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Efficacy of implementing throat relaxation techniques on vocal cord dysfunction severity among asthmatic patients

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Abstract

Vocal Cord Dysfunction (VCD) results in functional airway obstruction, life threatening symptoms and other serious pulmonary conditions. This study aimed to evaluate the efficacy of Implementing Throat relaxation techniques on vocal cord dysfunction severity among asthmatic patients. A quasi experimental research design was utilized. The study was carried out at Chest Hospital in Assiut City. A purposive sample of 90 asthmatic patients with vocal cord dysfunction. Two tools were used for Structured interview questionnaire which contained demographic and medical data. Vocal Cord Dysfunction Questionnaire (VCDQ). The majority of studied patients were over 50 years old, with more than half being female, staying for more than 7 days. The mean±Sd of their BMI was of 29.2 ±6.1, and a significant increase in the number of normal vocal cords was observed after implementation, indicating a statistically significant difference in VCDQ, LOS, and BMI. Implementing throat relaxation techniques showed positive improvement in VCD severity within a week among asthmatic patients. Nurses should prioritize and incorporate breathing and relaxation techniques into their care for asthmatic patients with vocal cord dysfunction through providing guidance and support in practicing these techniques, nurses can contribute to improved patient outcomes and overall well-being.

Keywords: Asthmatic patients, Throat relaxation techniques, Vocal cord dysfunction

Introduction

Vocal Cord Dysfunction (VCD) is an intriguing condition where the vocal cords inappropriately and intermittently adduct during inspiration. When a person has acute lung disease, their symptoms can mimic those of extra-thoracic airway obstruction, such as wheezing, stridor, shortness of breath, coughing, or a feeling of hunger for air. These symptoms can last anywhere from a few seconds to several minutes and are mainly felt around the upper respiratory tract (neck) (Hurvitz & Weinberger, 2021; Jam et al, 2025).

Many times, VCD is misdiagnosed as asthma, which causes patients to receive the wrong kind of medication. Treatment for this illness involves laryngeal relaxation exercises, speech therapy, education, and the use of anxiolytics, especially in the case of acute bouts (Lee et al., 2020).

Additionally, misdiagnosing VCD as asthma increases expenditures and causes considerable morbidity; these findings may also be attributed to the abuse of asthma treatment techniques. Breathing exercises and a prompt and accurate diagnosis of VCD have the ability to reduce or eliminate the patient's burden as well as that of the healthcare system. (Kaplan et al., 2020).

The initial phase of diagnosing vocal cord dysfunction includes a thorough medical history and examination to identify any distinctive signs of the condition. Laryngoscopy, when done properly, can be used to diagnose vocal cord disorders. This is indicated by the development of the flow-volume loop measured by impulse oscillometry, which is less accessible than spirometry or pulmonary function tests (Vertigan et al., 2020).

It's important for nurses to provide proper education, guidance, and support to asthmatic patients when

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introducing these breathing relaxation techniques. Encouraging regular practice and incorporating these techniques into their daily routines can empower patients to better manage their asthma symptoms and improve their overall quality of life. Relaxation techniques (yoga, meditation, or similar activities), laryngeal relaxation exercises (neck, jaw or throat relaxation exercises), and more (Sun et al., 2023).

These techniques can help relax the muscles surrounding the vocal cords. This relaxation can reduce tension and spasms in the vocal cords, which are common in VCD. allowing individuals with VCD to achieve a more balanced and controlled airflow during inhalation and exhalation. This can help minimize vocal cord closure and improve overall vocal cord function. reduce vocal cord irritation caused by rapid, shallow breathing. By promoting slower and more controlled breathing patterns, these exercises can minimize vocal cord strain and discomfort. reducing stress levels, individuals with VCD may experience fewer episodes of vocal cord dysfunction. (Barker et al., 2020).

Staff nurses have an important role in managing and improving patient life threatening symptoms, quality of life and morbidity associated with vocal cord dysfunction. These interventions may include breathing and relaxation techniques, pulmonary function measures and teach patients to performed of this exercises daily (Diab et al., 2022).

