

Effect of Breathing and Relaxation Techniques on Reducing Morbidity Associated with Vocal Cord Dysfunction among Patients with Asthma and Chronic Obstructive Pulmonary Disease

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Abstract

Vocal cord dysfunction (VCD) resulting in functional airway obstruction, life threatening symptoms and other serious pulmonary conditions. **Aim:** The study aimed to evaluate the effect of applying breathing and relaxation techniques on the morbidity associated with vocal cord dysfunction among asthmatic and patient with COPD patient. **Design:** A quasi experimental research design was utilized. **Setting:** The study was carried out in chest department at Aswan University Hospital. **Subjects:** A purposive sample of 90 patients with vocal cord dysfunction in asthmatic and COPD patient were enrolled in this study using pre and posttests. **Tools:** Two tools were used for collection of data: **Tool I:** Structured interview questionnaire, health relevant data, and pulmonary function measures. **Tool II:** Vocal Cord Dysfunction Questionnaire (VCDQ). **Results:** There were statistically significant difference between the mean and SD of Pulmonary Function measures 92.11 ± 14.03 , $10.70 \pm .34$, 83.44 ± 13.79 & 496.66 ± 105.08 after 4th day of application of the breathing and relaxation techniques. There were a statistically significant difference (0.034) between a symptoms pre and posttest. **Conclusion:** The study concluded that, breathing and relaxation techniques has a positive improvement in level of life threatening symptoms as difficulty of breathing & throat tightness , and morbidity associated with vocal cord dysfunction and function measures after 4th day of application of the breathing and relaxation techniques. **Recommendation:** This study recommended that, the nurses should pay more attention to breathing and relaxation techniques as a simple, cheap and effective technique while taking care of vocal cord dysfunction among patient with asthma and COPD.

Keywords: *Asthma, Breathing and relaxation techniques, Chronic Obstructive Pulmonary Diseases (COPD), Morbidity & Vocal cord dysfunction*

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a public health crisis that has emerged as the 3rd leading cause of mortality worldwide (**World health organization, 2020**). The global prevalence of COPD is estimated to be 11.7% (95% CI 8.4%–15.0%). In the United States alone, COPD affects 16.4 million adults comprising of current (13.9%), former (11.9%), as well as non (3.2%) smokers (**American Lung Association, 2021**). Asthma is one of the most common, affecting all age groups out of these patients, a percentage varying between 5 and 10% suffers from a severe form of the disease, characterized by poor symptom control despite a correctly prescribed maximal inhaled therapy. (**Sears, 2014**).

Vocal cord dysfunction (VCD) is an intriguing condition where the vocal cords inappropriately and intermittently adduct during inspiration (**Balkissoon & Kenn, 2018**). The clinical presentation of acute (VCD) last from seconds to a few minutes that occur primarily during inspiration and are felt around the upper respiratory tract (neck), resulting in symptoms identical to extra thoracic airway obstruction include

wheezing, stridor, shortness of breath, cough, or a sensation of air hunger (**Hseu et al., 2017**).

VCD is often misdiagnosed as asthma which leads to inappropriate choice of treatment options for subjects with this condition. Management of this disorder includes speech therapy, education and laryngeal relaxation exercises, anxiolytics treatment particularly for acute episodes (**Balkissoon Kenn, 2018**).

Also misdiagnosis of VCD as asthma leads to significant morbidity and increased costs, and misuse of measures of asthma control may be contributing to these findings. Timely and accurate diagnosis of VCD and the use of breathing exercises have the potential to eliminate or minimize the burdens on the patient and the health care system. (**Traister et al., 2016**)

Several studies support the use of 13 possible (VCD) treatments including: breathing exercises to abduct vocal cord (with examples given as sniffing or puckered lip breathing, biofeedback (described as improving control of the vocal cords by first watching how they move on a screen during a scope procedure in the doctor's office), relaxation techniques (yoga, meditation, or similar activities), laryngeal relaxation

exercises (neck, jaw or throat relaxation exercises), and more. (Yibrehu, et al., 2020)

The first step in diagnosis of vocal cord dysfunction involves a careful history and physical exam looking for characteristic features of vocal cord dysfunction. Diagnosis of vocal cord dysfunction can be identified with the use of laryngoscopy, ideally performed. This is suggested by the appearance of the flow-volume loop obtained through spirometry or pulmonary function testing as well as through impulse oscillometry, although the latter is not as readily available (Komarow, et al., 2019).

