

Effect of Implementing Educational Program on Self-efficacy and Late Pulmonary Complications among Patients with Permanent Tracheostomy

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Abstract:

Background: Egypt showed that head and neck cancers make up about 17-20% of adults must managed by tracheotomies for the following reasons bronchial toilet, prolonged mechanical ventilation, occlusion of the upper airway, airway protection or maintenance and easier weaning. **Aim:** This study aimed to evaluate the effect of implementing educational programs on self-efficacy and late pulmonary complications among patients with permanent tracheostomy. **Design:** A quasi-experimental research design (pre- posttest and follow up) was used. **Sample:** 60 adult patients with permanent tracheostomy were selected for a purposive study. **Setting:** The study conducted in surgical outpatient clinic at Qena Tumor Hospital. **Tools I:** Structured Interviewing Questionnaire consists of two parts **II:** Self-Care Reported Practice **III:** Tracheostomy Self-Efficacy Scale and **IV:** Pulmonary Complications Assessment Scale. **Results:** There were statistically significant differences between pre/post and pre/follow-up as regard total mean knowledge scores , mean care practice score, self-efficacy level mean scores and late Pulmonary complication severity related post implementing educational program. **Conclusion:** The educational program is effective in enhancing patients' knowledge, self-efficacy and decreasing late pulmonary complications in patient with permanent tracheostomy. **Recommendations:** Increase patient's awareness of the complications associated with tracheostomy and self-care practice.

Keywords: Educational Program, Permanent Tracheostomy, Pulmonary Complications & Self-efficacy.

Introduction

The term "head and neck cancers" (HNC) refers to a category of cancers that affect the larynx, ear, nose, and mouth. Elucidate is the tenth most prevalent cancer incidence among men worldwide, making it the seventh most reported type of cancer affecting both sexes (Altunbas et al., 2021). Among the malignant head and neck cancers, generality prevalent is laryngeal cancer (Carroll Alfano, 2019). Tobacco and alcohol use are the most frequent risk factors linked to HNC, and there is a considerable interaction between the two. In addition to inadequate oral hygiene and the presence of human papillomavirus in the tongue, tonsils, and throat, especially in nonsmoking individuals (He et al., 2021). Egypt showed that HNC makes up about 17-20% of all malignancies where smoking rates are increasing for both cigarettes and water (Khaled, 2021).

Total laryngectomy, or the whole surgical removal of the larynx combined with construction of a permanent tracheostomy and disunion from the upper airway, is the treatment used for laryngeal cancer (Mitchell et al., 2019). A major factor in the rise in tracheostomy cases is the rising frequency of head and neck cancer (Jakobsen et al., 2018). Consequently, an increasing

number of tracheostomy patients visit various healthcare facilities, such as hospitals or private homes (O' Cathain et al., 2020). Adults can also get tracheotomies for the following reasons: bronchial toilet, prolonged mechanical ventilation, occlusion of the upper airway, airway protection or maintenance, and easier weaning (Prinz et al., 2021).

When a tracheostomy is created, the patient experiences major physical changes that affect their ability to breathe, speak, swallow, smell, and maintain their body image. A individual's capacity to acquiesces the changes in his or her new self appears to be conditioned by alterations in respiration, communication, body image, and spirituality, which makes these functional abnormalities a common source of physical, psychological, social, spiritual, and sexual implications (Queirós, 2021). Along with frequently limiting social lower self-esteem and sense of self-efficacy. Thus, a person's activities and quality of life can have a significant impact on each other (Stavropoulou et al., 2021).

Many complications can arise during or soon after a tracheostomy for patients who have had an ostomy, including bleeding, pneumothorax, unintentional injury, and infection. Late complications include

airway obstruction, aspiration, dislodged tube, tracheomalacia, tracheocutaneous fistula, peristomal skin breakdown, and pressure ulcers. Adequate preoperative planning, safe surgical techniques, and appropriate rehabilitation to psychologically prepare the patient can prevent most complications (Swords et al., 2020). Tracheostomy treatment self-efficacy refers to tracheostomy patients' conviction that they can successfully manage their stoma to minimize side effects (Xu et al., 2018). Improved stoma acclimating and management as well as fewest psychosocial problems in the fore year following surgery are linked to higher levels of self-efficacy immediately following surgery. In order to develop stoma adjustment, self-efficacy is crucial. Tao et al., 2023 state that self-efficacy is maintained and restored by taking appropriate action and confidently managing daily stressors.

