Nurses' Performance Regarding Care of Patients with Tracheostomy

Isaac Sabry Naeem Beshay[1], Magda Abdelaziz Mohamed[2], Howyda Ahmed Mohamed[3] and Sara Fathy Mahmoud[4]
Clinical Instructor, Health Technical Institute of Sohag, Professor of Medical Surgical Nursing[2], Assistant Professor of Medical Surgical Nursing[3] and Lecturer of Medical Surgical Nursing[4], Faculty of Nursing, Ain Shams University.

Abstract:

Background : Tracheostomy is a surgical procedure which consists of making an opening direct to airway through an incision in the trachea. The most common indications for tracheostomy are acute respiratory failure and need for prolonged mechanical ventilation representing two thirds of all cases and traumatic or catastrophic neurologic insult requiring airway, or mechanical ventilation or both. Nursing staff must be understand the immediate postoperative and long-term management of patients with tracheostomy to provide safe and competent care for these patients. **Aim:** This study aimed to assess nurses' performance regarding care of patients with tracheosotmy. **Design:** A descriptive design was utilized for the conduction of this study. **Setting:** the study was carried in general intensive care unit, which is affiliated to Sohag University hospital. **Subjects:** A convenience sample of all the available staff nurses of (50) nurses working in general intensive care unit.**Tools:** Three tools, nurses' self-administered questionnaire,, nurses' practice observational checklist and nurses' attitude questionnaire. **Result:** The studied nurses were having unsatisfactory total level of knowledge regarding care of patients with tracheostomy, unsatisfactory level of practice and had negative attitude regarding care of patients with tracheostomy. **Conclusion**: There were unsatisfactory level of performance among nurses under the study. **Recommendations:** The study should be replicated on large sample and in different hospitals setting in order to generalize the results.

Keywords: Performance, Tracheostomy.

Introduction:

A tracheostomy is an opening created by a surgical incision into the anterior wall of the trachea to make an exterior opening or stoma. A tracheostomy tube is inserted at the time of surgery to maintain a patent airway. The aim of tracheostomy is to bypass obstruction in the upper airway; to aid prolonged and assisted ventilation; and to facilitate the removal of respiratory secretions. Tracheostomy can be a temporary solution or a long-term measure **(Kim & Julie, 2013).**

General indications for the placement of tracheostomy include acute respiratory failure with the expected need for prolonged mechanical ventilation, failure to wean from mechanical ventilation, upper airway obstruction, difficult airway, and copious secretions. The most common indications for tracheostomy are acute respiratory failure and need for prolonged mechanical ventilation (representing two thirds of all cases) and traumatic or catastrophic neurologic insult requiring airway, or mechanical ventilation or both. Upper airway obstruction is a less common indication for tracheostomy **(Ran, Pendem, Pogodzinski, Hubmayr, & Gajic, 2015).**

Decreased level of consciousness, poor airway protective reflexes, and severe alterations in physiology associated with trauma and medical illness are also indications for tracheostomy. The frequency of performing tracheostomy appears to be increasing, so that development of less invasive tracheostomy

techniques that can be performed safely at the patient's bedside **(Michele, et al., 2019)**

Basic human needs of tracheostomy patients such as respiration, communication, and nutrition may be altered due to the presence of a long-term tracheostomy that will be likely impact upon the psychosocial wellbeing and quality of life (QoL) of the individual concerned. Adverse psychosocial impacts may arise due to the inherent disfigurement accompanying a tracheostomy. It is widely understood that acquired disfigurement presents unique psychological and social challenges and may profoundly impact upon an individual's life **(Gul & Karadag, 2010).**

Patients with a tracheostomy are considered to be high risk and have numerous complexities for nurses to consider. In addition to understanding facility policy regarding tracheostomy care, nurses must possess the specific knowledge and skills to provide successful care for affected patients. Nursing priorities for the patient with a tracheostomy must be supportive, lending focus to maintaining and improving respiratory function while preventing complications. Whether the nurse is a novice or experienced, caring for a patient with a tracheostomy can be an intimidating experience **(Smith, 2016).**

Nursing care for patients with tracheostomy consists of sustaining the surgically inserted tracheostomy tube and stoma to reduce bacterial growth and preventing infection, as well as preventing skin breakdown and contain secretions so they do not block the tube. Nurses are primarily responsible for tracheostomy care, including the cleaning, replacing, or changing the inner cannula, changing the dressing, cleaning the area around the stoma and suctioning **(Sole, 2013).**