Quantification of airflow to confirm diagnosis of VCD is commonly done through pulmonary function testing to measure flow volume loops. Patients with VCD typically demonstrate a flattening inspiratory flow volume loop during an episode (Cohen, 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 perform these exercises daily (Slinger, et al., 2019).

Significance of the study

From previous studies in COPD is a progressive disease that gets worse overtime but asthma is a reversible condition when the right treatment is received at the right time which makes early treatment important especially when symptoms of vocal cord dysfunction occurs as 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 George, et al. (2018). These studies provide evidence and uniquely implementation of breathing and relaxation techniques to help patient maintain and limit complications, improve pulmonary functional, efficacy of breathing exercises and its 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 those patients.

Methods:

Aim of the study:

To evaluate the effect of applying breathing and relaxation techniques on the morbidity associated with vocal cord dysfunction among asthmatic and COPD patient.

Research hypothesis:

Post application of breathing and relaxation techniques patients will exhibit improved symptoms of breathlessness, throat symptoms, decrease hospital stay and health care cost than pre application test .

Study Design:

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

Setting:

This study was carried out at chest department and chest intermediate care unit at Aswan University hospital.

Subjects:

A purposive sample of 90 patients with vocal cord dysfunction among asthmatic and COPD patient were enrolled in this study in pre/post test based on the following criteria:

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

Exclusion criteria: Have already attended formal teaching program about vocal cord dysfunction in asthmatic and COPD 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:

$$n = \left[2(SD)(z_{\alpha/2} + z_{\beta})^2 \times \{2(SD)^2\} \right]$$

(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,

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

(Jaykaran & Tamoghna 2013)

Tools of data collection:

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

Tool I: Demographic and medical data:

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

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

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

Part 3: Pulmonary Function measures: such as Forced expiratory volume (FEV1). Forced expiratory volume / forced vital capacity in the first, second, third, four) FEV1/FVC), Forced expiratory coefficient, and Peak expiratory flow.

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, 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 and his quality-of-life 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 Aswan Universities (for content validity).

- **Vocal Cord Dysfunction Questionnaire (VCDQ)**, (Tool II) validity and reliability was calculated in speaking Arabic people: some items were written in English so it is translated in Arabic language to be understood by subjects.

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).

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.

Field work:

Data collection was extended over a period of 12 months starting from 1 January 2021 to 31 December 2021; the researchers were attended to the previously mentioned settings three days/ week from 9:00 Am to 1:30 Pm. The study was conducted in three phases namely: assessment, implementation and evaluation:

Assessment phase:

During this phase, the researchers explained the purpose of the study, tools components, and steps of each technique used for reducing symptoms associated with vocal cord dysfunction. The time needed for completing the questionnaire was ranged from 15 - 20 minutes for each patient.

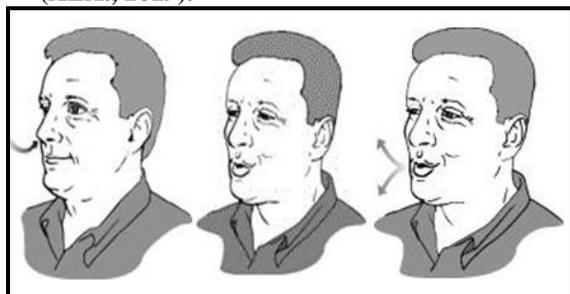
Implementation phase:

- Based on the findings of assessment phase, goals and expected outcomes were formulated.
- In this phase the breathing and relaxation techniques used to reduce symptoms associated with vocal cord dysfunction for COPD and asthmatic patients was provided by an oral instruction as a method of teaching supported by data show presentation and simulated brochure contains diagrams and pictures which designed by researchers in simple Arabic language.
- The selected patients who were recruited were interviewed individually by the researchers five times throughout the study.
- The first time for pretest, which implemented through two sections:
 - 1st section was carried out by the researchers for each participant at inpatient departments for collecting baseline data about their demographic, clinical finding, and vocal cord dysfunction symptoms. The interview carried out at the previously mentioned departments in the hospital during the morning and afternoon shifts. It took about 15 - 20 minute using tool I (part 1 & 2) and tool II.
 - 2nd section was carried out individually within 20 minutes and addressed steps of breathing and relaxation techniques used for reducing symptoms associated with vocal cord dysfunction. Audiovisual and written instructions about the importance each technique that used to reduce symptoms associated with vocal cord dysfunction for COPD and asthmatic patients. These materials were introduced to the patients within 30 minute, then researchers allowed 10 minutes to participants to ask their enquiries.