Nurses have been paying more attention to self-care, since they engage in preoperative and postoperative education for stoma patients by outlining the postoperative requirements, including changes to look and lifestyle suggestions. The primary goal of discharge planning for a tracheostomy patient is to guarantee autonomy recovery for a safe return home and reintegration into the community (Villa et al., 2019). Consequently, it is expected that the individual would acquire the necessary skills to manage the tracheostomy device and stoma in order to preserve their airway, prevent complications, and improve their quality of life. (Yang et al., 2021). Nursing interventions should therefore be utilized to assist the patient in developing the self-care skills necessary to address the needs and issues resulting from a tracheostomy, with an emphasis on training the patient to learn adaptability (Young et al., 2022). Additionally, the capacity of people, families, and communities to support one another in their efforts to prevent illness, promote health, take on more social obligations, and deal with disability whether or not they receive medical assistance. Resuming relationships, hobbies, and other activities is made possible by this, and tracheostomy patients' improved lifestyle is given top emphasis in their therapy (Seo, 2023).

The focus of attention for nurses has shifted to self-care since complex nursing interventions are typically used to encourage self-care (Jaarsma et al., 2020). Given its particulars, such as the number of elements involved, behaviors, targeted populations or settings, and the knowledge and abilities needed by both intervention providers and recipients, an intervention may be complicated (Skivington et al., 2021). It frequently takes several research studies to create sophisticated nursing treatments for self-care (Jaarsma et al., 2020).

Significance of the study

Harminizing to data gathered deem (Qena Tumor Hospital) between the years 2020 and 2021, observed that about (n=67) patients with tracheostomy visited the surgical outpatient clinics for follow-up (Qena Tumor Hospital's records, 2021). Beside, the number of persons with tracheostomy has been expanding in newcomer. Patients' quality of life is diminished and their physiological, psychological, and social adaptations have all been adversely affected by having a tracheostomy. In addition, most tracheostomy patients lack the knowledge and skills necessary to properly care for their stomas. Equip effective and affirmative teaching mastery assist patients jude their self-care skills (Silvia et al., 2023). So, purpose of the study was to assist this particular patient population.

Aim of the study

This research aimed to evaluate the effect of impleminting educational programs on self-efficacy and late pulmonary complications among patients with permanent tracheostomy.

Research Hypothesis:

- 1- The patient's knowledge and self-care reported practice score could be modulated post-implementing the educational program compared to the pre-implementing educational program.
- 2- The patient's self-efficacy score could be improved post-implementing the educational program compared to pre pre-implementing educational program.
- 3- The patient's late pulmonary complications could be reduced post-implementing the educational program compared to pre pre-implementing educational program.

Subject and Methods

Research Design

Quasi-experimental research design (pre,post and follow up) was hired to conduct this study. This type of studies includes working with independent variables random assignment of participants terms (Khorais et al., 2022). The educational program considered the independent variables while the dependent variable was: late pulmonary complications and self-efficacy.

Setting

The study was proceeded in the surgical outpatient clinic at Qena Tumor Hospital. There are outpatient clinics affiliated with Qena Oncology Hospital, which consist of two rooms for examining and treating oncology patients attached to its waiting hall for patients.

Subjects

A Purposive sample of 60 adult subjects with permanent tracheotomy was recruited in the current

study. Estimated sample size using the G power software. A tool for calculating statistical power analyses for various t tests, F tests, χ^2 tests, z tests, and some exact tests is called G Power. It can also be used to calculate effect sizes and visually represent power analysis results. Based on Cohen's recommendations, it offers the effect size conventions of "small," "medium," and "large."

Patients were selected according to inclusion criteria: Adult patients age from 18 \geq 60 years of both sexes (Seo, 2023), can communicate, agree to take part in this study and have more than three months of tracheotomy.

However, whosoever with terminal illness, physical and psychological disabilities, but incapable to take care of themselves were excluded from the study.