Significance of the study:

Tracheostomy is one of the most frequently performed surgical procedures for critical ill patients suffering from airway disorders and requiring intubation beyond 21 days on mechanical ventilation **(Alhajhusain, et al., 2014).** Every year about 800,000 United States residents undergo mechanical ventilation for acute respiratory insufficiency, often for a period of days or weeks. Some studies have documented a significant increase in the number of patients requiring mechanical ventilation. Up to 34% of patients who need mechanical ventilation for more than 48 hours perform a tracheostomy for prolonged mechanical ventilation. The average number of tracheostomies performed annually in the United States is more than 100,000 **(Cheung & Napolitano, 2014).** So that, assessing nurses' performance for patients with tracheostomy is very effective to identify their needs regarding how to care for those critical patients effectively.

Aim of the study:

Assess nurses' performance regarding care of patients with tracheostomy through:

- Assessing nurses' level of knowledge regarding care of patients with tracheostomy.
- Assessing nurses' level of practice regarding care of patients with tracheostomy.
- Assessing nurses' level of attitude regarding care of patients with tracheostomy.

Research question:

1- What is the nurses' level of knowledge regarding care for patients with tracheostomy?

2- What is the nurses' level of practice regarding care for patients with tracheostomy?

3- What is the nurses' level of attitude regarding care for patients with tracheostomy?

Subjects And Methods:

I- Technical design:

Research Design:

A descriptive design was utilized to conduct this study.

Research Setting:

This study was conducted at general intensive care unit, which is affiliated to Sohag University hospital. The ICU divided into four rooms; each one consists of five beds with total number of twenty beds with mechanical ventilation beside each bed.

Subjects:

A convenience sample of all the available staff nurses of (50) nurses working in general intensive care unit at Sohag University hospital.

Data were collected by using the following tools:

First tool: Nurses' self-administrated questionnaire:

It was developed by the researcher in simple Arabic language after reviewing the relevant and recent literatures **(Babiker, 2016) and (Dhaliwal, Choudhary, & Sharma, 2018).** It included two parts:

Part (1): it was concerned with the assessment the demographic characteristics of the nurses under study such as (age, gender, qualificationss, marital status, years of experience and previous attendance of training courses regarding care of patients with tracheostomy).

Part (2): it was concerned with assessing: (A) nurses' knowledge regarding tracheostomy. (B) nurses' knowledge regarding nursing care for patients with tracheostomy.

Scoring system:

The total score of the nurses' knowledge was 31 grades and each correct answer was given one grade and the incorrect answer was given zero.iit was categorized as follows:

- ≥ 85% was satisfactory level of knowledge (≥ 26 grades correct answer).
- < 85 % was unsatisfactory level of knowledge (< 26 grades correct answer).

Second tool: Nurses' practices observational checklists:

It was used to assess the nurses' level of practice regarding care of patients with tracheostomy. This tool was adapted from **(Loerzel, Crosby, Reising & Sole, 2014) and (Wilkinson & Van Leuven ,2015).**

To assess nurses' practice regarding care of patients with tracheostomy including three procedures (Tracheostomy tube suctioning, caring of tracheostomy stoma site and changing tracheostomy tube).

Scoring system:

Regarding scoring system of the nurses' practice observational checklists: It consisted of 3 procedures with 98 steps. Each item that was done correctly was given one grade and each item that was not done was given zero. The total score of practice was 98 grades. It was classified as the follows:

- ≥ 85% was satisfactory level of practice (≥ 83 grades correct actions).
- < 85 % was unsatisfactory level of knowledge (< 83 grades incorrect actions).

Third tool: Nurses' attitude questionnaire Likert scale:

It was used to assess nurses' attitude toward caring of patients with tracheostomy. It was adapted from **(Mitchell & Ron, 2015).**

Scoring system:

This tool is consisted of 30 statements. The responses for the positive attitude statements were on three Likert scale where 3= agree, 2= neutral and 1= disagree. While, the response for negative attitude statements were 1= agree, 2= neutral and 3= disagree. The total score of attitude was 90 degrees. The total score for the whole attitude scale was calculated for every nurse and the mean of the total score for all nurses was calculated.

