# Effectiveness of a Video Teaching Programme Regarding Tracheostomy Care on Knowledge and Skills of Care Providers of Tracheostomized Patients at AIIMS, New Delhi

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Abstract: <u>Background of the study</u>: Patient education facilitates imparting information to the patients and their caregivers by the health professionals. The obligation of pre-discharge patient and care providers education and ensuring standard care at home for the patients with a lifelong tracheostomy is emphasized. These patients require a cautious and meticulous home care of the tracheostomy tube and the stoma.<sup>1</sup>.Aim: To develop an effective video based learning resource material about tracheostomy care in adults, for providing knowledge and developing skills of care providers, for providing home care to the patients discharged from the hospital with tracheostomy tube in-situ <u>Methodology</u>: Pre-Experimental research design (one group pre test post test design) on 29 care providers from neurosurgery and neurology wards, AIIMS, New Delhi. Purposive sampling technique was used and data collection was done by using a knowledge questionnaire and observation checklist. <u>Results</u>: The pre test, post test I and post test II mean knowledge scores were  $12.3 \pm 2.2$ ,  $18.6 \pm 1.2$  and  $18.2 \pm 1.4$  respectively. The mean pre test, post test I and post test II were significantly higher as compared to the pre test knowledge and skills scores at p<0.000 level of significance. <u>Conclusion</u>: The video teaching program was found effective in bringing about an increase in knowledge and effective skills of care providers skills of care providers dual their care providers.

Keywords: Effectiveness, Video teaching Programme, Tracheostomy care, Care providers, Tracheostomized Patients

#### 1. Introduction

Respiratory system is one of the vital systems of our body. Its primary purpose is the exchange of gases. Any respiratory obstruction will affect the oxygen supply to the cerebral cells leading to cerebral hypoxia which will result in deterioration of neurological status of the patient and may lead to death. This is particularly important in patients suffering from neurological disorders as oxygen is required for the survival of brain cells. Patients who are unable to maintain their own ventilation, an artificial assistance in the form of endotracheal intubation and tracheostomy may be required.<sup>2</sup>

Tracheostomy is one of the most common procedures performed in intensive care unit.<sup>3</sup> A tracheostomy is an incision into the trachea that forms a temporary or permanent opening to allow airflow and permit the removal of bronchotracheal secretions.<sup>4</sup>A tracheostomy may be performed as an emergency or planned procedure. 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.<sup>5</sup>

The patient leaving the hospital with a new tracheostomy will face problems with secretion management, increased risk of infections, alterations in body image & impaired vocalization. To ensure a safe transition from the hospital to home, the patient and family must demonstrate competence in all aspects of tracheostomy care, able to recognize signs and symptoms that should be reported to the physician and have adequate support at home. Nurses can help a patient successfully manage these problems through comprehensive discharge planning.<sup>6</sup>

Patients having neurological and neurosurgical conditions may have neurological deficit and some are in unconscious state. These factors render their ability of self-care of TT insitu and make them partially or fully dependent on their care providers. This fact imposes the need to teach the care providers about tracheostomy care of their patient, so that they can perform it safely and properly.

A review of tracheostomy videos concluded that audiovisual materials like video recordings can be useful as a basis for an educational session or as a substitute when the specialty nurse is unavailable to provide education.<sup>7</sup>

However; there were no studies available on use of videoteaching program for the training of care providers for home care of tracheostomy of their patient. Hence, researcher felt the need to develop a video teaching program to teach the care providers about tracheostomy care of their patient.