Sample size Calculation

The sampling formula developed by Slovin was utilized to ascertain the sample size for the research population. where N is the total number of populations, N is the sample size, and e is the error margin with a 95% confidence range of 0.05. The total population is 67, concordance to the formulation:

$$n = N / (1 + (N) (E)^2) = 67 / (1 + (67) (0.05)^2)$$

$$n = 67 / (1 + (67) (0.0025))$$

$$n = 67 / (1 + 0.25) = 67 / 1.25 = 60$$

Tools of data collection

Tool (I): Structured Interviewing Questionnaire about tracheostomy care

After examining relevant and recent literature, the researchers constructed it Dawson (2023) & Zenk et al., (2020). It involved two parts, Part (1) consists of the patient's clinical and demographic data, including age, sex, marital status, education level, place of residence, employment, previous hospitalization during last year because of pulmonary diseases related to tracheostomy complications and smoking, Part (2) composed of patients' knowledge about tracheostomy care. Such part was created for assessing people's level of knowledge about tracheostomy care. Thirty multiple-choice questions were spout the following topics: two around the definition and causes of tracheostomy; one on the tracheostomy health benefits, seven about tracheostomy complications and their management; six withdraw adjusting to tracheostomy; seven on daily activities (bathing, sexual relations, communication, eating, drinking, and exercising); six jet tracheostomy care; and two emerge follow-up visits. The correct response received a score of one and the incorrect response received a score of zero. The mean score for the portion was calculated by adding the item scores together and dividing the sum by the total number of items. With a total score of 30,

the results were categorized as either satisfactory (above 60%) or unsatisfactory (below 60%).

Tool (II): Self-Care Report Practice

Modified by Rasool et al., (2023) to evaluate the tracheostomy patient's self-care routine. includes nine stages for suctioning, six steps for changing the external tracheostomy tube, six steps for caring for the stoma and skin, six steps for oral care, four steps for feeding and nutrition, and four steps for communication. For every step that was completed correctly, two points were awarded; for every step that was not completed, there were zero points. The overall practice score is categorized as follows: Practice that scored 60% or more was deemed adequate, whereas practice that scored lesser than 60% of the possible points were deemed inadequate.

Tool (III): Tracheostomy Self-Efficacy Scale (TSES)

Adopted from El-Anwar et al., (2022) and servant to assess the level of self-efficacy in tracheostomy patients which includes a 15-item questionnaire that covered four domains of self-efficacy (SE), namely, knowledge (5 items), identifying emergencies (4 items), performance (3 items), and coping (3 items). The total number of items was 15. Scoring was rated on a 5-point Likert scale ranging from "not at all confident" to "highly confident." Higher degree of tracheostomy self-efficacy indicated by higher scores. The total score falls between 15 and 75. Patients were categorized into three groups based on their scores: Slighter self-efficacy (least or equal to 37 grade), moderate self-efficacy (38–58 grade), and high self-efficacy (more or equal to 59 coefficient).

Tool (IV): Pulmonary Complications Assessment Scale

It modified from Sakai M et al., (2022) then used to evaluate degree and nature of tracheostomy-related pulmonary problems. It is divided into four domains: excessive secretion leakage, bad odor, erythema surrounding the stoma site, and erosion/stenosis of the stoma site. There is a total score of 0 to 15; enfolded four categories (mild = 1-3), (moderate = 4-6), (severe = 7-15), and (unaffected = 0).

Validity and Reliability:

Seven experts (five academic staff members of the South Valley University Faculty of Nursing and two from chest disease and tuberculosis department) for tested the content validity. According to their opinion, modification was carried out. The test-retest approach was used to assess tool's reliability; the correlation coefficients for tools II, III, and IV were determined to be 0.92, 0.84, and 0.77, respectively, suggesting high reliability.

Ethical considerations

The study proposal was examined and approved by the Ethics Committee of South Valley University's Faculty of Nursing The written approval No: (SVU-

NUR-MED-SUR-7-4-9-2023). Participants gave written agreement after the study's purpose was made clear, no harmful procedures were employed with them, they were all given the option to withdraw from the study at any time, and human rights were upheld. The information must be kept private and anonymous.

Pilot study

It was conducted on 10% of the study participants (6 patients) participated in a pilot study to assess the tools' clarity, applicability, feasibility and proverbial to estimate the time bearable to consummates the tools. Consequently, certain modifications implemented to offer additional pertinent data collecting tools. The study didn't include these patients.