The total score of attitude was 90 grades. Based on critical care approach. It was considered that:

- ≥ 85% was positive nurses' attitude when the total grades ≥ 77 grades.
- < 85 % was negative nurses' attitude when the total grades < 77 grades.

II- Operational design:

- **Preparatory phase:**

It included reviewing of related literatures, and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

- **Tools validity and reliability:**

- **Validity** This stage developed by a jury of five experts, Two professors, two assistant professors and one lecturer from Medical Surgical Nursing Department, Faculty of Nursing, Ain Shams University. The experts reviewed the tools for clarity, relevance, comprehensiveness, simplicity and applicability. Minor modifications of tools were done according to the panels' judgment.

- **Testing reliability** of proposed tools was done statistically by Cronbach Alpha test. Alpha Cronbach for nurses' knowledge was 0.754 and for nurses' practice was 0.805 and for nurses' attitude was 0.791 that indicate high reliability of the used tool, with highly statistically significant difference (P value was <0.001).

- **Pilot study:**

A pilot study was carried out on 10% of nurses (5 nurses) from the study subjects to test the applicability, clarity, feasibility of the tools used and to determine the time needed for the application of the study tools. Nurses who were included in the pilot study were included into the study sample because no modifications were done after conducting pilot study.

- **Field work:**

- Data were collected within four months from the beginning of July 2019 to the end of October 2019. The aim and nature of the study were explained by the researcher to all nurses who were included in the study and got their oral approval to participate in the study prior to data collection.

-First, the researcher filled the observational checklists by observing each nurse while caring for patients with tracheostomy which took from 15-30 minutes for each procedure according to its difficulty and the nurses' attitude questionnaire took 30 minutes to be filled by the nurses.

- Then, the researcher assessed nurses' knowledge regarding care of patients with tracheostomy at Sohag University Hospital by using self-administered questionnaire which was developed by the researcher in simple Arabic language and it took 45 minutes to be filled by the nurses. The researcher was attended to the setting 3 days per week in the morning and afternoon shifts.

III- Administrative design:

An official permission was issued from the Faculty of Nursing Ain Shams University to the director of Sohag University Hospital and director of general intensive care unit at which the study was conducted, explaining the purpose of the study and requesting the permission for data collection from the study group. Meeting and discussions were held by the researcher to explain to nurses the aim, the nature and the objectives of the study.

IV- Statistical design:

All collected data were organized, entered and analyzed using appropriate statistical significance tests. The data were collected, coded and entered to personnel computer. Then, the data were analyzed by using Statistical Package for Social Sciences (SPSS) version 25.0. Number and percentage for qualitative variable were done. Mean and standard deviation (SD) were used. For relation between variables, Chi square ($\chi 2$) test was used. Also, alpha Cronbach test was used to test reliability of tools. Test of significance was used and regarding significance of the result, the observed differences and association were considered as follows:

- Non-significant (NS) $P > 0.05$
- Significant (S) $P \leq 0.05$
- Highly significant (HS) $P \leq 0.001$

Results

Table (1): showed that, **(40%)** of the studied nurses their age range between 30 - <40 years with mean 37.3 ± 5.21 year. Regarding to gender and marital status of the studied nurses **(82% & 66%)** of them were female and married, respectively. Related to qualifications of the studied nurses **(54%)** of them had technical nursing degree. Also, **(30%)** of the studied nurses their years of experience were <5 years with mean 8.75 ± 7.2 year. Moreover, **(82%)** of the studied nurses didn't attend training course about care of patients with tracheostomy.

Figure (1): showed that, **(68%)** of the studied nurses had unsatisfactory level of knowledge about care of patients with tracheostomy. While, **(32%)** of them had satisfactory level of knowledge about care of patients with tracheostomy.

Figure (2): showed that **(70%)** of the studied nurses had unsatisfactory level of practice about care of patients with tracheostomy. While, **(30%)** of them had satisfactory level of practice about care of patients with tracheostomy.

Figure (3): showed that **(60%)** of the studied nurses had negative attitude about care of patients with tracheostomy. While, **(40%)** of them had positive attitude about care of patients with tracheostomy.

