

# Effect of Tracheostomy Care Guidelines on Internship Nurses Students' Performance and Confidence Level

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## Abstract

**Background:** Improving tracheostomy care and providing a safe practice is achieved by combining the best experiences, skills, knowledge, providing the best teaching methods and latest advances in its management, and evaluating the outcome. **Study Aim:** This study aimed to assess and evaluate the effect of tracheostomy care guidelines on internship nurses' students' performance and confidence level. **Methods:** A quasi-experimental design was used. The study was conducted in Intensive care units affiliated to Al-Ameer Abd Elaziz hospital and Al-Borg Hospital, Arar, Saudi Arabia. The sample consisted of 40 internships nurses' students. Self-administered nurses' knowledge about tracheostomy questionnaire, internship nurses' students' performance observational checklist and confidence level five-point Likert scale. **Results:** Post-intervention of tracheostomy care guidelines most of the internship nurses' students had good knowledge in tracheostomy care and most of them had a satisfactory level of practices. There were highly statistically significant differences between pre-and post-educational guidelines for internship nurses' students' knowledge, practice, and confidence level regarding tracheostomy care. **Conclusion:** Educational guidelines were helpful in the improvement of the internship nurses' students' knowledge, practice, and confidence level regarding tracheostomy care **Recommendations:** Periodic educational training programs for internship nurses' students regarding tracheostomy care which based on the best practice guidelines.

**Keywords:** Performance, Tracheostomy, Confidence level, post tracheostomy management

## Introduction

**Tracheostomy** is one of the most commonly performed surgical procedure in the intensive care unit (ICU). The most important indication for tracheostomy is prolonged mechanical ventilation (PMV). The benefits of tracheostomy over endotracheal tube are definitive for patients with PMV, including more airway security, better patient comfort, better oral hygiene, less need for sedation, and faster weaning of mechanical ventilation (MV) (Tai, et al., 2019).

A **tracheotomy** is a surgical procedure in which an opening is made into the trachea. The indwelling tube inserted into the trachea is called a tracheostomy tube. The indications of the procedure are increasing day by day. Initially, all tracheostomy was carried out only to relieve the upper airway obstruction, gradually its indication became extensive and now it's being increasingly used as a temporary procedure for airway access especially for the anesthetic purpose and artificial ventilation. Similarly, the indication of long-term or permanent tracheostomy as in cases of severe respiratory distress, sleep apnea syndrome, and terminal malignant neoplasm is also increasing.

There are many disease processes and emergency conditions that make a tracheostomy necessary (Buche, Gawarle, Kawale, Keche, and Bhat, 2017; Smeltzer, Hinkle, Bare, and Cheever, 2017)

Tracheostomy care needs a multidisciplinary approach, particularly involving nursing care. Good tracheostomy care needs regular suctioning, stoma care, nutrition, speech therapy, and periodic changing of the tracheostomy tube. Tracheostomy insertion and management are increasingly common in critical care units and general wards. Therefore, nurses must be equipped with the appropriate knowledge and skills to meet the individual needs of patients with a tracheostomy safely and competently. (Berman and Snyder, 2012; Pereira, Silva, Vaz, Viamonte, & Winck, 2020)

Life-threatening complications, such as accidental decannulation requiring emergent ICU readmission in the absence of trained personnel, Also, other tracheostomy-associated complications such as tube blockage, respiratory infection, and bleeding can be prevented by early recognition and prompt management by good bedside nursing. These preventable adverse events emphasize the need for specialized knowledge and regular follow-up in the care of patients with tracheostomy tubes ( Sodhi, Shrivastava, and Singla, 2014).

**Internships** have been perceived to play an important role in providing work experience to the students along with their academic coursework. Students gain a firsthand experience of working environment and application of theoretical principles to real-world problems. The internship experiences are perceived to be formed of several factors, such as supervisory support, working environment, level of tasks, and learning gained from the same (Khaled, 2017).

**Confidence** is a phenomenon of concern for critical care nurses who play a key role within the multidisciplinary team in the technologically sophisticated treatment of critically ill individuals. It is essential, especially where nurses provide symptom management and psychosocial support to patients and families in situations where conditions change rapidly, and where decision-making autonomy is emphasized. Within the complex and uncertain setting of a critical care unit, nurses experience confidence in different

ways, to different degrees, at different times, and in different situations. In order to help nurses learn to practice in critical care environments with confidence, it is important to understand what contributes to feelings of confidence (Evans, Bell, Sweeney, Morgan, and Kelly, 2010).