Data collection procedures

From January 2022 to June 2022, a period of six months, was used to collect the data. Our study was carried out in 4 phases: assessment, planning, implementation, and evaluation. Firstly in the **Assessment phase**, all patients whose fulfilled the inclusion criteria were subtended to collect data on their prior knowledge and experience with tracheostomy care. Additionally, self-efficacy was evaluated through usage the pre-constructed tools. In outpatient clinic, the researcher gathered data three days /week. Individual patient interviews were conducted to collect the data during the morning shift in (a room inside the outpatient clinics designated for meeting with patients to receive instructions or to guide them. It is well ventilated, lited and contains 30 chairs divided into two rows. It has a data show projector and a blackboard. It also has an entry door and an emergency exit conformed to occupational safety and health specifications). There was a 30- to 45-minute time limit for each interview. In the **Planning Phase**, The researchers developed goal and material of the educational program. Overmuch, each patient received an illustrated poster and a colored booklet written in clear Arabic, both created by the researchers. In **Implementing phase**, the educational program, which was divided into four main sessions—three theoretical and one practical-covered both the theoretical and practical components. Depending on the clinic's situation, it was conducted in a patient convening area or viz other idle hall, the total patients' number was covered by the program, which had to be repeated eight times for eight patient groups. The list of patients assigned to training session that researchers organized was seven to eight patients per session. With discussion intervals, each session ran for sixty minutes.

Using posters and data presentations as media, lectures and group discussions were used to carry out the theoretical part of the program. The following components of the instructional program were

included in the practical part, which was executed using posters, actual materials, re-demonstrations, and video sessions

Sessions of an educational program

Session 1	Introduction meeting to start building relationship and explain the purpose, scope, and timeline of the program to the patient.
Session 2	Anatomy of the respiratory system, tracheostomy definition, types, causes, complications, management of the tracheostomy problems, and tracheostomy care (protecting the skin around the tracheostomy, suctioning, and medication).
Session 3	Dietary guidelines, hygiene, clothes, shaving, swimming, workouts, activity, going back to work, travel tips, sex, conversation, and social and psychological interactions.
Session 4	Peristomal skin care and stoma cleaning, following up Every session started with a brief summary of the one before it. Each patient received a copy of the booklet when the educational program was implemented .

In (4) **Evaluation phase**: an assessment of the effectiveness of patients' knowledge, and practice pre-, immediate post, and post-three months using tool (I) and tool (II). Assessing patients' self-efficacy and pulmonary stomal complications through comparison of pre-, post-, and post-three-month data using tools (III) and (IV).

Administrative Design

An official letter from the Dean of Faculty of Nursing South Valley University to administrator of Qena Tumor Hospital, illustrative the purpose of the study, was exported to obtain approval to command this study.

Statistical Design

A statistical Package for Social Sciences (SPSS) version 25 was used to check, code, tabulate, and statistically analyze the obtained data. Numbers, percentages, means, and standard deviations was displayed alongside the data in tables and graphs. Additionally, the independent sample t-test also chi-square test were applied. Significance level of < 0.05 was established.

Results

Table (1): Distribution of demographic and clinical data of the studied patients (N=60)

Socio-demographic data	N	%
Age		
20 <30	7	11.67
30 < 40	17	28.33
40 < 50	16	26.67
50-60	20	33.33
Mean ±SD 48.31 ± 8.47		
Sex		
Male	40	66.67
Female	20	33.33
Marital status		
Single	8	13.33
Married	31	51.67
Divorced	21	35.00
Education		
Illiterate	5	8.33
Basic education	2	3.33
Secondary education	42	70.00
University	11	18.33
Occupation		
Employee	20	33.33
Free work	12	20.00
Not work	18	30.00
Retired	10	16.67
Residence		
Urban	40	66.67
Rural	20	33.33
Hospitalized due to pulmonary complication:		
airway obstruction	25	41.67
Pulmonary infection /Pneumonia	60	100.0
Tracheo-cutaneous fistula	5	8.330
Tracheal trauma/bleeding	17	28.33
Smoking		
Smokers	35	58.67
Non-smokers	25	41.67
passive smokers	60	100

Table (2): Knowledge Affected Permanent Tracheostomy Care Among Studied Patients (N=60)