Table (2): show that, there was highly statistically significant relation between total knowledge about care of patients with tracheostomy

and marital status and nurses' qualifications at (P= < 0.01). Also, there was statistically significant relation between total knowledge about care of patient with tracheostomy and their age, nurses' gender, years of experience and training course they attend at (p= < 0.05).

Table (3): showed that, there was highly statistically significant relation between total practice about care of patient with tracheostomy and their age, qualifications and years of experience at (P= < 0.01). Also, there was statistically significant relation between total practice about care of patient with tracheostomy and training course at (p= < 0.05). While, there is statistically insignificant relation between total practice about care of patient with tracheostomy and gender and marital status at (p= > 0.05).

Table (4): showed that there was highly statistically significant relation between total attitude about care of patient with tracheostomy and their age, marital status and years of experience at (P= < 0.01). Also, there was statistically significant relation between total attitude about care of patient with tracheostomy and qualifications and training course at (p= < 0.05). While, there is statistically insignificant relation between total attitude about care of patient with tracheostomy and gender at (p= > 0.05).

Table (1): Frequency and percentage distribution of the studied nurses' demographic characteristics (n=50).

Characteristics	N	%
Age (year)		
20 - <30	15	30
30 - <40	**20**	**40**
≥ 40	15	30
Mean ± S.D **37.3 ± 5.21**		
Gender		
Male	9	18
Female	**41**	**82**
Marital Status		
Married	**33**	**66**
Not Married	17	34
Qualifications		
Secondary nursing degree	18	36
Technical nursing degree	**27**	**54**
Bachelor nursing degree	5	10
Years of Experience (year)		
< 5	**15**	**30**
5 -<10	**15**	**30**
10 -<15	9	18
≥15	11	22
Mean ± S.D **8.75 ± 7.2**		
Training Course about caring of patients with tracheostomy		
Yes	9	18
No	**41**	**82**

Figure (1): Satisfactory and unsatisfactory total level of nurses' knowledge regarding care of patients with tracheostomy (n=50).

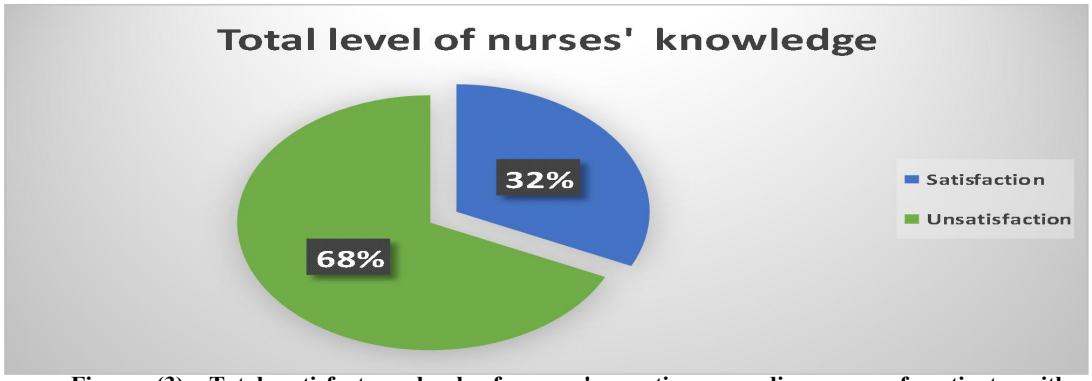

Figure (3): Total satisfactory level of nurses' practice regarding care of patients with tracheostomy (n=50).