#### 2. Literature Survey

**C.(T.) Tolomeo et al**., conducted a quality improvement (QI) project to standardize care and skills proficiency training to parents of infants with a tracheostomy tube in preparation for discharge to home. A convenience sample of

#### International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

infants with a tracheostomy tube admitted to the Pediatric Respiratory Care Unit were included in the study. Descriptive statistics were used to analyze the results. Results revealed that through this QI approach, the time required by parents to achieve proficiency in the care of a technology dependent infant was decreased, the length of stay for these infants was also reduced, and increase referral of the infants for developmental assessment.<sup>8</sup>

Loerzel VW, Crosby WW, Reising E et al., describes the development and outcomes of the Tracheostomy Care Anxiety Relief Through Education and Support (T-CARES) program, developed in response to high readmission rates for patients with head and neck cancer discharged with a tracheostomy. T-CARES consists of an 18-minute video demonstration, group discussion, return demonstration, and skills assessment. The course also incorporates hands-on practice on a low-cost anatomical task trainer created by the authors. A significant reduction in caregiver anxiety was noted after participation in the T-CARES program. T-CARES and similar programs can be developed to teach self-care for a variety of conditions that patients and caregivers are expected to manage at home.<sup>9</sup>

Nagi M, Kapoor S, Kaur S et al., conducted an experimental study about the effect of an intervention on the performance regarding change of Tracheostomy Tube (TT) among the caregivers of the patients who are going to be discharged with a TT in situ from neurosurgery units of a tertiary care hospital. Sixty-four subjects were purposely selected. The tools used were identification data sheet and an observation checklist on the change of TT. First, the caregivers were observed during change of TT. Then, each subject was demonstrated the right technique of change of tube. Result revealed that before demonstration, only one subject had some knowledge about the change of TT. After 72 h of demonstration, the score was  $12.34 \pm 1.6$  (77.2%). Study concluded that the caregivers should be properly trained regarding changing the TT in order to prevent any complication while performing the procedure. The results of this study provide further strategies for other caregiver guidance programmes.<sup>10</sup>

Sharma B conducted a quasi experimental study in Vinayaka Mission Hospital, Salem to assess the effectiveness of video assisted teaching module on tracheostomy care on 50 staff nurses. Findings revealed that overall post-test mean score was  $23.58 \pm 2.21$  which was 78.6% of the total score, revealed good knowledge of staff nurses. The difference in mean percentage between pre and post-test was around 27.4% shows that video assisted teaching module was effective in improving the knowledge of staff nurses regarding tracheostomy care. Overall post-test mean skill score was  $26 \pm 3.38$  which was 74.28% of the total score revealing good performance of staff nurses on tracheostomy care. The difference in mean percentage between pre and post-test was around 24.8% shows that video assisted teaching module was effective in improving the skill of staff nurses in performing tracheostomy care.<sup>11</sup>

Cetto R, Arora A, Hettige R, et al, conducted a cohort study, which highlighted that the suboptimal standards in tracheostomy care have been a growing concern in view of the increasing demands for ICU. With the introduction of Tracheostomy Care Bundle checklist, a dedicated Tracheostomy Multi-disciplinary Team and an educational programme, the time to decannulation following ICU discharge decreased from 21 days to 11 days; as did the mean total tracheostomy time, from 34 days to 25 days; the number of critical incidents substantially declined from 58 to  $7.^{12}$ 

**Graf MJ, Montagnino BA, Hueckel R, et al.,** conducted a study which revealed that caregivers of patients with new tracheostomies needed a median of 14 days to successfully complete a tracheostomy care training program. Discharge occurred at median of 6.5 days after education was completed. They concluded that a structured education and discharge program for caregivers may result in a shorter length of stay for patients with new tracheostomies.<sup>13</sup>

## 3. Statement of the Problem

"A study to assess the effectiveness of video teaching program regarding tracheostomy care on knowledge and skills of care providers of adult patients with tracheostomy tube in-situ in Neuro-sciences centre of AIIMS, New Delhi."

#### **Objective of the Study:**

To evaluate the effectiveness of video teaching program on tracheostomy care in improving knowledge and skills of care providers of adults patients with tracheostomy tube (TT) insitu.

#### Hypotheses:

 $H_1$ - The knowledge score of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video teaching program will be higher as compared to the baseline knowledge score at 0.05 level of significance, as assessed by self-administered knowledge questionnaire.