Knowledge Items	Pre		post		Follow-up		X2 (P) Pre-post	X2 (P) Pre-FU
	N	%	No	%	N	%		
-Definition & Causes of tracheostomy	14	23.33	59	98.33	50	83.33	53.57(< 0.001)*	50.46(< 0.001)*
-Health characteristics of tracheostomy	9	15.00	52	86.67	50	83.33	67.66(< 0.001)*	65.26(< 0.001)*
- Complication and prevention	16	26.67	60	100.0	51	85.00	56.66(< 0.001)*	54.91(< 0.001)*
- Dietary change	8	13.33	58	96.67	49	81.67	76.33(< 0.001)*	66.63(< 0.001)*
- Daily activity	15	25.00	55	91.67	50	83.33	52.56(< 0.001)*	55.66(< 0.001)*
- Tracheostomy care	10	16.67	57	95.00	52	86.67	86.43(< 0.001)*	73.14(< 0.001)*
- Follow-up	10	16.67	60	100.0	57	95.00	88.17(< 0.001)*	76.43(< 0.001)*
Total knowledge score:								
-Satisfactory (60%or more)	7	11.67	57	95.00	55	91.67	78.71(< 0.001)*	72.88(< 0.001)*
-Unsatisfactory: (less than 60%)	53	88.33	3	5.00	5	8.33		
Mean ± SD	8.98±3.76		23.40±2.06		21.76±2.21		H=124.48 <0.001*	

(*) Statistically significant at $p < .05$; (H) Kruskal Wallis test

Table (3): Practice Related To Permanent Tracheostomy Care Among Studied Patients (N=60)

Practice Items	Pre		post		Follow-up		X2 (P) Pre-post	X2 (P) Pre-FU
	No	%	No	%	No	%		
Adequate practice about: (60%+)								
-External tracheostomy tube changes	12	20.00	54	90.00	56	93.33	55.16 (< 0.001) *	56.23 (< 0.001) *
- Stoma and skin care	12	20.00	59	98.33	57	95.00	62.14 (< 0.001) *	62.87 (< 0.001) *
- suctioning	16	26.67	55	91.67	58	96.67	54.12 (< 0.001) *	57.42 (< 0.001) *
- Oral care	5	8.33	60	100.00	60	100.00	74.56 (< 0.001) *	74.56 (< 0.001) *
- Feeding and nutrition	18	30.00	56	93.33	55	91.67	53.54 (< 0.001) *	52.33 (< 0.001) *
- Communication	21	35.00	60	100.00	60	100.00	77.86 (< 0.001) *	77.86 (< 0.001) *
Total practice score:								
-Adequate (> 60%)	6	10.00	58	96.67	54	90.00	63.47(< 0.001) *	60.07(< 0.001) *
-Inadequate: (< 60%)	54	90.00	2	3.33	6	10.00		
Mean ± SD	22.13±12.09		65.62±11.75		67.28±12.04		H=112.36 <0.001*	

(*) Statistically significant at $p < .05$; (H) Kruskal Wallis test

Table (4): Permanent Tracheostomy Care Self-Efficacy Level among Studied Patients (N=60)

Self-efficacy level	Pre		post		Follow-up		X2 (P) Pre-post	X2 (P) Pre-FU
	No	%	No	%	No	%		
- Low self-efficacy (≤ 37)	46	76.66	20	33.33	6	10.00	37.89(<0.001)*	46.66(<0.001)*
-Moderate self-efficacy (38–58)	10	16.67	20	33.33	3	5.00		
-High self-efficacy (≥ 59)	4	6.67	20	33.33	51	85.00		
Mean ± SD	49.36±9.51		72.40±17.2		73.86±18.01		H=68.22 < 0.001*	

