Efficacy of Planned Teaching on Knowledge Regarding Tracheostomy Suctioning Among Staff Nurses

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Abstract: *The aim of airway suction is to clear secretions, thereby maintaining a patent airway and improving ventilation and oxygenation. Removal of such secretions also minimizes the risk of atelectasis. The present study was aimed at primarily to assess efficacy of planned teaching on knowledge regarding tracheostomy suctioning among staff nurses working in selected hospitals of Vidarbha Region in Maharashtra. Objectives: To assess the existing knowledge of staff nurses regarding tracheostomy suctioning. To assess the knowledge of staff nurses regarding tracheostomy suctioning after the teaching program. To associate the knowledge regarding tracheostomy suctioning with selected demographic variables. Descriptive evaluatory research approach is used in this study. The subjects consisted of 50 staff nurses. A pre experimental one group pre-test post test design was used. Tool used for this study was structured knowledge questionnaire. major Findings: Among the subjects majority 40 (80%) belongs to 21-30 years and only 10 (20%) belonged to 31- 40 years. Gender shows that 52% of them were females and 48% were males. 58% of them were educated upto GNM, 36% were Basic B.Sc.(N) and 6% were educated upto P.B.B.Sc.(N). Years of experience reveals that 76% of them had experience of 1-5 years, 20% had 6-10 years and 2% each had experience of 11-15 years and >15 years respectively. 24% of them were working in SICU, 44% in MICU, 30% in ENT and 2% were working in oncology ward. Experience in the present working area shows that 92% of them had experience between 1-5 years, 6% had between 5-10 years and 2% had between 10-15 years of experience. Staff nurses who participated in the training on tracheostomy care or suctioning after basic nursing training shows that 56% of them attended the said training and 44% are not attended any training.. The findings show that in pre test 48% subjects were having satisfactory level of knowledge,52 % of study participants were having good level of knowledge and none was having excellent level of knowledge. In post test scores 80.00% of subjects showed excellent knowledge, 20% of subjects showed good knowledge and none was in the satisfactory level. Conclusion: The findings of the present study show a significant improvement of knowledge scores after the planned teaching There is association found between knowledge score with the gender, and there is no significant association with the age, professional qualification, total years of experience, area of working, years of experience in present working area and participation in training.*

Keywords: Efficacy, planned teaching, knowledge, tracheostomy, care, staff nurses.

1. Introduction

Learning is the addition of new knowledge and experience Interpreted in the light of past knowledge and experience. Teaching and learning is an integral part of nursing. Nurses have the responsibility to educate patients related to various aspects and keep themselves updated. Various teaching strategies are used to increase knowledge, such as lecturing, demonstration, discussion and self-education. These methods of self-education has an advantage over the others as the learner can educate himself at his own pace and it also stresses on rereading [1].

Tracheostomy suctioning comes under nurse's responsibility and to practice it effectively all nurses must have a sound knowledge regarding tracheostomy suctioning and its importance. Nurse's knowledge will be improved by including planned teaching for them. Very few studies are conducted to assess nurses knowledge regarding tracheostomy suctioning and the efficacy of a planned teaching on the knowledge regarding same.

To care for a patient with a tracheostomy requires a clear understanding of each patient's need for the tracheostomy and the type of tube required. Tracheostomy care and management is more and more necessary in both the intensive care setting and the general ward. It is therefore ever more important that trained nurses are equipped with the appropriate skills, knowledge and support to meet the unique needs of each patient safely and competently. This study aims to discuss the indications for a tracheostomy care and management that are commonly carried out, with the purpose of increasing knowledge and interest of the care of a patient with a tracheostomy[2].

The investigator observed that the staff nurses in general do not use appropriate oxygen delivery devices, suctioning techniques and airway management skills. So the investigator felt the importance of refreshing the knowledge of staff nurses using a planned teaching to increase the quality of nursing care.

