

Effect of an Educational Training Program in Tracheostomy Care on Nurses' Knowledge and Skills

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Abstract

Background: A tracheostomy is a surgical procedure in which an opening is made into the anterior wall of the trachea. With an increasing demand for intensive care beds more nurses in acute and high dependency wards will be expected to care competently for patients with tracheostomy tubes.

Aim: To evaluate Nurses' knowledge and skills in performing tracheostomy care and to determine the effectiveness of the educational training program on nurses knowledge and skills.

Methods: A quasi-experimental study (one group) conducted at Sinnar Teaching Hospital (STH). A total coverage technique was used 45 nurses were included. measurements of the group were made both before and after training program.

Results: The total knowledge percentage before training program ranged from (2.2%) to (46.7%), and after training program, ranged from (57.8%) to (88.9%). 91.1% of respondents (41) they were not attending training course in Tracheotomy Care before. There was statistically significant different in the mean total knowledge score of the participants before and after the program at p value level = (0.00).

Conclusion: The nurses included in the study do not have adequate knowledge and skills in the evidence-based guidelines for tracheostomy care. There is no correlation between the qualifications or years of experience and knowledge of nurses regarding tracheostomy care. Continuing professional development programme on tracheostomy care should be made compulsory for all nurses.

Keywords: Tracheostomy, training program, nursing care, nursing skills, nursing knowledge.

Introduction

A tracheostomy is a surgical procedure in which an opening is made into the anterior wall of the trachea, below the cricoid cartilage, usually between the second and third rings of cartilage to maintain a patient airway^[1-3]. The two terms tracheotomy and tracheostomy are very similar, they are often and falsely used interchangeably, resulting in some degree of confusion. tracheotomy refers to the surgical procedure during which an incision is made into the trachea to create an alternative airway. The opening that is formed is called a tracheostomy, also referred to as the stoma, and is secured by the placement

of a tracheostomy tube through which the patient will be able to breathe^[4]. A tracheostomy requires surgical dissection; therefore, it is not typically an emergency procedure like endotracheal tube, which can be quickly inserted in the most emergency situations. Tracheostomy consider as a routine procedure in the practice of otolaryngology Ear, Nose and Throat (ENT) critical care and in other areas.

Care of Patient with tracheostomy is a true emergency and an essential aspect of effective airway management^[5, 6]. However, this is usually associated with several potential complications can be divided into

early those associated with insertion of the tracheostomy or late those arise following the procedure. Ranging from; pain, hemorrhage, tube displacement, blocked of tube to in extreme cases, cardiac dysrhythmias, trauma, atelectasis, infection, and death^[5, 7]. All these risks are preventable or may at least be minimized by good tracheostomy care.

In view of such hazards, it is imperative that nurses must be aware of these risks and were able to practice according to current research recommendations on all aspects of tracheal care. Specialized training enhances nurses' confidence and perceived delivery of patient care regardless of nurses' experience level^[5-7].

With an expanding interest for concentrated consideration beds, more medical caregivers in intense and high reliance wards will be required to really focus capability on patients with tracheostomy tubes^[6]. Moreover, to the way that, understanding with tracheostomies are not restricted to the serious consideration setting however present on a wide assortment of nursing units; intense consideration, pediatrics, geriatrics, oncology, long haul care offices, recovery units, medication, and medical procedure units^[8, 9].

Some specialist suggested that general ward nurses (other than specialists) should be able to care for patients with tracheostomy tubes if they have no other respiratory problems. However, there is evidence that practitioners are not adequately educated or experienced to care for patients with tracheostomy tubes in general wards^[7].

Psychological aspects of care are also important, and some patients may be unable to communicate verbally, causing frustration and anxiety^[10]. The presence of a tracheostomy tube can also affect the person's body image, cause embarrassment, and affect their psychosocial health^[11].

Nurses have most contact with tracheostomized patients; therefore, their role in providing safe and effective care cannot be overestimated^[12]. Although nurses must recognize and work within their limits of competence, they must also participate in appropriate learning and practice activities to develop and maintain their competence^[13]. Patients expect that nurses who

provide tracheostomy care to be competent and confident practitioners and have a professional responsibility and possess the necessary skills and knowledge^[14].

Most of the nurses were had a poor level of knowledge concerning Tracheostomy care, in term of, indications of insertion, types of tubes, aseptic techniques, stoma care, and suction technique^[15]. Nurses will always benefit from continuing education and being kept up to date regarding changing aspects of care within a hospital setting. In Sudan, there were many educational programs for nurses, although no educational program before this study provided to nurses regarding competences of tracheostomy care^[16-18].