 $\rm H_2$ - The skills score of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video teaching program will be higher as compared to the baseline skill score at 0.05 level of significance, as assessed by observation checklist.

## 4. Conceptual Framework

The present study was focused on assessing the knowledge and skills regarding tracheostomy care among care providers of patients with tracheostomy tube in-situ by applying General System theory Developed by Ludwig Von Bertalanffy (1969).

## **Operational Definition:**

• **Tracheostomy care-** Refers to monitoring for signs and symptoms of respiratory distress, tracheostomy suctioning, tracheostomy hygiene, managing blocked tube and emergency decannulation & signs and symptoms to report immediately to the physician.

- **Tracheostomy Suctioning** Refers to mechanical aspiration of excess pulmonary secretions from an artificial airway (tracheostomy tube) placed in a patient by a rubber or polythene catheter.
- **Tracheostomy hygiene** Refers to cleaning of inner cannula in case of metallic tube, cleaning of area around tracheostomy with boiled cool water, applying sterile dressing under the neck plate of TT and changing the soiled neck threads.
- **Care providers** Refers to relatives, friends of patient and other paid workers involved in the care of patients in the hospital and at home for more than 8 hours.
- Video teaching program –In this study it refers to the systematically designed individualized teaching program to educate care providers of adult patient with TT in situ with the help of video made by the researcher on tracheostomy care in adults which includes anatomy and physiology of respiratory system, Tracheostomy suction, Tracheostomy hygiene, Management of blocked tubes, Management of emergency decannulation.
- Effectiveness Refers to significant increase in the level of knowledge and skills of care providers of adult patient with TT in situ which is measured from the response of pre test, Video teaching Programme and post test.

## 5. Methodology

Research Approach: Quantitative, experimental approach

**Research Design** Pre-Experimental research Design (one group pretest and posttest design)

**Setting:** The present study was conducted in Neurology and Neurosurgery wards of Neuro-sciences center of All India Institute of Medical Sciences (AIIMS), New Delhi.

#### Variables:

#### Independent variable

Video teaching program on tracheostomy care in adults. **Dependent variable** 

Care providers' knowledge regarding tracheostomy care in adults.

Care providers' skills regarding tracheostomy care in adults. **Extraneous variable** 

Care provider's age, Care provider's sex, Education of the care provider, Days on tracheostomy,

Previous participation in educational programs on tracheostomy care, Performance of tracheostomy care before participating in this study.

**Population:** Care providers of adult patients with tracheostomy tube in-situ in AIIMS hospital, New Delhi

**Sample:** Care providers of adult patients with tracheostomy tube in-situ in AIIMS hospital, New Delhi who met the eligibility criteria.

**Sample Size:** The sample size of the present study comprises 29 Care providers of adult patients with tracheostomy tube in-situ in AIIMS hospital, New Delhi

**Sampling Technique:** Purposive sampling technique was used to collect the sample

#### Inclusion criteria

- Care providers of all patients (age >18yrs) with tracheostomy admitted in Neurology and Neurosurgery wards (NS-2, NS-3, NS-4, NS-5) of Neuro-sciences center of AIIMS, New Delhi.
- 2) Care provider providing the care to their patient in the hospital and at home for more than 8 hours a day.
- 3) Care provider age range between 18 to 50 years.
- 4) Able to understand Hindi or English.

#### **Exclusion criterion**

- 1) Care providers who were not willing to participate in the study.
- 2) Care providers of all tracheostomy patients with following conditions were excluded:
- Tumors of trachea or larynx
- Congenital abnormalities of airway
- Trauma accidental and surgical of trachea or larynx
- Foreign bodies in airway
- Vocal cord paralysis

#### **Tools for Collection of Data:**

- 1) Demographic datasheet: Demographic profile of care providers.
- 2) Knowledge questionnaire (20 items) on tracheostomy care to assess the knowledge of care providers regarding tracheostomy care before and after intervention.
- 3) An observational checklist (78 items) to assess the skills of care providers regarding tracheostomy care before and after intervention.