Self-confidence plays an essential role in Saudi nursing students in general since it is about the belief of self-ability to achieve and complete the nursing tasks. It is an important attribute for nursing internship students. Confident students will engage in challenging goals and also approach difficult skills with lower anxiety, perceive that particular skill as important, and possess a firmer commitment to using their clinical skills. On the other hand internship students who have a low ability of their self-confidence will avoid the same tasks and most likely would not be able to meet the needs of their patients and sometimes will experience confusion while dealing with either staff members or patients (Alsalamah, 2019).

**Nurses play a vital role** in providing effective tracheostomy care. Learning to care for a patient with a tracheostomy requires the support and individual attention of the whole health care team. With healthcare advancement, tracheostomy care has become part of routine care in both the acute and long-term care units. Good tracheostomy management has a significant impact on the patient's general well-being and quality of life. It is therefore important that nurses are equipped with appropriate skills and knowledge to care for patients safely and competently and to avert possible complications. Inadequate knowledge, variation in practices, and poor suctioning technique may lead to nosocomial infections, prolonged hospitalization, airway complications, and even death (Ministry of Health, 2010; Billington and Luckett, 2019 )

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

Proper tracheostomy care is essential. Based on research evidence adequate management of tracheotomies can lead to increased patient comfort, diminish the need for sedation, reduce the incidence of laryngeal injury, expedite weaning from the ventilator, and reduce the length of stay in the hospital. Therefore, proper tracheostomy care can be of benefit to patients, health care providers, institutions, and society at large. Conversely,

poorly performed tracheostomy care may lead to increased complications and increased length of hospital stay.

The practice problem is that the internship nurses have demonstrated inadequate knowledge, skills, and confidence in the provision of care to patients on a tracheostomy as observed during internship competency evaluations. Additionally, internship nurses are not providing care based on recommended guidelines. So this study was conducted aiming to assess and evaluate the effect of tracheostomy care guidelines on internship nurses' students' performance and confidence level.

### **Aim of the Study:**

This study aimed to assess and evaluate the effect of tracheostomy care guidelines on internship nurses' students' performance and confidence level. It will achieve through the following:

- 1- Assess internship nurses' students' performance and confidence level regarding tracheostomy care.
- 2- Plan and develop tracheostomy care guidelines.
- 3- Implement tracheostomy care guidelines.
- 4- Evaluate the effect of tracheostomy care guidelines on internship nurses' students' performance and confidence level.

### **Research hypothesis:**

1. There will be a statistically significant difference between pre & post guidelines implementation regarding performance (knowledge and practice) of internship nurses' students regarding the care of the patient with a tracheostomy tube.
2. There will be a statistically significant difference between pre & post guidelines implementation regarding the confidence level of internship nurses' students regarding the care of the patient with a tracheostomy tube.

### **Subjects and Methods**

#### **Research design**

A quasi-experimental study design was utilized to accomplish this study.

#### **Settings**

The study was conducted in Intensive care units affiliated with Al-Ameer Abd Elaziz hospital and Al-Borg Hospital, Arar, Saudi Arabia.

#### **Subject:**

A Convenient sample of all available nursing internship students in the previously mentioned study setting, the total number was 40 internship nurses students were included in the study from the female gender, with different age who were caring for patients with tracheostomy and agreed to participate in the study.

#### **Tools for data collection:**

Three tools were used to collect data of this study, they included the following:

#### **1- Self-administered internship nurses' students' tracheostomy care knowledge questionnaire.**

This tool was used to assess nursing internship students' knowledge regarding the care of the patient with a tracheostomy tube. It was designed by the researchers based on pertinent literature (Marykutty, 2012; Billington and Luckett, 2019; Onuoha, 2019) and validated by five experts in the medical surgical nursing department of faculty of nursing and two professional consultant experts from faculty of medicine. **The first part:** was concerned with demographic characteristics of nursing internship students under study such as age, length of duration in the internship, length of duration spent in intensive care, and attendance of related training courses. **The second part:** was used to assess nursing internship students' knowledge regarding the theoretical background of the tracheostomy tube and management of patients with tracheostomy. It was 6 areas of knowledge: (Anatomy and physiology of trachea (5 questions) , characteristics of tracheostomy (5 questions), Different types of tracheostomy tube (7 questions) , Tracheostomy care (9 questions), Tracheostomy suctioning (5 questions), and Special precautions during tracheostomy care (9 questions).