The aim of this study is to evaluate nurses' knowledge and skills in performing tracheostomy care and to determine the efficiency of the educational training program on nurses knowledge and skills.

Methods

Study area

This study carried out in Sennar Teaching Hospital in Sennar state, it is one of the 18 states of Sudan. It located in the central east of Sudan, lies about 300 kilometers (186 miles) south east of Khartoum capital of Sudan. This study was carried out in three wards at Sennar Teaching Hospital, surgical wards, trauma, emergency department, and intensive care unit.

Study design

We used a quasi-experimental study design (one group) and we run measurements to the group before and after training program.

Data collection

We collected data by structured questionnaire (anonymous) and observational checklists with an information letter and a consent form attached to it was design in written form, it included questions regarding existing knowledge, and practical applications of tracheostomy care.

Data analysis

Descriptive statistics were used to interpret the demographic data: sex, years of experiences and

qualification. Descriptive and inferential statistics were used to describe the knowledge and skills levels of the participants. Multiple measures were used (Mean, frequency, percentage, and standard deviation) to examine the variables. Tables, bar, and pie diagram were drawn to describe frequencies and percentages. Means and standard deviations were used to summarize and to compare pre- and post-knowledge and skills scores.

Results

The study was conducted among 45 nurses at

different education levels (a baccalaureate degree, diploma, and school graduate nurses) working in an area where the study was conducted. Distribution of sample according to the Gender category the majority (62.2%) were female. According to educational qualifications, most of the participants (57.8%) has a diploma degree. According to years of experience and attendance of the training course in tracheotomy care most of participants 41 nurses (91.1%) were not have training program before as shown in Table 1.

Table 1: Frequency distribution of data according to educational qualifications, Years of experience, and Attending training course in Tracheotomy Care (n=45)

Qualifications	Frequency	Percent%
School Nursing Certificate	15	33.3
Diploma degree	26	57.8
Baccalaureate B.Sc.(N)	4	8.9
Post Graduate	0	0.0
Total	45	100.0
Years of experience		
1-3	15	33.3
3-5	14	31.1
5-7	6	13.3
< 7	10	22.2
Total	45	100.0
Attending training course in Tracheotomy Care		
None	41	91.1
Once	4	8.9
Twice	0	0.0
More	0	0.0
Total	45	100.0

Distribution of data according to the knowledge in tracheostomy care elements before intervention program, showed that the total knowledge percentage ranged from (2.2%) to (46.7%) as shown in Table 2.

Table 2: Distribution of data according to the knowledge in tracheostomy care elements before intervention program(n=45)

Question NO	Knowledge Questions	Complete correct task	
		Frequency	Percent %
Q 5	Explanation of the procedure to the patient is it essential and consider first step to	18	40
Q 6	A tracheostomy is surgical procedure usually performed	5	11.1
Q 7	What Types of Tracheostomy procedure	13	28.9
Q 8	Tracheostomy tubes can be classified by	10	22.2
Q 9	A tracheostomy alters which of the following physiological Process	13	28.9
Q 10	The most common early tracheostomy complication is	8	17.8
Q 11	An inflated cuff in a tracheostomy tube use for prevention of aspiration	9	20
Q 12	The stoma care which will be performed include	3	6.7
Q 13	The important measures which must be performed prior to suction to reduce risk of infection is	5	11.1
Q 14	An inflated cuff in a tracheostomy tube use for prevention of aspiration	2	4.4
Q 15	The recommended suction pressure for adults is	1	2.2
Q 16	Tracheostomized patient with spontaneously breathing should suctioned	21	46.7
Q 17	Cleaning of inner tube of tracheostomy tube should be done with	6	13.3
Q 18	If unplanned tube changed of tracheostomy tube, what were the reasons for this	13	28.9
Q 19	Explanation of the procedure to the patient is it essential and consider first step to	3	6.7
Q 20	A tracheostomy is surgical procedure usually performed	20	44.4
Q 22	Hand washing essential step before and after the tracheostomy care; Why	20	44.4

Distribution of data according to the knowledge in tracheostomy care elements after the intervention program, showed significant increase in knowledge percentage ranged from (57.8%) to (88.9%) as shown in Table3.