- Breathing and relaxation techniques used for reducing symptoms associated with vocal cord dysfunction as the following:

Pursed lip breathing technique

1. Relax the neck and shoulder muscles.
2. Breathe in (inhale) slowly through the nose for two counts, keeping mouth closed .Don't take a deep breath; a normal breath will do. It helps to count the breath :inhale, one, two.
3. Pucker or "purse "the lips as if we're going to whistle or gently flicker the flame of a candle.
4. Breathe out (exhale) slowly and gently through the pursed lips while counting to four .It may help to count the breath :exhale, one, two, three, four (ALA., 2019).



Adopted by (American Lung Association, 2019)

Throat relaxation techniques:

A yawning stretch to release tension in throat and jaw

1. Put the finger across Adams apple .
2. Start to yawn and notice how the throat moves underneath finger.
3. As exhale from the yawn, sigh "ah "at whatever vocal ranges comes out naturally .
4. Repeat this exercise 5 times, each time focusing on inhaling completely on the yawn and sighing to release the yawn completely (Centers for Disease Control and Prevention, 2019).



Adopted by (Amy,2021)

A chin massage to relax jaw and stretch throat:

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



Adopted by (Pradeep, 2020)

Neck and throat massage to keep throat relaxed:

1. Massage parts of throat and neck can pinpoint problem area.
2. Always make sure to hydrate after a massage
3. Try gargling with salt water, drink lots of warm water
4. Rest your throat for 1 to 3 days when the throat gets strained (Robinson, 2019).



Adopted by (Change, 2021)

- The 2nd interviews time were carried out by the researchers using tool I part 3 for each patient in the department through three steps:

The first step: the researchers start to complete part 3 in tool I before implementing the steps of the previous techniques as a pre-test, it took about 10 - 15 minute.

The second step: the researchers instruct the patient to apply the instruction of each step in breathing and relaxation techniques with good observation to the patient during the implementation period, it took about 90 minute.

The third step: immediately after implementation the both techniques the researchers start to complete part 3 in tool I again as a post-test, it took about 10 - 15 minute.

- The previous three steps repeated for four consecutive days in the 3rd, 4th and 5th interviews time.
- The 5th 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 implementing breathing and relaxation techniques.

Evaluation phase:

This phase was emphasized on estimating the effect of the intervention to determine the aim of the study has been fulfilled or not, through a comparison between pre and post breathing and relaxation techniques used for reducing symptoms associated with vocal cord dysfunction for COPD and asthmatic patients by taking pulmonary function measures before and after 1,2,3 and 4th day of application of the 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.

Results**Table (1): Distribution of the demographic data of the studied patients (N. 90).**

Demographic data		N. (90)	%
Age groups	<40	12	13.3
	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
	smoker	30	33.3

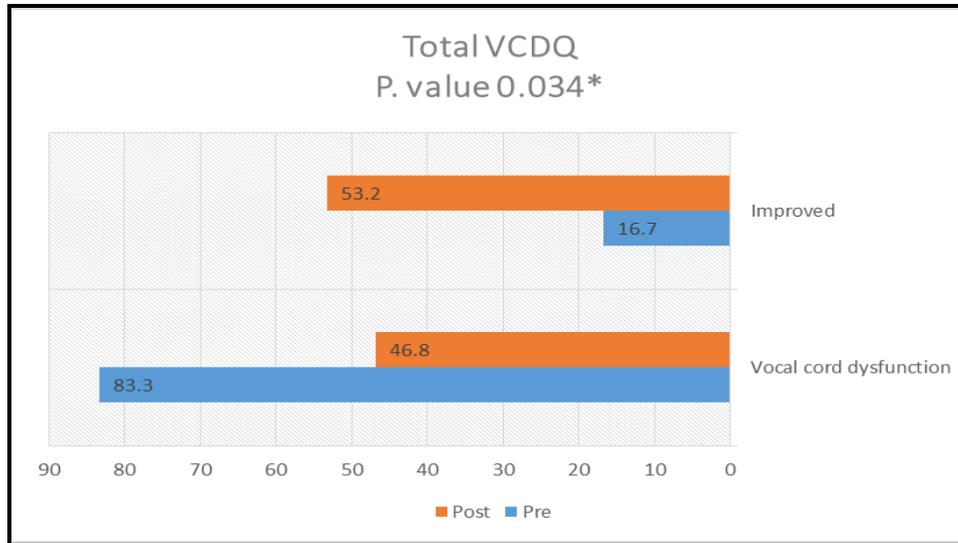


Fig (1): Distribution of the total VCDQ (N. 90)

Table (2): Relationship of mean and SD of Pulmonary Function measures before and after 1,2,3 and 4th day of application of the Breathing and relaxation techniques.