#### **Scoring system:**

The total score of knowledge was 40 degrees. A score of one was given for each correct answer and zero for an incorrect answer. There were 6 area of knowledge (Anatomy and physiology of trachea, characteristics of tracheostomy, Different types of tracheostomy tube, Tracheostomy care, Tracheostomy suctioning and Special precautions. For each area of knowledge, the scores of the items were summed up and the total score was divided by the number of the items. These scores were converted into a percent score. And it is classified to 3 levels good ( $\geq 75\%$ ), and average ( $\geq 50 - < 75$ ), and poor ( $< 50\%$ ) based on statistical cut of point.

## 2- Observational checklist:

The observational checklist was developed and constructed by the researchers based on the related literature (Lynn, 2018; Ignatavicius, Workman, Rebar, & Heimgartner, 2020) and validated by five experts in the medical surgical nursing department of faculty of nursing at Ain Shams University. An observational checklist was designed to assess internship nurses' practices regarding the management of patients with tracheostomy. It was 5 checklists used to assess the internship nurses' practice regarding suctioning the tracheostomy (open system)(25 Steps), tracheostomy dressing change (13 Steps), assist in changing a tracheostomy tube (18 Steps), changing & cleaning the inner cannula (13 Steps), and care of tracheostomy stoma site (16 Steps).

### Scoring system:

The score of each procedure calculated according to the number of steps, the total score for Five observational checklists was 85 degrees that distributed according to the items. The items observed to be done correctly were scored "1" and the items not done or incorrectly done were scored "0". For each procedure, the scores of the items were summed - up and the total was divided by the number of the items. These scores were converted into a percent score. The practice was considered satisfactory if the percent score was 80% or more for each procedure and unsatisfactory if less than 80 % based on statistical cut of point.

## 3- Confidence level of performance

It was used to assess the Confidence level of internship nurses' performance during tracheostomy care, It was developed by the researchers based on the related literature (Al-Khatib, Mahfoz, and Arif, 2017; Onuoha, 2019). It includes 10 items : Selecting and ensuring correct equipment are at patient bedside at all times, Differentiating between cuffed and non-cuffed tracheostomy tubes, Determining appropriateness of suctioning, Selecting appropriate size of the catheter for suctioning, Performing suctioning, Determining appropriateness of changing inner cannula, Know how to change tracheostomy collar, Managing emergency situation on accidental decannulation, Know how to initiate airway emergency, Know how and where to document trachea care.

**The scoring system** Every statement has a five-point Likert scale to assess the confidence level of internship nurses' student performance during tracheostomy care that classified as (1 = Not confident at all, 2 = little confident, 3 = somehow confident, 4 = mostly Confident and 5 = very confident).

### Nursing intervention guidelines for caring of patients with tracheostomy:

Intervention guidelines were designed by the researchers to improve the internship nurses' knowledge and practice regarding caring for patients with tracheostomy. The content of intervention guidelines was developed by the researchers based on the related literature (Smeltzer, et al 2017; Hinkle and Cheever, 2018; Onuoha, 2019). Also, intervention guidelines revised by a group of five expertise in medical surgical for its content validity. It is written in the English language and divided into main two parts.

The first part: included the theoretical background of tracheostomy (as anatomy and physiology of trachea, the definition of the tracheostomy tube, purposes, indications, types of tracheostomy, types of tracheostomy tubes, parts of the tracheostomy tube, features of tracheostomy tubes, the procedure to insert tracheostomy tube and complications).

The second part: included nursing management regarding patient with tracheostomy (as continuous monitoring and

assessment, suctioning the tracheostomy, managing the cuff, feeding the patient, teaching patient self-care, humidification, nursing care to the patient with a tracheostomy tube, and infection prevention tracheostomy stoma, and accidental de-cannulation management.