Table 3: Distribution of data according to the knowledge in tracheostomy care elements after the intervention program(n=45)

Question NO	Knowledge Areas	Complete correct task	
		Frequency	Percent %
Q 5	Explanation of the procedure to the patient is it essential and consider first step to	39	86.7
Q 6	A tracheostomy is surgical procedure usually performed	32	71.1
Q 7	What Types of Tracheostomy procedure	38	84.4
Q 8	Tracheostomy tubes can be classified by	31	68.9
Q 9	A tracheostomy alters which of the following physiological Process	22	48.9
Q 10	The most common early tracheostomy complication is	34	75.6
Q 11	An inflated cuff in a tracheostomy tube use for prevention of aspiration	36	80
Q 12	The stoma care which will be performed include	29	64.4
Q 13	The important measures which must be performed prior to suction to reduce risk of infection is	31	68.9
Q 14	An inflated cuff in a tracheostomy tube use for prevention of aspiration	40	88.9
Q 15	The recommended suction pressure for adults is	36	80.8
Q 16	Tracheostomized patient with spontaneously breathing should suctioned	34	75.6
Q 17	Cleaning of inner tube of tracheostomy tube should be done with	34	75.6
Q 18	If unplanned tube changed of tracheostomy tube, what were the reasons for this	26	57.8
Q 19	Explanation of the procedure to the patient is it essential and consider first step to	31	68.9
Q 20	A tracheostomy is surgical procedure usually performed	31	68.9
Q 22	Hand washing essential step before and after the tracheostomy care; Why	35	78.9

Summary statistics of knowledge before and after intervention program is shows in table4 there was significant increase in knowledge of participants P.value 0.000.

Table 4: Summary statistics of knowledge before and after intervention program (n=45)

Knowledge Questions	Complete correct task				P value
	Before program		After program		
	Frequency	Percent %	Frequency	Percent %	
Q5	18	40	39	86.7	0.00
Q6	5	11.1	32	71.1	
Q7	13	28.9	38	84.4	
Q8	10	22.2	31	68.9	
Q9	13	28.9	22	48.9	
Q10	8	17.8	34	75.6	
Q11	9	20	36	80	
Q12	3	6.7	29	64.4	
Q13	5	11.1	31	68.9	
Q15	1	2.2	36	80.8	
Q16	21	46.7	34	75.6	
Q17	6	13.3	34	75.6	
Q18	13	28.9	21	46.7	
Q19	3	6.7	31	68.9	
Q20	20	44.4	31	68.9	
Q22	20	44.4	35	78.9	

Practice score was significantly changed in all performances after the training program compare to same group before as shown in table 5.

Table 5: Summary statistics of Mean, Standard deviation, and P.value of practice score before and after the training program (n=45).

No	Performance	Mean		SD		P value
		Pre	Post	Pre	Post	
1	Change of Tracheostomy Dressing & Tie	01.70	21.11	2.69	2.99	0.00
2	Stoma and Skin Care	8.42	22.70	3.57	3.49	0.00
3	Tracheostomy Tube Suctioning	10.13	20.40	2.15	2.81	0.00
4	Change of Tracheostomy Inner Tube	7.46	19.86	2.10	3.58	0.00
5	Tracheostomy Tube Changes	10.70	21.11	2.69	2.99	0.00

Discussion

In the present study, participants according to level of formal education, our study showed that most participants (57.8%) had diploma degree in nursing sciences from nursing faculties. This means that majority of participants had a minimum qualification. These findings are consistent with previous research study from India done by SREEJA T.P (2007) [19].

Regarding the distribution of sample according to years of experience, the data in our study showed that most of nurses (33.3%) were had three years' experience and below, which considered as less experience. In a study done by NISHAMOL. Y. N in Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST), (November 2011) result showed, that majority of nurses were had below 10 year experience [20]. The T-test was used to find out whether there is any association between the years of experience and knowledge, there are not statistically significant different (p value = 0.616).

The distribution of participants according to attendance training course in tracheotomy care, in this study showed that most nurses (91.1%) were not specifically trained in care of tracheostomy patients. This

agrees with a study done by Mondrup et al, in Denmark (2012) where (47%) of the studied participants, reported no formal staff education or training in tracheostomy care, and he further states that the lack of enough training in tracheostomy care, is a huge contributor to morbidity and mortality of the patients. This in essence affects negatively on the standards of tracheostomy care because training in tracheostomy is essential specialized training enhances nurses' confidence and perceived delivery of quality patient care regardless of nurses' experience level [5].

This finding showed what happening in the study setting where nurses continue providing care without specifically trained in care of tracheostomy patients, these lead to confusion and lack of parity of care.

