Concerning smoking, the current study identified a statistically significant difference between endotracheal tube and laryngeal mask. This finding aligns with the results of a study by **Swerdlow, (2020)** who found an acknowledged workplace risk for those who work in operating rooms is surgical smoke.

The current investigation revealed a significant positive correlation among types of inhalation, Gagging, and aspiration. This observation is supported by the finding in a study carried out by **Hays, (2020)** During inhalation of volatile anesthetic agents can produce airway irritation and may precipitate coughing, patients are particularly prone to laryngospasm, emesis, and aspiration of gastric contents.

The results of the current study showed that there was a highly statistically significant difference regarding airway complications of patients in laryngeal masks and endotracheal tubes during anesthesia. This complication of using an ETT was reported to occur more than in LMA **(Kost, 2020).** In our opinion, there are further advantages of LMA use. First, the optimal position of the LMA could be ensured by a simple medical strip. With the ETT, it is common practice to secure the ETT throughout the entire procedure with the assistance of another person. Second, with the LMA, it was possible to determine the site of tracheal puncture by bronchoscopy alone. With an ETT, additional indirect measures such as palpation of laryngeal structures and transillumination are recommended. This may be difficult in anatomical variations.

This result agreed with **Neto., et al**

(2023) who reported that tracheal intubation with a laryngoscopy was considered a leading cause of dental injury. Similarly, the study conducted by **Al Saeg., et al (2021)** found that there is a relationship between the length of intubation and its complexity about the proportion of laryngeal injury. In my opinion, the length of time and complexity of intubation have an impact on the difficulties of recovery. **Also,** this finding is in agreement with **Paramaswamy, (2019)** who reported that after the insertion of an endotracheal tube (ETT), insufficient ventilation or oxygenation is obtained. Once alternative explanations such as tube kinking, patient biting, or capnography side stream obstruction have been ruled out, this situation presents itself. Additionally, the study conducted by **Hung. et al(2022)** found that lower sealing pressure and a higher incidence of stomach insufflation were two of the observed drawbacks of LMA compared to ETT.

The results of the current study showed that there was a highly statistically significant difference regarding airway complications of patients in laryngeal masks and endotracheal tubes post-anesthesia. **Similarly, Kaiser et al., (2019)** reported that patients with ETTs showed critically impaired ventilation and hypoxia (Pao2 60 mm Hg), with an LMA, no case of hypoxia. Most studies using an LMA for PDT found minor changes in ventilation or at least ventilation comparable with an ETT.

This finding is matched with **Craven et al., (2023**) found that the LMA is recommended for use in patients at risk for aspiration. Also, This finding is in agreement with **Aryafar., et al (2021)** who reported that the incidence of Following LMA, there would be fewer sore throats, which would be linked to less postoperative throat pain and happier patients. Following LMA, there would be fewer sore throats, which would be linked to less postoperative throat pain and happier patients. Age, sex, and BMI did not significantly correlate with the incidence of sore throat following LMA administration. In our study, patients who had general anesthesia during surgery reported having minor postoperative sore throats after LMA.

The results of the current study showed that there was a statistically significant relationship between theeducational level of the studied nurses and overallknowledge throughout the phases of the educational guidelines. From the researchers' point of view, it reflected the importance of educational level in promoting health and decreasing the incidence of airway risks and complications for patients who use laryngeal masks and endotracheal tubes through updating and improving their knowledge.

Conclusions:

Based on the findings of this study, it can be concluded that educational guidelines regarding airway risks and complications for patients using laryngeal masks and endotracheal tube has positive effects on improving patients' knowledge. Also, has a significant effect on decreasing the frequency of risks and complications of laryngeal mask airway and endotracheal tube. Additionally, the laryngeal mask has fewer risks and complications than the endotracheal tube.

Recommendations:

The following recommendations are suggested based on the results of the current study:

- Prepare patients before surgery and give patients health education. Providing nurses with continuous in-service training programs that help increase their knowledge.
- Replication of the current study with a larger sample of nurses in different settings is required to generalize the results.

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