2. Review of Literature

Literature review is a critical summary of research on a topic of interest generally prepared to put a research problem in context or to identify gaps and weakness in prior studies so as to justify a new investigation.[3] Studies reviewed have been arranged under the following headings:-

Efficacy of Planned Teaching

Kadam,A.*(2014)* found that Structured education programme was highly effective to improve the knowledge score and to improve the attitude score of subjects/ caregiver towards colostomy care of patient [4]. Anjum,S.(2014)conducted study to assess knowledge of contraceptives methods and appraisal of health education among married women and concluded After the health education married women knowledge was improved to 100% about female sterilization followed by condom 99%, skin implants 86%, oral pills 85% and emergency contraceptives 85%.Sociodemographic variable were significantly associated with existing knowledge and level of married women specially   age at marriage, age at first child, occupation,, income ,education [5][6]. Babu, R. L. (2014) The findings of the study concluded that care takers had inadequate knowledge regarding non-curative care of terminally ill cancer patients. The planned education programme on non-curative care of terminally ill cancer patients was highly effective in improving the knowledge of care takers regarding non-curative care of terminally ill cancer patients.[7] Shinde,M.(2014) concluded that demonstration regarding feeding of hemiplegic patient among caregivers was effective in increasing the skill of the caregivers regarding feeding of hemiplegic patient [8].

Deshmukh, M., & Shinde, M. (2014). concluded that the structured education was effective on knowledge and practice of staff nurses regarding venous access device care[9]. Bhudhagaonkar, J., & Shinde, M. (2014). Concluded that Structured Education Regarding Menstrual Hygiene Practices was effective among Adolescent Girls.[10]

Knowledge of staff nurses on tracheostomy suctioning.

Nursing Lectures (2011) In an article on tracheostomy suctioning emphasizes the tracheal suction as the insertion of a suction catheter into the trachea, to remove secretions from the patient's chest. Airway suctioning removes excess secretions from the respiratory tract by the insertion of a catheter into the area and the application of a negative pressure. It may be both life saving and potentially harmful, particularly in patients who are fragile or likely to require long-term regular suctioning. The most effective way to prevent hypoxia during suctioning of patient with respiratory failure is to hyper oxygenate for one minute with 100% O2 prior to suction and limit suction to 15 seconds.[11]

Nahoko, Harada. (2010) conducted a study on Closed suctioning system. This study suggest that closed suctioning systems are no better than open suctioning systems in terms of mortality, morbidity, or the cost-benefit ratio. As a conclusion the evidence on the efficacy and effectiveness of closed suctioning systems is inconclusive. [12]

Clevened clinical foundation. (2009) in their guidelines on tracheal suction recommended that tracheostomy suctioning removes thick mucus and secretions from the trachea and lower airway that are not able to clear by coughing. [13]

Peter, Griffiths. (2009) conducted a randomized control trail on tracheal suctioning knowledge and skills. The study concluded with retention of knowledge and tracheal

suctioning practice is improved when training is followed up by tailored feedback on performance. [14]

Julie C, Reeve. (2009) The study concluded with the opinion that Instillation of normal saline before tracheal suctioning decreases the incidence of VAP in mechanically ventilated adults. [15]

Problem Statement

"A study to assess the efficacy of planned teaching on knowledge regarding tracheostomy suctioning among staff nurses working in selected hospitals of Vidarbha Region in Maharashtra".

Objectives

1 To assess the existing knowledge of staff nurses regarding tracheostomy suctioning.
2 To assess the knowledge of staff nurses regarding tracheostomy suctioning after the teaching program.
3 To associate the knowledge regarding tracheostomy suctioning with selected demographic variables.

3. Operational Definitions

- Study:- it means an investigative technique to assess the knowledge of staff nurses regarding tracheostomy suctioning.
- Assess:-   means to evaluate the knowledge regarding tracheostomy suctioning among the staff nurses.
- Efficacy:- is a result of planned teaching which is assessed by pre test and post test.
- Planned Teaching:- refers to meaningful systematic interaction between the investigator and staff nurses regarding tracheostomy suctioning which is assessed by pre test and post test.
- Knowledge:- refers to the response and skills of staff nurses on tracheostomy suctioning.
- Tracheostomy :- Tracheostomy is a surgical creation of a stoma or an opening into the trachea through the neck for the purpose of facilitating passage of air into the lungs or to remove secretions from the trachea.
- Suction:- tracheostomy suction means the act or process of sucking up or aspirating.
- Staff Nurses:- In this study staff nurses are registered nurses and are directly   involved in the delivery of the patient care.

Assumptions

- Staff nurses have some knowledge about tracheostomy suctioning.
- Increase in knowledge will help to improve their practices.
- Knowledge can be assessed through structured questionnaire.

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Hypothesis

H_0 There is no significant difference between pre test and post test knowledge of staff nurses regarding tracheostomy suctioning which is measured by structured questionnaire at $P < 0.05$ level.