Pulmonary Function measures	pre- test	Post test			
		1 st day	2 nd day	3 rd day	4 th day
Forced expiratory volume FEV1	72.13±15.5	83.26±16.24	87.26±16.75	87.18±14.20	92.11±14.03
P. value		0.976	0.001	0.519	0.001
Forced expiratory volume / forced vital capacity in the first, second, third, four FEV1/FVC.	1.11±.30	1.11±.28	1.12±.17	1.11±.10	10.70±.34
P. value		0.268	0.076	0.273	0.001
Forced expiratory coefficient in the first, second, third, four.	66.30±18.93	76.83±14.68	80.03±15.81	79.62±13.06	83.44±13.79
P. value		0.131	0.001	0.514	0.001
Peak expiratory flow	427.50±103.47	459.96±105.54	478.70±104.19	476.74±103.76	496.66±105.08
P. value		0.001	0.001	0.001	0.001

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

Table (3): Relationship between the demographic data and total CVDQ (n=180)

Demographic and medical data		Total VCDQ				P. value
		Improved		Vocal cord dysfunction		
		N. =90	%	N. =90	%	
Age group	<40	12	13.3	0	0.0	0.105
	40-50	6	6.7	0	0.0	
	>50	57	63.3	15	16.7	
gender	male	33	36.7	9	10	0.198
	female	42	46.7	6	6.7	
LOS	3to7 days	21	23.3	9	10	0.020*
	more than 7 days	54	60	6	6.7	
BMI	18.5-24.9	27	30	0	0.0	0.020*
	25-29.9	27	30	9	10	
	>30	21	23.3	6	6.7	

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

Table (1): Showed that majority of the studied patient were >50 years old, more than half are 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.

Fig (1): Showed comparison between pre and post test and reveavel 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 and posttest.

Table (2): Revealed that, there were statistically significant difference between the mean and SD of Pulmonary Function measures after 4th day of application of the training program.

Table (3): Revealed that, there were statistically significant difference between the total VCDQ and LOS and BMI.

Discussion

COPD is the leading cause of morbidity and weighs down the global socio-economy. GOLD defines COPD as a disease that involves persistent respiratory symptoms along with airflow limitations because of alveolar and/or airway deformities resulting from long term exposure to toxic particles and gases. (**Gold Reports, 2021**)

Vocal cord dysfunction is a complex condition causing asthma-like symptoms in healthy individuals or augmenting dyspnea in persons with coexisting asthma. The condition can occur alone but is frequently coexistent with asthma, and is associated with a high burden of health care comparable to severe asthma by itself. Accurate diagnosis and optimal management of VCD may entail involvement of respiratory physicians, Ear, Nose, Throat (ENT) surgeons, speech pathologists, nursing professionals, psychologists and/or psychiatrists. (**Bardin,etal., 2018**)

Continued use of biofeedback, breathing exercises and laryngeal relaxation exercises combined with stress reduction may improve both short- and long-term management of patients diagnosed with vocal cord dysfunction. (**Yibrehu et al. 2020**)

The main finding of this study revealed that, there were no statistical significant differences in the basic data (patient's demographic & clinical characteristics) between pre and post test.

Regarding age, the age highest percentage was for age group (>50) this result agree with **Baxter et al., (2019)** who mentioned that patients with vocal cord dysfunction tended to be older. However, this finding disagree with **Ayres & Gabbott (2020)** who stated that VCD is most prevalent among young women aged 20–40 year and is thought to be primarily psychological in causation.

Concerning gender data presented that more than half of the studied group were female this findings agree with **Yibrehu et al., (2020)** who stated that, the patient with vocal cord dysfunction has a female majority. also this result come in the same line with those of **Husein et al., (2018)** who mentioned that this condition is predominantly observed in females and review of published research indicate a female- to - male ratio of approximately 3:1

Regarding body mass index, more than one third of the studied patients had a comorbidity obesity. This match with **Prabhakar et al., (2017)** who mentioned that, the most frequent co-morbidities in vocal cord dysfunction patients being obesity

In relation to comorbidity and smoking, the study results concluded that more than one third of the studied patient had a Comorbidity obesity+Gurd and more than half not smokers. This finding in the same line with **Baxter et al., (2019)** who revealed that the most frequent co-morbidities being obesity and gastroesophageal reflux disease (GORD) in patient with vocal cord dysfunction and the majority had never smoked

Considering Persian version of Vocal cord Dysfunction Questionnaire; according to **Fowler et al., (2015)** the VCDQ is a valid and responsive instrument suitable to determine changes of the symptoms in patients with VCD; it also helps to detect the symptoms which are important to patients and could offer future therapy cues.