Content validity of knowledge questionnaire and observational checklist was obtained. Both the tools were found reliable with the reliability co-efficient of 0.93 and 0.91 respectively.

## Development of video teaching program on tracheostomy care in adults

A 18 minute video teaching on tracheostomy care in adults was prepared based on the American Association of Respiratory guidelines on suctioning of the patient at home (1999)<sup>14</sup> and other guidelines given by National Health Services (NHS) trust hospital<sup>15</sup> and various universities<sup>16-18</sup> for patients about home care of tracheostomy. Video was made in hindi as well as english.

**Ethical Considerations:** The ethics committee of AIIMS approved the study protocol. Informed written consent was taken from all the participants. Confidentiality and privacy of the information given by the participants was maintained throughout the study period.

#### **Pilot Study:**

Pilot study was done among 10 care providers of adult tracheostomized patients and study was found to be feasible.

#### **Data collection procedure:**

Table 1: Method of C	Collection of Data
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			Ро	st test	
Pre test	Intervention	Same day of Two weeks		ks after	
		intervention		intervention	
OK <sub>1</sub> OS <sub>1</sub>	X	OK <sub>2</sub>	$OS_2$	OK <sub>3</sub>	OS <sub>3</sub>

O- Observation, K- Knowledge and S- Skills

Volume 6 Issue 7, July 2017

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Teaching programme (X) was conducted as per the prepared lesson plan based on video teaching. It was conducted as one to one teaching. Method of teaching was lecture cum discussion and projection of the video teaching programme on tracheostomy care. The equipment used was a laptop computer to play the video. Duration of the intervention was 25-30 minutes.

## 6. Results

Table 2: Frequency and percentage Distribution of Care	e
providers, N=29	

Demographic variables	Median	Range	
Age (years)	33 years	20- 50 years	
Duration of stay with pt	12 hours	8-24 hours	
(hrs)			
	Frequency (%)		
	Male	15 (51.7)	
Sex	Female	14 (48.3)	
	Married	15 (51.7)	
Marital status	Unmarried	10 (34.5)	
	Others	4 (13.8)	
Relation with patient	Spouse	4 (13.8)	
	Sibling	10 (34.5)	
	Son/daughter	7 (24.1)	
	Parents	8 (27.6)	
Self health status	Healthy	27 (93.1)	
	Any chronic illness	2 (6.9)	
	Any infectious disease	-	
Occupation	Unemployed	14 (48.3)	
	Employed	14 (48.3)	
	In health sector	1 (3.4)	
Education	Able to read and write	5 (17.2)	
	Primary	3 (10.3)	
	Secondary	5 (17.2)	
	Higher secondary	5 (17.2)	

	Graduation	8 (27.6)
	Post-graduation & above	3 (10.3)
Attended any other	Yes	5 (17.2)
educational program on	No	24 (82.8)
tracheostomy care		
Performed TT care before	Yes	4 (13.8)
	No	25 (86.2)
If yes, how many times	Not performed	25 (86.3)
	1-25 times	2 (6.9)
	26-50 times	1 (3.4)
	>50 times	1 (3.4)

Table 2 depicts that the care providers under the study had a median age of 33 years and 12 hours duration of stay with the patient. Almost equal numbers of care providers were males (51.7%) and females (48.3%). Majority of the care providers were married (51.7%), healthy (93.1%), related to patient as their sibling (34.5%) and had educational qualification of Graduation and above (37.9%). Of the total employed care providers (51.7%), only 3.4% were working in health care sector. Very few care providers had attended any other educational program on tracheostomy care (17.2%). Out of (13.8%) care providers who had performed tracheostomy care before this study, equal number of care providers performed it up to 1-25 times (6.9%) and for >26 times (6.8%).

scores N=29						
	Pre test Post test I					
	Mean ±	(Immediately	(two weeks after)			
	SD	after)	Mean $\pm$ SD			
		Mean $\pm$ SD				
Knowledge	$12.3 \hspace{0.1cm} \pm \hspace{0.1cm} 2.2 \hspace{0.1cm}$	$18.6 \pm 1.2$	$18.2 \pm 1.4$			
score						