Significance of the study

Asthma is a reversible condition causing symptoms of vocal cord dysfunction. From previous studies the patients with vocal cord dysfunction facing life threatening problems effect on the patient quality of life and morbidity include shortness of breath, feeling of suffocating, air hunger, wheezing, especially during inhalation, stridor, high-pitched sound during inhalation, chronic coughing, chronic throat clearing, throat tightness or choking feeling, hoarseness or weak voice and chest tightness or chest pain (Stojanovic et al., 2022). These studies provide evidence and uniquely implementation of breathing and relaxation techniques to help patient maintain and limit complications, improve pulmonary functional, that effect on quality of life. Therefore, nurses ought to pay additional attention to the breathing and relaxation techniques method as a simple, effortless, inexpensive and efficient technique while caring for asthmatic patients.

Methods

Aim of the study

To evaluate the efficacy of implementing throat relaxation techniques on vocal cord dysfunction severity among asthmatic patients.

Research hypothesis

Patients who practice throat relaxation techniques will exhibit a decline of vocal cord dysfunction severity among asthmatic patients.

Study design

A quasi-experimental research design was utilized to conduct this study.

Setting

The study was carried out at Chest Hospital in Assiut City.

Subjects

A purposive sample of 90 asthmatic patients with vocal cord dysfunction in was enrolled in this study using pre and posttests based on the following criteria:

Inclusion criteria: Patients from both sexes, the patients would be previously diagnosed with vocal cord dysfunction in asthmatic patient, and the age of the patients ranged between 20 and 60 years old.

Exclusion criteria: Have already attended any teaching program about vocal cord dysfunction in asthmatic patient, patients with dementia, mental retardation, obvious physical problems, and history of major psychological disorder.

Sample size: Was calculated based on information obtained from literature, considering level of significance of 5%, and power of study of 80%, the sample size can be calculated through the following formula:

$n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{2(SD)^2\}]/$ (mean the difference between two groups)^2

Where: SD = standard deviation

$Z_{\alpha/2}$: This based on level of significance, for 5% this is 1.96

Z_{β}: This based on power, for 80% this is 0.84

Therefore, $n= [(1.96 + 0.84)^2 \times \{2(2.4)^2\}]/ (0.95)^2=100.08$

Tools of data collection

Two tools were used for collection of data and achieve the aim of the study as the following:

Tool I: Structured interview questionnaire

This tool was developed by researchers after extensive literature review to collect baseline and personal data. It consisted of two parts as follow:

Part 1: Demographic data: such as name, age, sex, level of education, occupation, marital status, residence, and BMI.

Part 2: Medical data: such as patients' present complain, date of admission, length of staying in the hospital and comorbid diseases.

Tool II: Vocal Cord Dysfunction Questionnaire (VCDQ)

There are several author-made questionnaires, which had been designed to evaluate vocal cord dysfunction symptom severity. Originally the vocal cord dysfunction questionnaire, was suggested by (Fowler, S. J., et al, 2015). VCDQ has been successfully cross-culturally adapted into the Persian language and demonstrated to be the validated and reliable questionnaire for monitoring symptoms in patients with VCD and to demonstrate the efficacy of treatment for VCD when performed before and after speech therapy.

Scoring system

This questionnaire is consisted of 12 items related to the most marked symptoms of the patients with VCD. The patients should answer each item based on the Likert scale. The response to each item on the questionnaire was rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

A numerical score from 1 to 5 is assigned to each answer and these are summed to provide a single total score of severity. The maximum severity score is 60 and minimum score is 12. A score of 12 is considered normal and If score higher than 12, means the patient have vocal cord dysfunction impacting his breathing (Fowler et al., 2015).

Content validity and reliability

- **Tool I,** was designed by the researchers and revised by five experts in the field of medical-surgical nursing in the faculty of (Nursing and Medicine) of Assiut and Beni Suif Universities (for content validity).
- **Vocal cord dysfunction** Questionnaire (VCDQ), (Tool II) validity and reliability was calculated in speaking Arabic people:

All the questions on the VCDQ have content validity, as all participants favorably accepted and understood the questionnaire and were able to answer it without difficulty, all items of the questionnaire were responded, and there were no missing data. All VCDQ questions had face validity (IS > 1.5).

The test-retest reliability and internal consistency of the VCDQ was 0.97 (95% confidence interval [CI] 0.95–0.96, P < 0.001) were acceptable with high Cronbach coefficient for the VCDQ (0.78).