(*) Statistically significant at $p < .05$; (H) Kruskal Wallis test

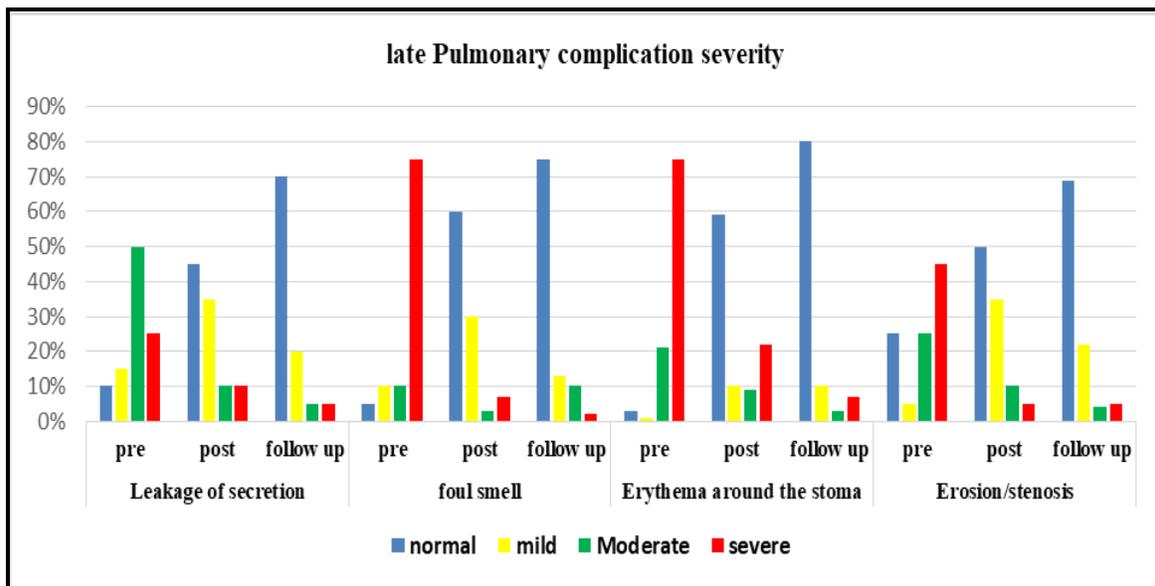


Figure (1): Late Pulmonary complication severity related to permanent stoma among studied patients (N=60)

Table (5): Correlation between total knowledge, total practices, total self-efficacy, and total late pulmonary complications related to permanent stoma (N= 60)

Pre	Follow-up			
	Knowledge	Practice	Self-efficacy	complications
Knowledge	.553**	-	-	-
Practice	.390*	.539**	.458**	-.723**
Self-efficacy	.363*	.418**	.539**	-.539**
complications	-.741**	-.404**	-.539**	-.741**

(*) Statistically significant at $p < .05$

Table (1): Revealed such 33.3% of the partakers aged ranged 50 - 60 years old, with mean 48.31 ± 8.47 years. In terms of gender, discovered over 50% were men. Concerning marital status, 51.67% were married. Ascendancy level of education, 70% had a secondary education. Furthermore, the same table showed 33.3% of the studied patients were employed. On the other hand, 66.67% lived in urban areas. In terms patients hospitalized for pulmonary complications, 100% of them were admitted because they had a pulmonary infection. In terms of smoking habits, 58.33% of them were involved in smoking.

Table (2): Demonstrates that prior to the implementation of the educational program, the patients' knowledge was lower on all items. All patient knowledge items showed a statistically significant improvement immediately after the educational program has been implemented. Three months later, some modest reductions were noted, but the levels were significantly higher than they were before to the program ($p < .001$). Overall knowledge improved ranked 11.67% in the pretest but 95% and 91.67% immediately after and after three months. Mean scores before educational program was implemented were 8.98 ± 3.76 and improved to 23.40 ± 2.06 and 21.76 ± 2.21 immediately after and after three months, respectively, a statistically significant difference between them ($p < 0.001$).

Table (3): Demonstrates that prior to the implementation of the educational program, the patients' practice was lower in all items. All patient practice items showed statistically significant improvement both immediately after the educational program was implemented and three months later ($p < .001$). The mean scores for overall practice were 22.13 ± 12.09 before the educational program was implemented. They improved to 65.62 ± 11.75 and 67.28 ± 12.04 after three months, respectively, with a statistically significant difference ($p < 0.001$). After three months, the overall sufficient practice increased from 10% in the pretest to 96.67% and 90.0%, respectively.

Table (4): Revealed that 76.66% of the patients in the study had poor levels of self-efficacy both before and after the implementation of an educational program on rapprochement (33.33% and 10.0%, respectively) at first and third months. Pre-, post-, and post-three-month changes were statistically significant ($p < 0.001$) following the implementation of an educational program. Before the educational program was implemented, the overall mean scores for permanent tracheostomy care self-efficacy were 49.36 ± 9.51 . These scores increased to 72.40 ± 17.21 and 73.86 ± 18.0 post-month and post-three months, respectively, statistically significant difference at ($p = 0.001$).

Figure (1): According to the figure, 50.0% of the patients under study had secretory leakage prior to the implementation of the educational program, but 10% and 5.3% of the patients had the same leakage one and three months later. Also, 75% had a foul smell at pre compared to 8% and 3% respectively post one and post 3 months after implementing educational program at the same time there were 76% had erythema around the stoma at pre compared to 20% and 7.5% respectively post one and post 3 months. Finally, there were 58% suffered from erosion/stenosis pre-compared to 6.5% and 5% respectively 1 and post 3 months after implementing educational program. Also statistically significant between pre, post, and post 3 months ($p = 0.001$).