Concerning the knowledge background of the participants in tracheostomy care before the program, the data given study revealed that the total knowledge background of the participants ranged from (2.2%) to (46.7%). These findings were supported with study done in Sudan by Mahasin (2016) showed results close to our study, that majority of nurses (71%) were had lacked knowledge concerning tracheostomy care, this is evidence that nurses are not adequately educated

or experienced to care for patients with tracheostomy tubes^[21].

In addition, the study findings showed that majority of participants' were lacked knowledge concerning tracheostomy complications, the percentage of correct answers was only (17.8%). In contrast to the study from India done by SREEJA T.P (2007) showed an opposite result to our study, revealed that the knowledge of nurses in tracheostomy care ranged from (96.2-100%)^[19].

Tracheostomy care usually associated with several potential complications can be divided into early complications those associated with insertion of the tracheostomy or late complications those arise following the procedure. Ranging from; pain, hemorrhage, tube displacement, blocked of tube to in extreme cases, cardiac dysrhythmias, trauma, atelectasis and, infection and death^[5, 6]. All these complications are preventable or may at least be minimized by good tracheostomy tube care. In view of such hazards, it is imperative that nurses are aware of these risks and can practice according to current research recommendations on all aspects of tracheal care. Specialized training enhances nurses' confidence and perceived delivery of quality patient care regardless of nurses' experience level ^[5].

After the training program, our study showed marked differences in participant's knowledge and practices concerning tracheostomy care between before and after intervention program. Findings showed that the participants knowledge score increased to minimum knowledge score (57.8%) in some items to reach (88.9%) in others.

The "t" test was used to find out whether there is any significant difference in the mean knowledge between pre- and post-the intervention program. There was statistically significant different in the mean total knowledge score of the participants before and after the program at (p value level = 0.00). This indicate that the educational program was successful in upgrading the participants knowledge concerning tracheostomy care.

Concerning the performance of the participants regarding tracheostomy care, the practice was assessed by using performance evaluation elements checklist. The correct practice getting one marks and the incorrect

practice getting half mark and not done getting zero mark.

The findings in this study illustrated that most of practice elements before the training program were inadequate, and the most of items scored ranged from zero to maximum (30%) before intervention, except for limited numbers of practices elements such as explanation of the procedure, wash hands, wear non-sterile gloves, disposal of used supplies and removal of used gloves.

The nurse who is accountable for giving care; require the following skills: appropriate respiratory assessment; an appreciation and understanding of humidification; when and how to perform airway suction; stoma care; and first-line management in the instance of tube blockage or displacement and emergency management. To support staff in caring for these patients safely and competently, provision of training, support and ready access to equipment is required accordingly, with the abundance of proof accessible, it is significant that the medical attendant is sufficiently prepared and completely able to be taken care of by a patient with a tracheostomy^[22].

After exposure to the training program the percentage of correct answers was improved, and it show increased score of frequencies and percentages of performance regarding tracheostomy care element after the intervention program. reach 100% in some items. Therefore, learning modules may increase knowledge of a particular topic and may provide learning opportunities in which the learner can feel more autonomous than with traditional classes. Nurses will always benefit from continuing education and being kept up to date regarding changing aspects of care within a hospital setting. These are a low-cost way to provide information so that nurses are better able to care for their patients. learning modules can be constructed on paper, through video, or computer and the subject matter should be concise and focused on the topic ^[23].

To compare between the results of pre and post the intervention program, to found out whether there is any significant difference in the mean practice "t" test was used between mean pre and post the intervention program .,and there are statistically significant different in the mean total practice score of the participants before

and after the program at (p value level = 0.00), and this indicate that the educational program was successful in upgrading the participants skills concerning tracheostomy care.

Overall, this study showed that the designed training program was successful in upgrading participant's knowledge and performanceregarding tracheostomy care. This success can be attributed to the clarity of the program content items and material, the use of simple language and the clear educational methods. The high interest of participants shared in study and their commitment constitute major factor in success of that work. The short time between pre and posttest for evaluation of the training course may also considered as contributing factor of high statistically significant results.

Conclusion

Evidence based guidelines and protocols for best practice should be established to follow in tracheostomy care and updated regularly. Nursing staff members should be motivated and supported to develop their careers and raise their interest in research by attending scientific conferences, to keep themselves updated with current practice. Continuing professional development programme should be made compulsory for all nurses.

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Ethics Clearance: The research proposal with educational package was submitted to the University Postgraduate research panel for permission to conduct the study and permission was obtained to ensure compliance with ethical standards. A formal written permission was obtained from the general director of the Hospital to conduct the study.

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