Throat relaxation techniques

These techniques adopted from (Gholamrezaei et al., 2021), (Thomas & Centeio, 2020) and (Toussaint et al., 2021). Throat relaxation techniques used for reducing symptoms associated with vocal cord dysfunction as the following:

A. A yawing stretch to release tension in throat and jaw

- Put the finger across Adams apple .
- Start to yawn and notice how the throat moves underneath finger.
- As exhale from the yawn, sigh "ah "at whatever vocal ranges comes out naturally.

- Repeat this exercise 5 times, each time focusing on inhaling completely on the yawn and sighning to release the yawn completely (Centers for Disease Control and Prevention, 2019).

B. *A chin massage to relax jaw and stretch throat*

- Tilt the head up so that the bottom of the chin is exposed.
- Take the index and middle fingers on each hand and place them under the chin along your jawline
- Massage the area in small circles
- Do this for 30 to 60 seconds.

C. Neck and throat massage to keep throat relaxed

- Massage parts of throat and neck can pinpoint problem area.
- Always make sure to hydrate after a massage
- Try gargling with salt water, drink lots of warm water
- Rest your throat for 1 to 3 days when the throat gets strained.

Pilot study

A pilot study was carried out on 10 % (9 patients) of patients representing the study sample to test the feasibility and clarity of the used tools; modifications were done based on the results. The sample included in the pilot study was excluded from the final study sample only minor modifications were done.

Procedure

Data collection was extended from 1 January 2023 to 31 December 2023 once weekly (Saturday) at morning and evening shifts.

The researcher explained the purpose of the study, tools components, and steps of each technique used for reducing symptoms associated with vocal cord dysfunction.

The researcher collects the patient personal and medical data (tool I) and the severity of Vocal Cord Dysfunction using (Tool II) as a baseline data (Pre-test).

Completing the questionnaire was ranged from 15 - 20 minutes for each patient and from their hospital files.

- The implementation of the throat relaxation techniques performed in one session.
- The relaxation techniques were provided for the studied patients in form of demonstration and re-demonstration procedure using video and colored pictures using simple Arabic language. The studied patients were interviewed individually by the researchers three times throughout the study.

It was carried out individually within 20 minutes and addressed steps of relaxation techniques used for reducing symptoms associated with vocal cord dysfunction.

- The relaxation techniques used for reducing symptoms associated with vocal cord dysfunction as the following:
- A yawing stretch to release tension in throat and jaw
- A chin massage to relax jaw and stretch throat
- Neck and throat massage to keep throat relax.
- The 2nd interviews time were carried out by the researchers using tool II for each patient in the department immediately after implementation the techniques the researchers start to complete tool II again as a post-test, it took about 10 - 15 minute.
- The 3rd interviews time the researchers fills out tool II also for second time as a post test to determine if the severity of VCD symptoms improved after 7 days of implementing breathing and relaxation techniques.

Ethical considerations and human rights

- An official approval for conducting the study was obtained from the responsible administrative personal after explaining the aim of the study.
- Participants were informed that participation in the study is voluntary and they have the right to withdraw at any time freely without any responsibilities.
- Informed oral consent was obtained from

each patient for participation after explaining the aim, benefits, and procedure of the study. Anonymity and confidentiality of data was assured and was used only for research purposes.

Statistical analysis

Statistical analysis was done according to the most currently reliable and valid statistical methods. Collected raw data was revised, coded and transferred into specially designed format to be suitable for computer feeding and entered into SPSS system files (SPSS package version 23) was used.

Following data entry, checking and verification processes was carried out to avoid any error during data entry. Frequency and percent were used to express categorical data. The Chi square test was developed to compare numerical data groups. If the P-value was less than 0.05, it was regarded significant, if it was less than 0.001 it considered highly significant, and if it was more than 0.05, it considered non-significant.

Table (1): shows that majority of the studied patient were >50 years old, more than half were female stay more than 7 days. two fifth of them were 25- 29.9 kg with mean and SD 29.2 ±6.1kg. more than one third had a Comorbidity obesity + Gurd but more than half not smokers.