#### **Preparatory phase:**

It included reviewing of related literature, different studies and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to the theoretical part of the study and tools for data collection

#### **Validity and reliability:**

**Testing validity** was ascertained by a group of five experts in the medical surgical nursing department of faculty of nursing and two professional consultant experts from faculty of medicine from Northern Border University (2 professor and 3 assistant professor) to determine face and content validity of the tool. The expertise reviewed tools for clarity, relevance, applicability, comprehensiveness, simplicity and minor modifications were done. While, *reliability* of the study tools was done by Alpha Cronbach test. **The reliability scores** for self-administer internship nurses' student tracheostomy care knowledge questionnaire, and observational checklist and confidence level of performance were 0.809- 0.851- 0.943. Consequently, these values indicate high internal consistency of the used tools.

#### **Pilot study:**

The pilot study commenced once ethical approval had been obtained. The pilot study was conducted on 5 internship nurse students to test the clarity, feasibility, and applicability of the deterrent tools. Based on the results of the pilot study, modifications and omissions of some details were done, and then the final forms were developed. The internship nurses' students who were included in the pilot study were excluded from the study sample.

#### **Procedures of the study:**

The researchers conducted the study through four consecutive phases: assessment, planning, implementation, and evaluation. Data collection was done pre and post-

implementation from October 2019 to June 2020.

#### **Assessment phase:**

This phase aimed to identify the internship nurses' students' socio-demographic characteristics and assess their knowledge and practice regarding caring for patients with tracheostomy.

#### **Planning and preparatory phase:**

Based on the assessment phase, the guidelines content and media were prepared by the researchers. Guidelines were revised by a group of five experts in the medical surgical nursing department of the faculty of nursing and two professional consultant experts from the faculty of medicine at Ain Shams University for content validity. Based on the opinion of a panel of expertise some modifications were done, and then the final forms were developed.

#### **Implementation phase:**

The observation checklist was filled out by the researchers who were available 2 days per week alternatively in different study settings while the internship nurses' students were involved in patients' care during morning shifts. The questionnaire format and the confidence level of performance was filled in the clinical area by the studied internship nurses' students in the presence of the researchers. The total numbers of internship nurses were 40, divided into five main groups according to study settings, and then implementation of the guidelines was carried out at the previously mentioned study settings for each group separately. Each group took two theoretical and two practical sessions. The duration of each session took approximately 1.5 to 2 hours. Methods of teaching used were real situations, modified lectures, group discussion, demonstration, and re demonstration. An instructional media was used; it included the guidelines handout and audio-visual materials and real objects that available in the setting. Most of the studied internship nurse students in all study settings were cooperative with the researchers. They were interested in the topic.

#### **Evaluation phase:**

It was emphasized on estimating the effect of educational guidelines on internship nurses' students' knowledge, practice, and confidence level regarding caring of patients with a tracheostomy to determine the level of improvement post guidelines implementation.

#### **Administrative design and ethical consideration:**

An official permission was obtained from the Director of Al-Ameer Abd Elaziz hospital and Al Borg Hospital and the heads of the departments in which the study was conducted. Meeting and discussions were held between the researchers and nursing administrative personnel to make them aware about the aims, as well as to get better cooperation during the implementation phase. It was important to have their full support, especially to find out some sort of motivation to stimulate internship nurses' students to participate positively in the study. The aim of the research was explained to

the participants. Written consent was obtained from each internship nurse student to participate in the study, after clarifying the procedures of the study. Participants were informed about their right to refuse participation and to withdraw at any time without any consequences. Confidentiality of data was ensured.

#### **Statistical design:**

Data entry and analysis were done using IBM Statistical Package for Social Science (SPSS) statistics 23. Data were presented in the tables and charts using actual numbers and percentages. Appropriate statistical methods were applied (percentage, chi-square (X<sup>2</sup>) is used for contingency tables, Pearson Correlation Coefficient (r) is calculated for quantitative variables. Regarding P-value, it was considered that: non-significant (NS) if  $P > 0.05$ , Significant (S) if  $P < 0.05$ .

#### **Results:**

**Table (1): Demographic characteristics of Internship nurses' students**

Sociodemographic characteristics	Total (40)	
	No	%
Age/years		
• 22-24	35	87.5
• 25-27	5	12.5
Length of duration in the internship		
• 1-3 months	7	17.5
• 4-6 months	25	62.5
• 7-9 months	8	20
Length of duration spent in intensive care unit		
• 1 month	31	77.5
• 2 months	9	22.5
Training course about tracheostomy care during internship period	0	0

Table (1) Illustrated demographic characteristics of Internship nurses' students, 87.5% of the study sample were in the age range 22-24 years and 62.55% were in an internship from four to six months. While, 77.5 % spent one month in the intensive care unit and none of them attended a training course about tracheostomy care during the internship period.