H_1 There is significant difference between the pre test and post test knowledge of staff nurses regarding tracheostomy suctioning which is measured by structured questionnaire at $P < 0.05$ level.

Limitations

- This study is limited only to those staff nurses who are readily available in the clinical area at the time of data collection.
- This study is limited to only selected hospitals of Vidarbha Region in Maharashtra.
- Assessing only the knowledge once before and after administration of planned teaching

Ethical Aspects

- Prior information was obtained from the higher authorities to conduct pilot study as well as the final study.
- Informed consent was obtained from the study samples.
- The subjects were informed about the confidentiality of the data.
- The subjects were informed that their participation is purely on the voluntary basis and they can withdraw from the study at any time.

4. Research Methodology

Methodology is the framework used to conduct the study. It includes the research design, the setting, population, sample and sample size, sampling technique, development and description of tool, validity and reliability, pilot study, data gathering process and plan for data analysis.[3]

Research Approach

Descriptive evaluatory approach is used in this study.

Research Design

One group pretest post test design

Pre Test	Intervention	Post Test
Day 1	Day 1	Day 7
0_1	X	0_2

O_1 = The knowledge score of staff nurses regarding tracheostomy suctioning before planned teaching.
X = Treatment- that is planned teaching.
O_2 =   The knowledge score of staff nurses regarding tracheostomy suctioning after planned teaching.

Setting of the Study

This study was conducted in a multi speciality hospital in Maharashtra. The rationale for selecting this hospital was easy transport, familiarity with the setting, administrative approval, co operation and availability of subjects.

Independent variables
In the present study the independent variable is planned teaching on tracheostomy suctioning.

Dependent variables
In the present study the dependent variable is knowledge score of staff nurses regarding tracheostomy suctioning.

Population
The population selected for the present study, were all Registered staff nurses working in the hospitals.

Target Population
In this study the target population includes all the staff nurses of the selected hospitals.

Accessible Population
In this study all staff nurses meeting the inclusive criteria and who are available at time of data collection.

Sample
In this study, sample consists of 50 registered staff nurses working in selected hospitals of Maharashtra who were available during the period of data collection.

Sampling Technique
In this study non probability convenience sampling technique is used.

Sampling Criteria

Inclusive criteria
- Staff nurses working in selected hospitals of Vidarbha Region in Maharashtra.
- Willing to participate in the study.
- Available at the time of data collection.

Exclusive criteria
Staff Nurses working in General ward, OPD, OT and Labour room.

Tool for Data Collection

The tools used in this study consist of two sections:
Section A:- consists of questionnaire on demographic
Section B:- consists of questionnaire on knowledge regarding tracheostomy suctioning.

Grading of knowledge
Poor	- Less than 50%
Satisfactory	- 51 – 60 %
Good	- 60 – 70 %
Excellent	- 70 and above.

These gradings are purely for this research study only.
Planned teaching on knowledge regarding Tracheostomy Suctioning

The planned teaching on knowledge regarding Tracheostomy suctioning was prepared with the following content areas based on tracheostomy suctioning. They are:
1) Definition of tracheostomy
2) Anatomy and physiology of trachea
3) Purposes of tracheostomy suctioning
4) Indications for tracheostomy suctioning
5) Equipments used for tracheostomy suctioning
6) Procedure of tracheostomy suctioning and its technique
7) Care of patient after tracheostomy suctioning
8) Unexpected outcomes and related interventions
9) Immediate, delayed and late complications.

Reliability
Reliability of the structured knowledge questionnaire was done by administering the questionnaire to 30 staff nurses by using the split half method. The reliability coefficient of correlation for structured knowledge questionnaire was;
r = 0.799. Hence the tool was found to be reliable.

Validity
Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure.[17]

To obtain content validity of the tool, the prepared tool with synopsis, evaluator's response sheet and content validity certificate was submitted to 11 experts of Nursing and Medicine . Experts were chosen on the basis of their teaching and clinical experience and interest in the problem area.

11 validated tools were received from the experts with their valuable suggestions and comments. All these suggestions were incorporated in the final draft of the questionnaire.

Procedure For Data Collection

Formal written permission was obtained from the selected hospital. Data was collected from15th July 2013 to 22nd July 2013. Data collection technique used was paper and pencil test. On the first day (pre test day) purpose of the study was explained to each sample and confidentiality of their response was assured. After the pre test the same day planned teaching was conducted to enhance their knowledge. Post test was conducted on the 7th day.