Table (5): Demonstrates that knowledge, practice, and self-efficacy were positively correlated before and three months after the implementation of an educational program. Additionally, this table demonstrates that in the pre and post-three-month periods following the implementation of an educational program, added a negative correlation among knowledge, practices, self-efficacy, and pulmonary complication connected to permanent stomas.

Discussion

Gaining the knowledge necessary to adapt to their new conditions is extremely difficult for patients with chronic tracheostomy. A person's ability to take care of themselves, be independent, and adjust to their illness is greatly influenced by their education. In addition, patients want to know what to expect in the wake of a tracheostomy. When it comes to educating patients on how to live with a tracheostomy, nurses are essential **Casserly et al., (2022)**. Thusly, the present study conducted to evaluate the effect of educational programs on self-efficacy and late pulmonary complications for patients with permanent tracheostomy.

In terms of clinical and demographic data, the present study showed that, with a mean age of 48.31 ± 8.47 years, one-third of the patients under study were between the ages of 50 and 60. This outcome is in line with **Al-Hussami, (2021)**, who found that more than one-third of the sample was more 50 years old. Furthermore, our finding get along with results of **Cetto et al., (2022)**, whose discovered persons over 50 years old had the most permanent tracheotomies. This could be a result of the increased risk of head and neck cancer in adults over 40.

In relations of sex, the current study show that, men made up more than semi of the patients under study. Outcome was in line research by **Qalawa & Moussa, (2019)**, those found men made up the majority of patients who had permanent tracheotomies.

According to **Abdelmohsen, (2020)**, men made up the largest proportion of tracheotomy patients. This from the researcher point might be the result of the fact that most males smoke heavily and are more prone to eat highly processed foods..

Regarding marital status, half of the patients were married. This aligns with the conclusions of **Abdulmutalib et al., (2020)** and **Irshad et al., (2021)**, found plurality of tracheotomy patients were married. This may have to do with the fact that the tracheostomy procedure would increase the patients' requirements and burdens because of the many responsibilities they would have to their spouses and children, suggesting that the disease would have an impact on their family. More over half of the patients had completed secondary education, according to the results on their educational background. This outcome may be explained by the fact that the majority of the patients prioritize their education and reside in urban areas. According to **Ran et al., (2020)**, the majority of the patients in the study had only completed secondary school. This finding is in line with their findings. This result was also at odds with the findings of another study conducted in **(2022)** by **El Sayed et al.**, which examined the effect of nursing tracheotomy care training on geriatric patients psychological status and self-esteem; and discovered that approximately half of the studied patients were uneducated." The study's findings about the vocations of the patients revealed that one-third of the sample held a job. This result aligned with the findings of **Abd el Rahman et al., (2020)**, who consider nursing instructions affected the self-care abilities of tracheotomy patients and detect that more than half of them had jobs.

In terms of patient residency, the current study discovered over half of the patients inhabits urban. it isn't at odds with **Mohamed, (2018)**, finding that majority of sample lived in urban areas, nor does it conflict with **Elhoty, (2019)**, finding that more than half of analyzed sample originated from urban districts. This could be because of the higher risk factors for cancer seen in cities, such as pollution and unhealthy lifestyle choices like smoking tobacco.

Regard to smoking, the present study discovered that 50% of sample were smokers. This finding is consistent with that of **Miller et al., (2020)**, who found that half of their participants were smokers. According to the study, smoking is one of the things that causes laryngeal cancer. Regarding the causes of hospital admission, The results of the current study revealed that all the studied had previous hospital admissions due to pneumonia. This agreement **Glass, (2021)**, revealed that about all of the sample, 60 patients with permanent tracheostomy had readmitted to the hospital three times a year due to the

tracheostomy tube's potential for aspiration, which can result in the development of pneumonia because food, liquid, and secretions can enter the lower airways, local infection at the tracheostomy site was fairly common, and tracheal inflammation affected every patient with permanent tracheostomy to some extent. Furthermore, a study by **Niederman, et al (2022)**, found that more than half of respiratory infections that complicate long-term tracheostomy are caused by pneumonia.