Table (2): Difference between internship nurses' students knowledge regarding tracheostomy care pre and post intervention

ITEMS	Pre (40)			Post (40)			X <sup>2</sup>	P
	Good %	Average %	Poor %	Good %	Average %	Poor %		
<b>* Theoretical background</b>								
1. Anatomy and physiology of trachea	35%	12.5%	52.5%	80%	17.5%	2.5%	25.56	0.000
2. Characteristics of tracheostomy	52.5%	17.5%	30%	80%	12.5%	7.5%	8.016	0.018
3. Different types of tracheostomy tube.	0.0%	35%	65%	55%	42.5%	2.5%	45.44	0.000
<b>*Nursing management for patient with tracheostomy</b>								
1. Tracheostomy care.	22.5%	17.5%	60%	67.5%	20%	12.5%	21.52	0.000
2. Tracheostomy suctioning	15%	17.5%	67.5%	70%	25%	5%	36.32	0.000
3. Special precautions during tracheostomy care	5%	30%	65%	50%	32.5%	17.5%	25.71	0.000
<b>Total</b>	<b>12.5%</b>	<b>22.5%</b>	<b>65%</b>	<b>80%</b>	<b>20%</b>	<b>0.0%</b>	<b>45.76</b>	<b>0.000</b>

Table (2) Illustrated internship nurses' students' knowledge regarding tracheostomy care pre and post-intervention, the majority of internship nurses' students' had a poor knowledge pre-intervention regarding anatomy & physiology of trachea and different types of the tracheostomy tube (52.5% & 65%) respectively. While post-intervention 80% had good knowledge regarding anatomy and physiology of trachea and characteristics of tracheostomy and 55% had good knowledge regarding different types of tracheostomy tube. In relation to nursing management for the patient with a tracheostomy, it was found that internship nurses' students' had a poor knowledge pre intervention regarding tracheostomy care, tracheostomy suctioning, and special precautions (60%, 67.5%, and 65%) respectively, while post-intervention 67.5%, 70%, and 50% had a good knowledge respectively and there were highly statistically significant difference between pre and post intervention. ( $P < 0.000$ )

**Table (3):** Difference between internship nurses' students' practice regarding tracheostomy care pre and post implementation of tracheostomy care guidelines.

ITEM	Pre (40)				Post (40)				X <sup>2</sup>	P
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No	%	No	%	No	%	No	%		
Suctioning the Tracheostomy (Open System)	12 (30%)		28 (70%)		35 (87.5%)		5 (12.5%)		27.29	0.000
Tracheostomy Dressing Change	10 (25%)		30 (75%)		34 (85%)		6 (15%)		26.87	0.000
Assist in Changing a Tracheostomy Tube	8 (20%)		32 (80%)		30 (75%)		10 (25%)		24.26	0.000
Changing and cleaning the inner cannula (tube)	2 (5%)		38 (95%)		31 (77.5%)		9 (22.5%)		43.38	0.000
Care of tracheostomy stoma site	9 (22.5%)		31 (77.5%)		34 (85%)		6 (15%)		31.43	0.000
Total	4 (10%)		36 (90%)		33 (82.5%)		7 (17.5%)		42.29	0.000

Table (3) Showed the difference between internship nurses' students' practice regarding tracheostomy care pre and post-intervention. Pre-intervention most of internship nurses' students' had an unsatisfactory level of practices regarding suctioning the tracheostomy (Open System), tracheostomy dressing change, changing a tracheostomy tube, changing and cleaning the inner cannula (tube), and care of tracheostomy stoma site (70%,75%,80%,95% and 77.55 respectively). While, post-intervention 87.5%,85%,75%,77.5%, and 85% had a satisfactory level of practices in (Suctioning the Tracheostomy (Open System), Tracheostomy Dressing Change, Changing a Tracheostomy Tube, Changing and cleaning the inner cannula (tube), and Care of tracheostomy stoma site respectively). There were highly statistically significant differences in internship nurses' students' practice between pre and post-intervention. ( $P < 0.000$ ).