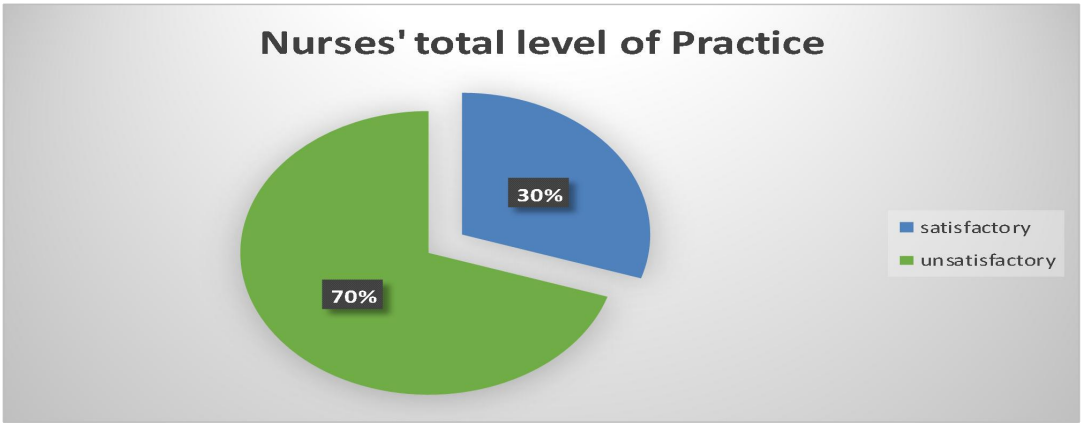

Figure (4): Total nurses' level of attitude in caring for patients with tracheostomy (n=50).

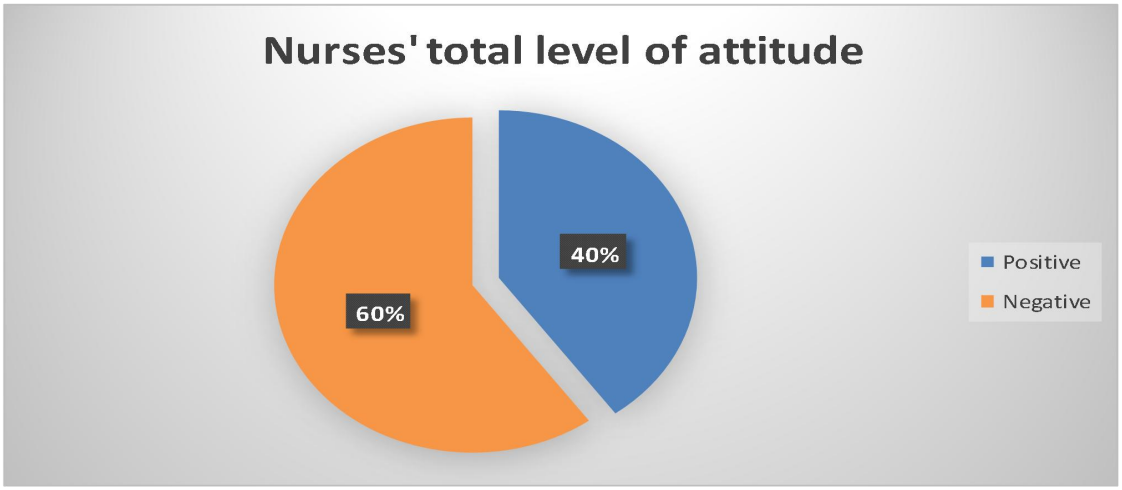

Table (2): Relation between demographic characteristics of the studied nurses and their level of knowledge regarding care of patients with tracheostomy (n=50).

Items		Total Knowledge Satisfaction =16		Unsatisfaction =34		X2 calculated	P-Value
		N	%	N	%		
	20 - <30	7	43.8	8	23.6		
Age	30 - <40	7	43.8	13	38.2		
	40or more	2	12.4	13	38.2	6.811	0.039*
Gender	Male	2	12.4	7	20.6	5.793	0.010*
	Female	14	87.6	27	79.4		
Marital status	Married	7	43.8	26	76.5	8.144	0.000**
	Not Married	9	56.2	8	23.5		
Qualifications	Secondary nursing degree	2	12.4	16	47.1	11.41	0.001**
	Technical Health Diploma	14	87.6	13	38.2		
	Bachelor	0	0	5	14.7		
Years of Experience	< 5 years	8	49.9	7	20.6		
	5 - 10 years	7	43.8	8	23.5		
	10 - 15 years	1	6.3	8	23.5		
	>15 years	0	0	11	32.4	3.265	0.025*
Training Course	Yes	1	6.3	8	23.5	1.990	0.044*
	No	15	93.7	26	76.5		

Table (3): Relation between demographic characteristics of the nurses and their total practice regarding care of patients with tracheostomy (n=50).