The present study findings revealed that; the 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 were increases with a statistically significant difference between pre and post exercise training program application., this findings agree with **Hicks et al., (2007)** who stated that patients should be taught various breathing techniques, known as quick-release techniques, which act to rapidly release the vocal cord from the paradoxical movement responsible for symptoms of VCD. These exercises focus on pursed-lip breathing using abdominal support, with a focus on relaxation. Patients are encouraged to practice this technique with 5 repetitions 20 times per day to assist with laryngeal relaxation and retraining and to ensure that patients can respond automatically.

Also this result in the same line with **Bahrainwalla & Simoh, (2017)** who clarified that the mainstays of treatment for vocal cord dysfunction (VCD) involve teaching the patient vocal cord relaxation techniques and breathing exercises. These procedures have been very successful and are used concomitantly with psychological support in difficult cases. From the research point of view, Application of the training

program that include breathing exercise in the form of pursed lip breathing and throat relaxation techniques was effective in improving signs and symptoms of vocal cord dysfunction and better patient outcome.

Concerning relationship between the demographic data and total VCDQ; the results concluded that, there were no statistically significant difference was observed between the total VCDQ and patient age and gender. These findings in accordance with those of **Rung-Chi et al., (2018)** who mentioned that no significant association was observed between sex and gender and VCD questions. For patients who presented with cough, hoarseness, or a diagnosis of asthma no significant association was found with VCD. As regard the relationship between body mass index & length of hospital stay and total vocal cord dysfunction questions (CVDQ) The finding mentioned that, there were statistically significant difference between the total VCDQ and LOS and BMI. This findings come in line with those of **Souza & Santos, (2018)** who stated that statistically significant difference between normal and obese individuals regarding signs and symptoms of vocal cord dysfunction and body mass index has negative influence on signs and symptoms of vocal cord dysfunction.

The present study found that, there were statistically significant difference between the mean and SD of pulmonary function measures after 4th day of application of the training program including forced expiratory volume /forced vital capacity, forced expiratory coefficient, and peak expiratory flow. Which means that performing pursed lip breathing technique, deep breathing exercise, progressive muscle relaxation and throat relaxation techniques resulted in improved pulmonary functions in patients with vocal cord dysfunction. This match with **Saoji, (2020)** who revealed that practicing breathing and relaxation technique improves symptoms of vocal cord dysfunction; causes recoveries in breathing parameters such as forced vital capacity (FVC), forced expiratory volume in 1st (FEV1), FEV1/FVC, and peak expiratory flow (PEF) rate (PEFR) decreases airway sensitivity; increases respiratory muscle strength and decreases the number of absolute eosinophilia in patients with asthma.

In this respect, **Murry et al., (2018)** documented that, the inspiratory measure of FIVC%, FVC% and FIV0.5/FIVC were significantly improved in vocal cord dysfunction group compared to the control group after performing breathing techniques and speech therapy. Finally, it was concluded that breathing techniques including pursed lip breathing technique, deep breathing exercise and relaxation techniques leads to significant improvement in pulmonary function in patient with vocal cord dysfunction among patients with asthma and COPD.

Conclusion:

The study concluded that, breathing and relaxation techniques has a positive improvement in level of patient, life threatening symptoms, improve pulmonary function measures and morbidity associated with vocal cord dysfunction among patients with asthma and COPD. Also significant difference existed between all studied groups regarding function measures after 4th day of application of the breathing and relaxation techniques.

Recommendation:

This study recommended that:

1. The nurses should pay more attention to breathing and relaxation techniques as a simple, cheap and effective technique while taking care of patients with Vocal cord dysfunction.
2. Publication and dissemination of the breathing and relaxation techniques to all patients with vocal cord dysfunction to reduce life threatening symptoms, and improve pulmonary function measures.
3. Additional research is needed to understand the effect of breathing and relaxation techniques on vocal cord dysfunction for patients with asthma and COPD.

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