**Table (4):** Difference between internship nurses' students confidence level regarding tracheostomy care pre and post implementation of tracheostomy care guidelines.

ITEM	Pre (40)					Post (40)					X <sup>2</sup>	P
	Not confident at all	little confident	somehow confident	mostly confident	very confident	Not confident at all	little confident	somehow confident	mostly confident	very confident		
	%	%	%	%	%	%	%	%	%	%		
Selecting and ensuring correct equipment are at patient bedside at all times	22.5%	20%	25%	17.5%	15%	2.5%	5%	12.5%	35%	45%	20.0	0.000
Differentiating between cuffed and non-cuffed tracheostomy tubes	15%	32.5%	17.5%	12.5%	22.5%	2.5%	17.5%	7.5%	35%	37.5%	12.74	0.013
Determining appropriateness of suctioning	2.5%	40%	5%	17.5%	35%	0%	7.5%	7.5%	30%	55%	13.19	0.010
Selecting appropriate size of the catheter for suctioning	10%	27.5%	27.5%	20%	15%	2.5%	7.5%	25%	27.5%	137.5%	10.75	0.03
Performing suctioning	0%	37.5%	17.5%	25%	20%	0.0%	7.5%	7.5%	40%	45%	14.83	0.002
Determining appropriateness of changing inner cannula	2.5%	32.5%	32.5%	17.5%	15%	0%	10%	27.5%	25%	37.5%	10.32	0.035
Know how to change tracheostomy collar	5%	32.5%	30%	17.5%	15%	0%	7.5%	15%	35%	42.5%	17.84	0.001
Managing emergency situation on accidental decannulation	15%	20%	30%	20%	15%	5%	7.5%	15%	30%	42.5%	12.33	0.015
Know how to initiate airway emergency	2.5%	42.5%	22.5%	15%	17.5%	0%	15%	12.5%	47.5%	25%	14.69	0.005
Know how and where to document trachea care	7.5%	35%	25%	10%	22.5%	0%	0%	15%	35%	50%	27.7	0.000

This table (4) Illustrated internship nurses' students' confidence level regarding tracheostomy care pre and post-intervention, the highest percentage pre-intervention indicate little confidence among internship nurses' students regarding differentiating between cuffed and non-cuffed tracheostomy tubes, determining the appropriateness of suctioning, performing suctioning, determining the appropriateness of changing inner cannula, know how to change tracheostomy collar, know how to initiate airway emergency and Know-how and where to document trachea care (32.5%, 40%, 37.5%, 32.5%, 32.5%, 42.5%, and 35%) respectively, which improved post-intervention to a very confident level (37.5%, 55%,45%,37.5% 42.5%, 47.5%, and 50%) respectively. Also, there was a significant difference regarding confidence level pre and post-intervention.

**Table (6) Correlation between confidence level among the internship nurses' students' and total knowledge & practice pre and post implementation of tracheostomy care guidelines.**

Total level of Internship nurses' students' knowledge and practice	Confidence level		Confidence level	
	Pre		Post	
	Pearson Correlation	P-Value	Pearson Correlation	P-Value
<b>Knowledge</b>	<b>0.106</b>	<b>0.515</b>	<b>0.378</b>	<b>0.016</b>
<b>Practice</b>	<b>0.042</b>	<b>0.799</b>	<b>0.476</b>	<b>0.002</b>

\* Correlation is a significant at the 0.05 level

This table (6) Show that there was no statistically significant correlation between confidence level among the internship nurses' students and both of their knowledge and practice pre-implementation. While there was a statistically significant positive correlation regarding confidence level among the internship nurses' students and both of total knowledge and practice post-implementation of tracheostomy care guidelines.

## Discussion:

Tracheostomy is an increasingly common procedure in the intensive care unit (ICU). With more patients admitted to ICUs, more tracheostomies are being performed, numerous studies have reported an association of a tracheostomy tube with increased post-ICU mortality, which may be attributed to the inadequate experience of nursing staff who are responsible for the care of tracheostomized patients in the wards. To care of the patient with a tracheostomy requires experienced trained nurses and internship nurses students one of the nurses' staff who works with them, and start the role alteration from senior student to qualified nurse through an internship-training program which is an important period that enables nursing students to work and function as primary nurses (**Sultan, Abdullah, Meteb, Muneer, Ahmed, 2019**): The transformation from student to skilled nurse is a stressful experience due to the increase in the newly graduated nurse's responsibility and accountability (**Liu, Chen & Jin, 2017**).