Items		Total practice satisfactory =15		unsatisfactory =35		X2 calculated	P-Value
		No	%	No	%		
	20 - <30	10	66.7	5	14.3	9.878	.000**
Age	30 - <40	3	20	17	48.6		
	40or more	2	13.3	13	37.1		
Gender	Male	3	20	6	17.2	0.836	.060
	Female	12	80	29	82.1		
Marital status	Married	9	60	24	68.6	1.351	.051
	Not Married	6	40	11	31.4		
Qualifications	Secondary nursing degree	2	13.3	16	45.7	8.199	.000**
	Technical Health Diploma	9	60	18	51.4		
	Bachelor	4	26.7	1	2.9		
Years of Experience	< 5 years	9	60	6	17.2	10.069	.001**
	5 - 10 years	4	26.7	11	31.4		
	10 - 15 years	2	13.3	7	20		
	>15 years	0	0	11	31.4		
Training Course	Yes	8	53.3	1	2.9	9.138	.020*
	No	7	46.7	34	97.1		

Table (4): Relation between demographic characteristics of the nurses and their total attitude regarding care of patients with tracheostomy (n=50).

Items		Total Attitude Positive =20		Negative =30		X2 calculated	P-Value
		N	%	N	%		
Age	20 - <30	12	60	3	10	10.055	.018**
	30 - <40	5	25	15	50		
	40 or more	3	15	12	40		
Gender	Male	4	20	5	16.7	.726	.298
	Female	16	80	25	83.3		
Marital status	Married	7	35	26	86.7	6.979	.000**
	Not Married	13	65	4	13.3		
Qualifications	Secondary nursing degree	2	10	16	53.3	5.021	.036*
	Technical Health Diploma	13	65	14	46.7		
	Bachelor	5	25	0	0		
Years of Experience	< 5 years	9	45	6	20	8.943	.000**
	5 - 10 years	7	35	8	26.7		
	10 - 15 years	3	15	6	20		
	>15 years	1	5	10	33.3		
TrCourse	Yes	8	40	1	3.3	11.736	.002**
	No	12	60	29	96.7		

Discussion

Regarding the study nurses' characteristics, the results of the present study revealed that less than half of the studied nurses' age were between 30 and 40 years old. This explains that they are adult, old graduated; tolerate the nature of the work and most of the study nurses were holding technical nursing degree. This finding is consistent with what was reported by **Marold (2015)** who mentioned that most of nurses who working in intensive care unit and anesthesia are between 30 and 40 years old. While, this is This finding is inconsistent with **Amer, Taha & Zaton (2015)** reported that more than three quarters of the study subjects' age was between 20-30 years.

Related to gender, the present results showed that, the most of the study nurses were females. This is may be due to the greater fraction of the nurse in Egypt was female and my also related to the studying of nursing in Egypt were exclusive for female only till few years ago. This finding is in consistent with **Mohammed, Sleem, Shehab & Mohammed (2017)** reported that most of their study group were female that may be due to elevated number of nurses among female.

As regards nurses' marital status, about two of third were married. This finding was contradicted with **Mohamed (2016)** found that the majority of the studied nurses were single.

Concerning to educational level, the present study results indicated that, more than half of the study nurses were had technical nursing degree. This might elaborate the current condition of nursing qualifications in Egypt. This result is contradicted with **Abdullah, Mohamed & Ismail (2014)** reported that the majority of the study subjects were having bachelor degree.

This finding is in accordance with **Yelverton, Nguyen, Wan, Kenerson, & Schuman (2015)** mentioned that, the number of diploma schools has declined in the recent years due to trend moving nursing education into the academic setting. This is in agreement with **Kroning (2014)** reported that, the nurses in critical care unit have a need to improve their educational level.

Regarding years of experience in critical care unit, the current study showed that near one third of the studied nurses had experience up to five years to less than ten years. This finding

may be due to that most of the nurses under study were recently graduated, work stress, severity of patient condition and occupational hazards that facing them in ICU, all of this prevent nurses from continuing work in the critical care unit. This finding was contradicted with **Mohammed (2016)** reported that more than two thirds of the study subjects' years of experience in ICU ranged between 1-5years.

As regard to having previous training courses, the present results showed that, more than three quarters of nurses under study had no previous training courses about caring for patients with tracheostomy. This may be due to shortage of staff, work load, lack of training courses about the tracheostomy and lack of time in intensive care unit (ICU). This result is similar to **Shahin (2012)** reported that the majority of the study subjects had no previous training courses.