Maximum score = 20



Figure 1: Simple Pyramid diagram represents mean pre test, post test knowledge scores of Care providers

Table 3 and Fig 1 shows that the pre test, post test I, and post test II mean knowledge scores are  $12.3 \pm 2.2$ ,  $18.6 \pm 1.2$ 

and 18.2  $\pm$  1.4 respectively. It shows an increase in mean post test scores from the mean pre test score and slight

decrease in mean score of post test II as compared with the mean score of post test I.

scores, N=29							
Eastan 1	Eastern 2	Factor 2 Mean difference (Factor 1-2) Std. p error value	Std.	р	95% CI for difference		
Factor 1	Factor 2		Lower bound	Upper bound			
Pre test	Post test I	-6.35	0.31	$0.000^{a^*}$	-7.13	-5.56	
Pre test	Post test II	-5.93	0.32	$0.000^{a^*}$	-6.75	-5.11	
Post test 1	Post test II	0.41	0.13	$0.009^{a^*}$	0.09	0.74	

 Table 4: Comparison of pre test and post test knowledge scores. N=29

*a-* Repeated measures ANOVA with Bonferroni correction, \*- statistically significant, p<0.05

Table 4 depicts that knowledge score at post test I and post test II are significantly higher as compared to the pre test knowledge score at p= 0.000 level. Also the slight decrease in knowledge score from post test I to post test II is found to be statistically significant at p=0.009 which can be attributed to very small SD (0.13) between these groups. Hence the slight decrease in knowledge score from post test I to post test II is found to be statistically significant but is not clinically significant. Hypothesis Testing: In the light of the above findings, the research hypothesis  $H_1$  i.e. the knowledge score of the care providers of adult patient with TT in-situ regarding tracheostomy care both immediately and two weeks after the video teaching program will be higher as compared to the baseline knowledge score at 0.05 level of significance as assessed by self-administered knowledge questionnaire, is accepted and null hypothesis is rejected. Thus it is concluded that the video teaching program is found to be effective in bringing about an increase in knowledge of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video teaching program.

Table 5: Mean Pre test, post test I, and post test II ski	lls
scores, N=29	

	Pre test	Post test I	Post test II		
	Mean $\pm$ SD	(Immediately after)	(two weeks after)		
		Mean $\pm$ SD	Mean $\pm$ SD		
Skills score	$38.2\ \pm 7.3$	$74.4 \pm 6.7$	71.7 ± 6.9		
1					

 $Maximum\ score = 82$ 



Figure 2: Simple Conical diagram represents mean pre test, post test skills scores of Care providers

Table 5 and Fig 2 shows that the pre test, post test I, and post test II mean skill scores are found to be  $38.2 \pm 7.3$ ,  $74.4 \pm 6.7$  and  $71.7 \pm 6.9$  respectively, as seen from table 4 above. It shows an increase in mean post test scores from the mean pre test scores and slight decrease in mean scores of post test II as compared to that of post test I scores.

Table 6: Comparison	of pre test and	post test skills scores,
	N-20	

_	N=29							
F ( 1	Easter 1	Factor 2	Mean difference (Factor 2-1 )	Std. Error	p value	95% CI for difference		
	Factor 1					Lower bound	Upper bound	
Γ	Pre test	Post test I	-36.16	1.03	$0.000^{a^*}$	-38.79	-33.53	
ſ	Pre- test	Post test II	-33.41	1.8	$0.000^{a^*}$	-38.01	-28.82	
Ľ	Post test I	Post test II	2.75	1.9	0.477	-2.09	7.59	

*a- Repeated measures ANOVA with Bonferroni correction, \*- statistically significant,* p<0.05

Table 6 signifies that skills score at post test I and post test II are significantly higher as compared to the pre test skills score at p=0.000 level. As interpreted from the table above, the skills score between post test I and post test II are not found to be statistically significant (p=0.477).