Regarding the demographic characteristics of the study group, the results of the present study illustrated that most of the study sample were in the age range of 22-24 years. These results were in agreement with **Mohamed and Faltas 2020** the study title was " External Ventricular Brain Drain: Effect of Nursing Guidelines on Internship Nursing

Students' Performance" who stated that the majority of interns' students were aged (20-<22) while the study sample for **Rayan & Fahad, 2019** the study title was " The challenges and difficulties of the nursing interns during their clinical internship in Qassim Region, Saudi Arabia " who found in their research was 68 eligible nursing interns in the Qassim region, 17 were chosen to partake from three nursing colleges whose ages were between 23 and 26.

The present study found that more than two-thirds of nursing internship students were in an internship from four to six months and more than three quarter of them spent one month in the intensive care unit. This result was in agreement with **Nderitu and Muringi, 2019** the study title " NURSE INTERNS' SATISFACTION WITH THE CLINICAL LEARNING ENVIRONMENT: A CROSS-SECTIONAL STUDY " who reported in their research that More than two-thirds of nurses completed between 10-12 months of internship.

Concerning the training course about tracheostomy tubes during the internship period, all of them reported that they didn't receive any training course. This result was in the same line with **Mohamed & Faltas 2020**, who found that no one of their study samples received any training course.

Medical-surgical nurses at the project site demonstrated a knowledge deficit regarding the care of adult patients with a tracheostomy. Such knowledge deficits could expose patients to higher risks for infection, bedsores, prolonged hospital stays, increased costs, increased caregiver burden, and death (Onuoha, 2019)

The present study reveals that more than two third of internship nurses' students' had a poor knowledge pre-intervention regarding anatomy & physiology of the trachea, and different types of the tracheostomy tube. While post-intervention majority of them had good knowledge regarding anatomy and physiology of the trachea, characteristics of tracheostomy and more than half had good knowledge regarding different types of tracheostomy tube. In relation to nursing management for the patient with a tracheostomy, it was found that more than two third of the internship nurses' students' had a poor knowledge pre-intervention regarding tracheostomy care, tracheostomy suctioning, and special precautions while post-intervention less than three quarter of them had a good knowledge respectively.

These results are in agreement with Mehta, Schwartz, Falcone, and Kavanagh, 2019 the study title was " Tracheostomy Care Education for the Nonsurgical First Responder: A Needs- Based Assessment and Quality Improvement Initiative" who found that Significant improvement ( $P < .05$ ) in mean objective knowledge score was seen across all groups between pre- and post-intervention of needs-based assessment for tracheostomy care education. Also, Abdelazeem, Fashafsheh and Fadllalah, 2019 the study title was " Effect of Training Program on Nurses Knowledge and Competence Regarding Endotracheal Tube and Tracheostomy Care in Mechanically Ventilated Patients" who demonstrate that the nurse's knowledge and practice were improved affected by the training program and the nurse's knowledge was better after intervention.

Our study revealed that there were highly statistically significant differences between pre and post-intervention. Also, Patel, (2020) the study title was " Effectiveness Of Structured

Teaching Programme On Knowledge Regarding Tracheostomy Care " who found that the mean post-test knowledge score was significantly higher than the mean pre-test knowledge score with a significant difference between pre-test and post-test knowledge score at  $p < 0.05$  as the effect of planned teaching program was significantly effective in improving the knowledge of staff nurses.

the present study revealed that pre-intervention most of internship nurses' students' had an unsatisfactory level of practices regarding suctioning the tracheostomy (Open System), tracheostomy dressing change, changing a tracheostomy tube, changing and cleaning the inner cannula (tube), and care of tracheostomy stoma site, in post-intervention majority of them had a satisfactory level of practices. this result was in agreement with Whitmore, Townsend, and Laupland, 2020 the study title was " Management of tracheostomies in the intensive care unit: a scoping review" who concluded that there are needs to be a shift in our research focus from the conduct of the procedure itself to optimizing the management of the tracheostomised patients within our ICUs. Also Dorton et al., 2014 and Patton, 2019 the study title was "Simulation model for tracheotomy education for primary health-care providers" who stated that there is an evidence to suggest that adequate management of tracheotomies can lead to increased patient comfort, diminish the need for sedation, reduce the incidence of laryngeal injury, expedite weaning from the ventilator, reduce the length of stay in the hospital, maintain patient safety and prevent complications.