Concerning nurses' total level of knowledge, the present result showed that more than two third of the nurses under study had unsatisfactory level of knowledge regarding care of patients with tracheostomy. This result may be due to that more than three quarter of nurses under study had no previous training courses about care of patients with tracheostomy. This finding was in agreement with **Marykutty (2012)** which shows less than half of respondents had knowledge regarding tracheostomy.

This is inconsistent with **Pradhan, Neupane, Sanjay, Kuwar, Sabita (2018)** reported that more than three quarters of the study subjects had adequate knowledge regarding care of patients with tracheostomy.

Concerning satisfactory and unsatisfactory total level of nurses' practice, two third of the study sample had unsatisfactory level of practice regarding care of patients with tracheostomy this may be related to majority of the nurses had diploma degree, and there was lack of in-service training programs and lack of guideline procedures manual. This result is in agreement with **Hashem & Abusaad (2016),** who found that more than three quarters of the studied nurses had unsatisfactory practice regarding nursing care for children with intestinal stomas.

This result is consistent with **Dawson (2014)** who stated that all health professionals must continually update their theoretical knowledge and clinical skills; those working in tracheostomy care can do this by developing their ability to combine the use of the assessment tools with good observational skills and closely observing their patients.

Regarding nurses' attitude two thirds of the nurses under study had negative attitude regarding care of patients with tracheostomy. As it is obvious from the study result, that the most of nurses under study had unsatisfactory level of practice regarding care of patients with tracheostomy which might effect to develop negative attitude toward care of patients with tracheostomy among nurses under study. This result is consistent with **El-Gawab (2017)** reported that graduated nurses had low comfort level regarding care of patients with tracheostomy .

There was statistically significant relation between nurses' level of knowledge and their demographic characteristics (age, gender, educational level, marital status, qualifications, years of experience, and attendance of training courses). This finding is congruent with **Abdulla & Abdulla (2014)** who reported that, there was a positive significant statistical correlation between age and knowledge of nurses' staff (increase knowledge with increase age of nurses).

There was statistically significant relation between nurses' total level of practice and their demographic characteristics (age, qualifications, years of experience and attendance of training courses). While, there is statistically insignificant relation between total practices and gender and marital status. This finding is consistent with **Eskander (2013)** reported that there was a statistically significant relation between total nurses' knowledge and their age, years of experience.

In contrast, **Elpasiony (2013)** reported that, there was no statistically significant

relation between nurses' performance (knowledge and practice) and their demographic characteristics (age, marital status, educational level, years of experience, and attendance of training courses).

There was statistically significant relation between nurses' total level of attitude and their demographic characteristics (age, marital status, qualifications, years of experience and attendance of training courses). While, there is statistically insignificant relation between total attitude and gender. This result is contradicted with **Mohamed (2018)** stated that there is no statistical significant relation between the nurses' overall level of attitude and their age, years of experience and level of education

Conclusion:

Approximately two thirds of the study nurses had unsatisfactory level of total knowledge and practice regarding care of patients with tracheostomy. Mean while, more than half of the studied nurses had a negative attitude regarding care of patients with tracheostomy.

There is a statistical significance relation between nurses' knowledge, practice, attitude and demographic characteristics of the studied nurses. In addition to, there was a significant strong positive correlation between total knowledge & practice of study nurses and there was strong positive correlation between total knowledge & total attitude and also between total practice and total attitude.

Recommendations:

Based on the results of the present study, the following recommendations are suggested:

Education:

♦On-going and regular In-service educational programs regarding evidence-based guidelines should include the care of patients with tracheostomy.

♦Nursing educators and clinical facilitators must incorporate strategies regarding care of patients with tracheostomy into the ICUs and use learning opportunities to raise awareness of nursing staff about the topic.

♦Developing a simplified and comprehensive booklet including basic information about tracheostomy.

♦Learning resources such as articles, journals and electronic resources such as computers and internet should be made accessible in the units for nursing staff members. Continuing professional development programs should include skills updates.

Practice:

♦In-service training and educational program prior to the work in the critical care unit.

♦Nurse supervisors should also verify that tracheostomy care checklists appropriately followed by all nursing staff to prevent tracheostomy complications.

♦Increase the number of nurses in ICU based on international nurse patient ratio to improve quality of care.

Research:

♦The study should be replicated on large sample and in different hospitals setting in order to generalize the results.

♦Further study to evaluate the reflection of educational program regarding nurses' perception.

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