**Hypothesis Testing:** In the light of the above findings, the research **hypothesis H**<sub>2</sub> i.e. the skills score of the care providers of adult patient with TT in-situ regarding tracheostomy care both immediately and two weeks after the video-teaching program will be higher as compared to the baseline skill score at 0.05 level of significance as assessed by observation checklist, is accepted and the null hypothesis is rejected. It is concluded that the video teaching program is

Volume 6 Issue 7, July 2017 <u>www.ijsr.net</u> Licensed Under Creative Commons Attribution CC BY found to be effective in bringing about an increase in skills level of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video teaching program.

## 7. Major Findings and Discussion

Results of the present study were in congruence with a research conducted by Kun SS, et al, to assess the knowledge of 152 primary caregivers, using a 25-question survey regarding how to handle emergency situations with tracheostomies or malfunction of the ventilators at home after a respiratory therapist driven training program. The result depicted increase in the mean knowledge score of 80% after the training program.<sup>19</sup>

The results were also similar to the study done by Nagi M, Kapoor S, Kaur S, et al., that compared tracheostomy tube change procedure skills among the caregivers of the patients who were going to be discharged with tracheostomy tube in situ before and after a demonstration of tracheostomy tracheostomy tube change procedure and providing them an information booklet. The result showed that the mean performance score was  $0.16 \pm 1.3$ , before the demonstration which increased to  $12.34 \pm 1.6$  in the return demonstration taken after 72 hours. (t = -48.17, 63, P < 0.0001). 10

## 8. Conclusion

The video teaching program was effective in bringing about an increase in knowledge of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video-teaching program. The video teaching program was effective in bringing about an increase in skills level of the care providers of adult patients with TT in-situ regarding tracheostomy care both immediately and two weeks after the video-teaching program. The improvement in knowledge and skills generally sustained two weeks after the video teaching program.

## 9. Nursing Implication

The findings of the present study have implication for Nursing Education, Nursing Administration, Nursing Practice, and nursing Research.

#### Nursing practice

- A video can be used to give discharge teaching to patients and care providers, thus, saving the time of nursing staff and excluding the risk of missing a step of the procedure.
- It can also be used by community health nurses to reinforce the teaching to patients and care providers after discharge from hospital and at home.

#### Nursing education

The video can be utilized in teaching nursing students about home care of tracheostomy during their course so that they can practice it during their ward postings for teaching the care providers about home care of tracheostomy before discharge.

#### Nursing research

- Conduct research to increase knowledge and skills of staff members regarding home care of tracheostomy.
- Conduct research to develop a video on tracheostomy care to increase knowledge and skills of new staff members regarding tracheostomy care practiced in wards.
- Develop other new innovative media for teaching patients and care providers in wards and community.
- Develop video as a health education tool for providing education to the patients and care providers in wards and community for health promotion and disease prevention.

#### Nursing administration

Video should be made available to the nursing staff in all the wards so that they can utilize it for providing discharge teaching to the patients.

## 10. Limitations

- Small sample size.
- Purposive sampling was used.
- Single setting was used; hence results cannot be generalized to other settings.
- The contamination which might have happened due to discussions among care providers in the absence of researcher and observation of skills of nurses performing tracheostomy care in wards after and before the assessment could not be avoided.

## **11. Recommendations**

Based on the findings of the study, the following recommendations are offered for future research.

- Study can be replicated in multiple settings like ENT wards, trauma wards, oncology wards including neurology and neurosurgery wards.
- A study with longer duration follow up can be taken up to have more evidence about the retention of knowledge and skill and also to observe the outcome of the patient after such a teaching program.
- The prepared video can be used to teach staff regarding home care of tracheostomy so as to improve their knowledge and skills and thus, the quality of discharge teaching.
- A similar study can be replicated with an aim to develop instructional video on other skill based procedure to improve knowledge and skill of patients and care providers.

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