This outcome may be explained by the fact that, if aseptic suctioning procedures are not followed, pneumonia may develop in tracheostomy patients.

Regarding the patients' understanding of tracheostomy prior to, immediately following, and three months after the educational program has been implemented. In comparison to before the educational program was implemented, results of the current study indicated most study applicants had a satisfactory level of knowledge three months after the program was implemented. Findings from this study align with those of **Zoë & Janet, (2023)**, who noted that the patients exhibited a moderate level of understanding regarding tracheostomy care, with the lowest scores being related to cleaning, suctioning, stoma-related problems and managing it. Additionally, **Feber, (2023)**, found that there was a significant difference in the tracheostomy knowledge ratings between the study group and the control group. This aligns with the research conducted by **Garrubba, et al (2022)**, which showed a significant improvement in the knowledge of tracheostomy patients following education as compared to their pre-education.

Regarding the tracheostomy practices of the patients prior to, immediately following, and three months following the implementation of the educational program, it was found that all study applicants had insufficient practice levels prior to the program, but the majority of them experienced adequate practice levels immediately following and three months later. Additionally, compared to the pre-program, the running study's results showed a highly significant increase in practice three months and immediately post-implementation of the educational program. This result is in line with the findings of **Bonvento, et al (2023)**, who discovered significant difference in the overall scores of tracheostomy care practice following the implementation of the educational program. In contrast to the per-assessment **Almanzalawi, (2021)**, discovered a highly significant enhancement in patient practice using the post-education guidelines. The researchers attribute that positive effects were observed by the educational program on the tracheostomy patients. This explained a situation and underlined how education can help individuals

receiving stoma care become more knowledgeable adept at using this kind of treatment.

About the self-efficacy of permanent tracheostomy care before, during, and three months after the program's implementation. Three months after the educational program was put into place, the current investigation discovered a statistically significant difference between pre and post-one and post-three months. Additionally, following the implementation of educational program, it was noteworthy improvement in the total mean score self-efficacy level. This is because educational program has had favorable results. The result of this study was supported by **Gul & Karadag, (2020)**, who discovered that a patient's quality of life can be affected by health literacy, which can also improve and influence self-efficacy. According to a study by **Mohamed, et al (2020)**, there were statistically significant improvements during the follow-up period and a lower mean score for permanent tracheostomy self-efficacy during the pre-program phase compared to the post-program era.

Concerning late pulmonary severity complication, the current study appeared half of the studied subjects had moderate secretion leakage and three-quarters had a foul smell and erythema around the stoma before program but this complication was reduced post-one and three months later. Findings are attributed by researchers to improved self-care abilities in identifying and handling anomalies. In agreement with **Das, et al, 2023**, who discovered that following the implementation of the guideline, the late pulmonary condition total scores dropped.

In terms of the relationship between patients' general knowledge, practice, and self-efficacy, there were noteworthy positive correlations between the patients' scores before and after the three months of the educational program's implementation. According to the researcher, patients who were better able to manage all aspects of care independently and had more information about tracheostomy care were more adapted to their tracheostomy than those who required more assistance from others. The study's findings align with those of **Rayess, et al (2021)**, who explained that statistically significant association amongst patients' knowledge scores and practice post-educational application among tracheostomy patients. Additionally, the intervention group exhibited significantly higher changes in scores across all self-efficacy domains in comparison to the baseline group. This outcome also matched that of **Wang, et al (2023)**, who discovered a highly statistically significant favorable correlation between the pre- and post-program tracheostomy care practices and knowledge of the patients under study. The findings of **McCormick, et al (2023)**, support this, showing

that study group self-care scores increased in conjunction with increase in tracheostomy knowledge. This suggests that having adequate understanding of the situation allowed for self-care.

This result aligned with **Silvia, et al (2023)**, which discovered in comparison to e control group, there was negative significant association between the study group's overall scores of late tracheostomy complications and patients' knowledge, practice, and self-efficacy.

Conclusion

Educational program improved the knowledge, practices, and self-efficacy, moreover, reducing severity of late pulmonary complications in permanent tracheostomy patients.

Recommendations

In light of the results of this study, the following recommendations are made.

- Participate the patient with permanent tracheotomies before being discharged, in a scheduled educational program.
- Require these patients also frequent education sessions, when the family and care provider are invited to participate in the tracheostomy patient's care.
- More research on a sizable group of tracheostomy patients is necessary to validate the findings and ensure generalization.

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