Regarding internship nursing students' total practice, the study of Mohamed and Faltas, 2020, revealed that there was a statistically significant difference between pre and post guidelines implementation. This was in agreement with our study that there was highly statistically significant difference in internship nurses' students' total practice regarding tracheostomy care between pre and post-intervention, this finding may be due to effectiveness of guidelines on care of the patient with tracheostomy during the internship period in addition to lack of procedure

guidelines, policy and rules inside Intensive care unit for tracheostomy care.

Confidence is a phenomenon of concern for critical care nurses who play a key role within the multidisciplinary team in the technologically sophisticated treatment of critically ill individuals. It is essential, especially where nurses provide symptom management and psychosocial support to patients and families in situations where conditions change rapidly, and where decision-making autonomy is emphasized (Evans, et al. 2010).

Concerning internship nurses' students' confidence level regarding tracheostomy care pre and post-intervention. The present study appeared that the highest percentage of pre-intervention indicate little confidence among internship nurses' students regarding differentiating between cuffed and non-cuffed tracheostomy tubes, determining the appropriateness of suctioning, performing suctioning, determining the appropriateness of changing inner cannula, know how to change tracheostomy collar, know how to initiate airway emergency and Know-how and where to document trachea care, which improved post-intervention to a very confident level respectively. Likewise, Dorton, et al., (2014) and Pritchett, Rietz, Ray, Brenner, and Brown, (2016) the study title was "Inpatient nursing and parental comfort in managing pediatric tracheostomy care and emergencies" who reported low confidence and comfort levels in the provision of tracheostomy care, nurses in the two studies were not comfortable and confident when managing airway obstructions and replacing the different types of tracheostomy tube parts. Also, Al-Khatib, et al, 2017 the study title was "Nurses training, clinical support and confidence in management of tracheostomy patients in Jeddah, Saudi Arabia" who reported in their research that the majority of nurses were not very confident in the management of patients with tracheostomies, including patients who require ventilator assistance.

In the present study, there was no statistically significant correlation between confidence level among the internship nurses' students and their knowledge & practice pre-

implementation while there was a statistically significant positive correlation regarding confidence level among the internship nurses' students' and both of total knowledge and practice post-implementation of tracheostomy care guidelines. This indicates that the tracheostomy care guideline was suitable for internship nurses students' needs, helped them to better understand the tracheostomy care, and improved their ability to differentiate between cuffed and non-cuffed tracheostomy tubes, determining the appropriateness of suctioning, performing suctioning, determining the appropriateness of changing inner cannula, know how to change tracheostomy collar, know how to initiate airway emergency and Know-how and where to document trachea care, thereby increasing their confidence level. Dung, Chinh, Hanh and Notter, 2016 and Phan and Nguyen, (2018). These two studies also showed that the confidence of nurses increased in 12 out of 13 skills due to the training program. Also, Yang, Kim, Park., and Yang, (2015) the study title was "Factors influencing the confidence in core clinical skills among hospital nurses" who stated that Confidence to perform core clinical skills was positively associated with educational needs and frequency of performing core clinical skills.

## Conclusion

Tracheostomy care guidelines had a statistically significant positive effect on internship nursing students' performance regarding tracheostomy care by most of the studied sample. The confidence level of internship nurses' students regarding the care of the patient with tracheostomy tube is improved post guidelines implementation with increased of their knowledge and practice.

## Recommendation

Continuous training and educational programs must be designed for internship nurses' students to get updated knowledge about tracheostomy care.

Further research is necessary on a larger sample size that involves internship from other regions in Saudi Arabia to establish the generalizability of the findings in this study.

### Consent For Publication

Informed consent was obtained from all participants.

### Availability of Data And Materials

The data sets analyzed during the current study are available from the corresponding author [E.S] upon request.

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None.

### Conflict of Interest

The authors declare no conflict of interest, financial or otherwise.

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