Plan for Data Analysis

The data was decided to be analyzed, using descriptive and inferential statistics on the basis of objectives of the study. To compute the data, a master data sheet was prepared by the investigator. These include;
- Items related to demographic variables.
- Data of pre-test and post-test score would be analyzed by using 'z' test, that would be used to detect the effectiveness of planned teaching.
- The significant difference between the knowledge and demographic variables would be calculated using ANOVA test.

5. Major Findings

Table 1 shows that the distribution of staff nurses according to their age in years reveals that 80% of them belongs to the age group of 21-30 and 20% of them belongs to 31-40 years respectively. 52% were females and 48% of them were males. Out of 50 samples 58% of them were educated upto GNM, 36% were Basic B.Sc.(Nursing) and 6% were educated upto P.B.B.Sc.(Nursing). Years of experience reveals that 76% of them had 1-5 years, 20% were 6-10 years and 2% each had experiences of 11-15 years and >16 years respectively. 24% of them were working in SICU, 44% in MICU, 30% in ENT and 2% were working in oncology ward. Years of experience in the present working area shows that 92% of them had experience between 1-5 years, 6% had 6-10 years and 2% had 11-15 years of experience respectively. Staff nurses who participated in the training on tracheostomy care or suctioning after basic nursing training shows that 56% of them attended the said training and 44% of them are not attended any training.

Demographic Variables	No. of staff nurses	Percentage (%)
Age(yrs)		
21-30 yrs	40	80.00
31-40 yrs	10	20.00
41-50 yrs	0	0.00
>50 yrs	0	0.00
Gender		
Male	24	48.00
Female	26	52.00
Professional Qualification		
GNM	29	58.0
Basic B.Sc.(Nursing)	18	36.0
P.B.B.Sc.(Nursing)	3	6.0
Any Other	0	0.00
Years of experience		
1-5 yrs	38	76.0
6-10 yrs	10	20.0
11-15 yrs	1	2.0
>15 yrs	1	2.0
Area of working		
SICU	12	24.0
MICU	22	44.0
ENT	15	30.0
Oncology	1	2.0
Any other	0	0.00
Years of experience in the present working area		
1-5 yrs	46	92.0
6-10 yrs	3	6.0
11-15 yrs	1	2.0
> 16 yrs	0	0.00
Attended any training on tracheostomy care or suctioning after basic nursing training		
Yes	28	56.00
No	22	44.00

Distribution of staff nurses according to their demographic variables.

Comparison of knowledge score of pretest and post test on knowledge regarding tracheostomy suctioning.
N=50

Area	Max Score	Pre Test		Post Test		Mean % Gain
		Mean	Mean%	Mean	Mean%	
Anatomy& Physiology	9	4.54	50.4	7.80	86.67	36.27
Indications	1	0.62	62.0	0.84	84.00	22
Knowledge of tracheal suctioning	11	5.72	52.0	9.60	87.27	35.27
Care of patients with tracheostomy	5	2.14	42.8	4.30	86.00	43.2
Post operative care	1	0.44	44.0	0.92	92.00	48
Complications	3	1.32	44.0	2.66	88.67	44.67

Data presented in above shows that the highest mean percentage of pretest score was 62% in the area of indications of tracheostomy, followed by knowledge on tracheostomy 52%, anatomy and physiology 50.4%, complications 44%, post operative care 44% and care of patient with tracheostomy 42.8%. Thus there is knowledge deficit observed in all the areas in staff nurses regarding tracheostomy suctioning.

The maximum mean percentage gain was 48% for post operative care, 44.67% for knowledge on complications, 43.2% on care of patient with tracheostomy, 36.27% on anatomy and physiology, knowledge on tracheostomy suctioning was 35.27% and 22% on indications for tracheostomy respectively.