Table (2): reveals that majority of the studied patients (Pretest) had a vocal cord dysfunction (VCDQ) but more than half of them improved posttest and number of the normal a vocal cord was increases with a statistically significant difference (0.034) between pre, posttest and after 7 days of implementation of the throat relaxation techniques.

Table (1): Distribution of the demographic and medical data of the studied patients (N. 90)

Demographic data		**N. (90)**	**%**
Age groups	18< 30	3	3.3
	30 < 40	9	10.0
	40-50	6	6.7
	>50	72	80.0
	Mean SD	55.4 ± 15.4	
Sex	Male	42	46.7
	Female	48	53.3
Length of Stay (LOS)	3to7 days	30	33.3
	More than 7 days	60	66.7
	Mean ±SD	2.6 ± 0.45	
BMI	18.5- 24.9	27	30.0
	25- 29.9	36	40.0
	>30	27	30.0
	Mean ±SD	29.2 ±6.1	
Comorbidity	Obesity	21	23.3
	Gurd	12	13.3
	Hypertension	18	20.0
	Obesity + Gurd	30	33.3
	Obesity+ Hypertension	6	6.7
	All of Them	3	3.3
Smoking	Not smoke	60	66.7
	Heavy smokers	30	33.3

Table (2): Distribution of the total severity of VCD among the studied patients pre, posttest and after 7 days of implementing relaxation techniques (n.=90)

VCD severity	**Pre test**		**Immediate post test**		**After 7 days**	
	N.	%	N.	%	N.	%
Normal Score (12)	15	16.7	19	21.1	59	65.6
Vocal cord dysfunction Score (> 12)	75	83.3	71	78.9	31	34.4

- Independent t-test *Significant difference at p .value <0.05, **Significant difference at p .value <0.01.

Table (3): Revealed that, there were statistically significant difference between the total VCDQ and LOS and BMI after 7 days of implementation of the throat relaxation techniques.

Table (3): Relationship between the demographic and medical data with total CVD severity after 7 days of implementing throat relaxation techniques (n. 90)

Demographic and medical data		Total VCDQ severity				P. value
		Normal		Vocal cord dysfunction		
		N. =59	65.6 %	N. =31	34.4%	
Age group	18< 30	1	1.7	2	6.4	0.105
	30 < 40	4	6.8	5	16.1	
	40-50	2	3.4	4	12.9	
	>50	52	88.1	20	64.6	
Gender	Male	22	37.3	20	64.5	0.198
	Female	37	62.7	11	35.5	
LOS	3to7 days	20	33.9	10	32.3	0.020*
	More than 7 days	39	66.1	21	67.7	
BMI	18.5- 24.9	19	32.2	8	25.8	0.020*
	25- 29.9	25	42.4	11	35.5	
	>30	15	25.4	12	38.7	
Smoking	Not smoke	40	67.8	20	64.5	0.653
	Heavy smokers	19	32.2	11	35.5	

- Independent t-test *Significant difference at p .value <0.05, **Significant difference at p .value <0.01.

Discussion

Vocal cord dysfunction is a complicated disorder that can exacerbate dyspnea in those with co-occurring asthma or cause asthma-like symptoms in healthy people. Although it can happen on its own, the illness usually coexists with asthma. It is linked to a high healthcare burden that is equivalent to that of severe asthma alone. Prompt diagnosis and effective treatment of VCD may need the collaboration of respiratory doctors, ENT surgeons, speech pathologists, nurses, psychologists, and/or psychiatrists (Mahoney et l., 2022). Patients diagnosed with vocal cord dysfunction may benefit from improved short- and long-term treatment if they continue to employ laryngeal relaxation techniques in conjunction with stress reduction. (Rameau et al., 2012).

This study aimed to evaluate the efficacy of implementing throat relaxation techniques on vocal cord dysfunction severity among asthmatic patients.

Regarding demographic and clinical data

The present study revealed that the highest percentage of the studied patients ages were (80%) for age group (>50) this result agree with Mahoney et al., (2022) who noted that the average age of patients with vocal cord dysfunction was higher than 57 years old. This conclusion, however, is at odds with Diab et al., (2022) asserted that VCD is predominantly psychologically driven and most common in young women between the ages of 20 and 40. According to the gender data provided, the majority of the group under study was female, which is consistent with the findings of Hughes et al., (2023) who reported that patients with vocal cord dysfunction are mostly female. Additionally, a study of published research indicates a female-to-male ratio of around 3:1. These results are consistent with those of Asha et al., (2022), who noted that this syndrome is primarily observed in females.