After the administration of planned teaching it was found that the post test mean knowledge score in all areas were higher than the pre test mean percentage knowledge scores. Thus suggesting the effectiveness of the planned teaching.
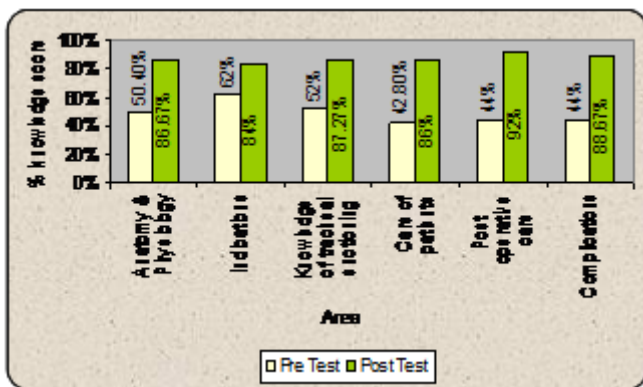

Figure
Comparison of knowledge score in pretest and post test

Significance of difference between knowledge score in pre and post test of staff nurses in relation to knowledge regarding Tracheostomy suctioning

N=50

Area	Pre Test		Post Test		z-value	p-value
	Mean	SD	Mean	SD		
Anatomy & Physiology	4.54	1.21	7.8	1.12	17.6	0.000
Indications	0.62	0.49	0.84	0.37	3.07	0.000
Knowledge of tracheal suctioning	5.72	1.93	9.6	1.39	18.37	0.000
Care of patients	2.14	1.21	4.3	0.86	12.71	0.000
Post operative care	0.44	0.5	0.92	0.27	5.85	0.000
Complications	1.32	0.95	2.66	0.59	9.86	0.000

Table shows the comparison of pretest and post test knowledge scores of staff nurses on knowledge regarding Tracheostomy suctioning. Mean, standard deviation and mean score percentage values are compared and 'z' test is applied at 5% level of significance. The tabulated value for n=50-1 i.e 49 degrees of freedom was 2.00. The calculated 'z' value are much higher than the tabulated value at 5% level of significance which is statistically acceptable level of significance. In addition the calculated 'p' values for all the areas of knowledge regarding Tracheostomy suctioning was 0.000 which is ideal for any population. Hence it is statistically interpreted that the planned teaching regarding Tracheostomy suctioning was effective. Thus the H_1 is accepted.

6. Summary of the Findings

Distribution of the staff nurses according to their demographic variables it was found that 80% of staff nurses were in the age group of 21- 30yrs. 52% of them were females, 58% of them completed GNM, 76% had the working experience of 1- 5years. 44% were working in medicine ICU and 92% of them had 1-5 years of working experience in the present working area. Among them 56% of staff nurses attended the inservice education programme on tracheostomy suctioning.

In the assessment of existing knowledge 62 % of staff nurses were having knowledge on the indications for tracheostomy and 52% were having knowledge on tracheostomy suctioning. Knowledge on anatomy and physiology of staff nurses were 50.4 % and knowledge on post operative care and complications were 44%. Only 42.8% of staff nurses had knowledge on care of patients with tracheostomy.

In the post test knowledge score 92% of staff nurses were having knowledge on post- operative care after tracheostomy and 88.67% of them were having knowledge on complications of tracheostomy suctioning. 86.67% of staff nurses were having knowledge on procedure of tracheostomy suctioning. Knowledge on care of patients with tracheostomy and indications on tracheostomy was scored as 86% and 84% respectively.

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In the comparison of pretest and post test knowledge scores of staff nurses on knowledge regarding tracheostomy suctioning, mean, standard deviation and mean score percentage values are compared and 'z' test is applied at 5% level of significance. The tabulated value for n=50-1 i.e 49 degrees of freedom was 2.00. The calculated 'z' value are much higher than the tabulated value at 5% level of significance which is statistically acceptable level of significance. In addition the calculated 'p' values for all the areas of knowledge regarding Tracheostomy suctioning was 0.000 which is ideal for any population. Hence it is statistically interpreted that the planned teaching regarding Tracheostomy suctioning was effective. Thus the H_1 is accepted.

Association of knowledge score in relation to demographic variables there was association between the knowledge score and the gender of staff nurses and there was no association with any other demographic variables.

7. Discussion

The findings of the study were discussed with reference to the objectives of the study and with the findings of other studies in this section.

The findings of the present study show a significant improvement of knowledge scores after the planned teaching. The findings show that in pre test scores 48% subjects were having satisfactory. Grading of knowledge, 52% of study participants were having good grading of knowledge and none was having excellent grading of knowledge score. In post test scores 80.00% of subjects showed excellent grading of knowledge, 20% of subjects showed good grading of knowledge and none was in the satisfactory grade.