In terms of BMI, about one-third of the individuals under investigation were obese with comorbidities. This corresponds with Castagnoli et al., (2020) who said that obesity is the most common co-morbidity in individuals with vocal cord dysfunction.

The study's findings on comorbidity and smoking revealed that over one-third of the patients were obese and/or smokers, while over half did not smoke. This data is consistent with that of Khan et al., (2023) who found that in patients with vocal cord dysfunction, obesity and Gastroesophageal Reflux Disease (GORD) were the most common co-morbidities, and that the majority of these patient's majority of them had never smoked.

Regarding the Persian version of the Vocal Cord Dysfunction Questionnaire (VCDQ), Gaffin et al., (2022) Who state that the VCDQ is a reliable and responsive tool that can be used to assess changes in a patient's symptoms. It also assists in identifying symptoms that are significant to the patient and may provide cues for future therapy.

The majority of the study participants (pretest) had Vocal Cord Dysfunction (VCDQ), according to the study's findings, but more than half of them improved after one week of throat relaxation techniques implementation, and the number of normal vocal

cords increased. There was a statistically significant difference (0.034) between the pre- and post- throat relaxation techniques application. The researcher opinion that the throat relaxation techniques help with laryngeal relaxation and retraining, as well as to make sure that patients can respond spontaneously. emphasize relaxation through pursed-lip breathing supported by the abdomen.

These results are consistent with Finnoff, et al., (2020). declarat that patients should be taught breathing techniques, which act to quickly release the vocal cord from the paradoxical movement that causes VCD symptoms.

This also led to the same conclusion as Monoson & Parsons, (2023) who said that teaching the patient throat techniques relaxation methods are the cornerstones of treatment for vocal cord dysfunction (VCD). These treatments have demonstrated great success, and in complex circumstances, they are utilized in conjunction with psychological assistance. According to researcher opinion, implementing a training program that incorporates breathing exercises like pursed lip breathing and throat relaxation techniques can improve vocal cord dysfunction symptoms and lead to better patient outcomes.

In regards to the correlation between the demographic information and the total CVDQ, the findings indicated that there was no statistically significant variation seen in the total VCDQ and patient age or gender. The results align with the findings of Backer et al., (2022) who reported that no significant correlation was found between gender and VCD queries and sex. There was no discernible correlation between VCD and individuals who had an asthma diagnosis, hoarseness, or cough upon presentation.

The results of the study indicated a statistically significant difference between the total Vocal Cord Dysfunction Questions (CVDQ), Length Of Hospital stay (LOS), and Body Mass Index (BMI). This data is consistent with that of Mohamed & Mobayed, (2023) who reported that there is a statistically significant difference in the signs and symptoms of vocal cord dysfunction between normal and obese individuals, and that body mass index has a negative impact on these signs and symptoms.

Conclusion

The study concluded that, throat relaxation techniques have a positive improvement in level of VCD severity after a week of its implementation. Majority of the studied patient were >50 years old, more than half were female stay more than 7 days. two fifth of them were 25- 29.9 kg with mean and SD 29.2 ±6.1kg. more than one third had a Comorbidity obesity + Gurd but more than half not smokers. Majority of the studied patients (Pretest) had a vocal cord dysfunction (VCDQ) but more than half of them improved posttest and number of the normal a vocal cord was increases with a statistically significant difference (0.034) between pre, posttest and after 7 days of implementation of the throat relaxation techniques. There was statistically significant difference between the total VCDQ and LOS and BMI after 7 days of implementation of the throat relaxation techniques.

Recommendation

This study recommended that:

Treatment plans for VCD should be tailored to the individual, taking into account their specific symptoms, triggers, and overall health.

Managing VCD often requires a multidisciplinary approach involving specialists such as pulmonologists, allergists, speech-language pathologists, and psychologists. Throat relaxation techniques can be a part of a comprehensive treatment plan that includes other interventions.

Additional research is needed to understand the effect of breathing and relaxation techniques on vocal cord dysfunction for patients with asthma.

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