Significance of difference between overall knowledge score in pre and post test in staff nurses in relation to knowledge regarding tracheostomy suctioning shows that mean pretest knowledge score was 14.78 and posttest knowledge score 26.14 which was found to be statistically significant. Based on this findings it is clear that staff nurses improved their knowledge regarding tracheostomy suctioning.

The findings of the present study was supported by the findings of previous studies In an evidence-based guide to suctioning by David R T (2007) International Journal of evidence based health care emphasises that in order to promote positive outcomes in patients with tracheostomy, nurses need to stay up-to-date on best practices and develop and maintain the necessary skills.

A study was conducted by Varghese S (2011) in Bangalore to assess the effectiveness of Self instructed module (SIM) on knowledge regarding current suctioning practice among staff nurses. This study recommends that there is improvement in the knowledge of staff nurses after the administration of the SIM. Best outcome in patient care with tracheostomy can be achieved if periodical trainings are provided to the staff nurses.

A study was conducted by Day T (2002) on comparing the need for applying suction both before and after inserting catheter. These two methods of tracheal suctioning in the same 18 children with chronic tracheostomies were done. Use of the American Thoracic Society (ATS) recommendations resulted in a significant increase in secretions obtained (t = -3.96; p = .001) when compared with traditional practice. The ATS-recommended method was also more efficient in children with secretions. When used first, no additional secretions were obtained after 90 minutes using the traditional method. Additional secretions were obtained with the ATS-recommended method when the traditional method was used first. Heart rate and oxygen saturation immediately and 1 minute after suctioning were not significantly different between methods.

8. Conclusion

After the detailed analysis, this study leads to the following conclusions:

Staff nurses were having less knowledge regarding tracheostomy suctioning before planned teaching. There was a significant increase in the knowledge of subjects after the introduction of planned teaching. To find the effectiveness of planned teaching 'z' test was applied and 'z' value was calculated, post test score was significantly higher at< 0.05 level than that of pre test score. Thus it was concluded that planned teaching on knowledge regarding tracheostomy suctioning was found effective as a teaching strategy.

Hence, based on the above cited findings, it was concluded undoubtedly that the planned teaching on knowledge regarding tracheostomy suctioning was effective in improving the knowledge of staff nurses regarding tracheostomy suctioning.

While associating the knowledge of staff nurses with their demographic variables shows that except gender any other demographic variables did not show a major role in influencing the pre test and post test knowledge score among staff nurses.

9. Implications of the Study

The implications of this study are discussed under the following headings
❖ Nursing administration
❖ Nursing education
❖ Nursing research
❖ Nursing practice

Nursing Administration

Findings of the study can be used by the Nursing Administrator in creating policies and plans for providing education to the staff nurses and care takers. Care and suctioning procedures for patient with tracheostomies play a vital role in the maintenance of patent airway. A programme at hospital level for prospective (future) staff nurses can be planned and implemented to create awareness and to reduce

the complications and provide safe and comfort to the clients with tracheostomy. Such kind of planned teaching can be conducted for staff nurse for all nursing procedure will help them to update and improve their knowledge, which may help to adopt correct practices in all nursing procedures.

Nursing Education

- The findings of the study will help the nursing students to develop an insight in the care of patient with tracheostomy and implement the knowledge of the same, while dealing with clients in various settings.
- The instruments prepared for this study will help the student nurses for collection of information regarding the technique and procedure of tracheostomy suctioning.
- The findings of the study will help nurse educators to guide senior staff nurses, colleagues and junior staffs regarding tracheostomy suctioning.

Nursing Research

The nurse researchers can use the findings of this study as baseline data to conduct further interventional research to identify the level of knowledge and to determine the association of other demographic variable as age, gender, professional qualification and previous experience in caring of patient with tracheostomy.

It highlights the areas, which require future exploration. The suggestion and recommendations can be utilized by other researchers conducting further studies in the same field.

Nursing Practice

- The findings of the study will help health care professionals including staff nurses to be more vigilant and tactful in order to identify and prevent complications related to tracheostomy suctioning that may deteriorate and alter their personal, social life and well being significantly.
- The planned teaching can be used for imparting knowledge regarding tracheostomy suctioning to health team members. Planned teaching will serve as a ready reference material for the health team members. It will also help the nurses to keep update knowledge regarding tracheostomy suctioning.
- The findings of the study can be used to promote community outreach services including health education, related to care and management of client with tracheostomies in their home settings.

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