EFFECT OF DIAPHRAGM BREATHING EXERCISE AND ELECTRIC FAN TO DYSPNEA, AND PULMONARY FUNCTION IN CLIENTS COPD; A Systematic Review

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Abstract: Introduction: Dyspnea and decrease of lung function in COPD are a major problem. These things need intervention that aims to relieve these problems. This systematic review has the purpose to know some interventions included diaphragm breathing exercise and electric fan to improve of dyspnea and pulmonary function. Methodology: Information related to this research was found on some journal databases such as MEDLINE, PubMed, Ebsco, CINAHL, Elsevier, Science Direct, which is a respiratory journals and a collection of abstract research that was identified from 2010 until 2017. Results: diaphragm breathing exercise and electric fan was an effective therapy against a decrease in dyspnea and improvement of lung function. Conclusion: diaphragm breathing exercise and electric fan that in which will be applied in daily life activities of patients of COPD to resolve dyspnea and lung function.

1 INTRODUCTION

COPD became the 3rd leading cause of death in 2020, about 3 million deaths assigned by to COPD in 2012, an estimated 6% of all deaths worldwide in the year (GOLD 2017). Chronic obstructive pulmonary disease (COPD) is a respiratory disorder characterized by airflow limitation is progressive due to blockage of the airways, due to the blockage in the peripheral, then the volume of air can be trapped in the lungs called hyperinflation (Borge et al. 2014). This case is usually caused by client with COPD, including dyspnea and pulmonary function decline illustrated by a decrease in vital force expiration 1 (FEV1). Worsening COPD is a major cause of morbidity and mortality globally (Morrow et al. 2012).

Dyspnea, or breathlessness is a subjective sensation of difficulty breathing and it can change the quality life of patients (Wong et al. 2016). Dyspnea is overcame in daily simple task such as walking in the road home, so paralyzing activity in COPD patients. Various non-pharmacological strategies can be used to treat shortness of breath, such as breathing exercises and the use of an electric fan (Luckett et al. 2017).

There are a number of published studies describing the use of diaphragmatic breathing exercises, including research Morrow et al. 2012 describes diaphragmatic breathing exercises can improve respiratory muscle activity but is not associated with dyspnea, while research Yamaguti et al. 2012 describes diaphragmatic breathing exercises can increase abdominal movement and improve
functional capacity. In addition to diaphragmatic breathing exercises, the authors propose is a non-pharmacological exercise that can be used patients of COPD to reduce shortness of breath by cold stimulation using an electric fan. The use of the electric fan to the patient with breathlessness supported by research Wong et al. 2016, describes an eclectic fan effective in reducing dyspnea. These findings are not replicated in a population of patients with COPD, although it seems reasonable to consider treatment of shortness of breath and reduced lung function of patients with COPD.

Diaphragm breathing exercise is one breathing technique, which aims to reduce dyspnea with increasing excursion diaphragm regulator process and it can improve muscle strength of the diaphragm that is the main muscle of breathing (Cahalin et al. 2002 in Morrow et al., 2012). Electric fan can stimulate the trigeminal nerve for reducing the perception of dyspnea (Luh et al. 2017).

The aim of this paper is to systematically review the current empirical evidence for the use of the diaphragm breathing exercise and electric fan as management approach for COPD Patients.

2 METHODS

2.1 RESOURCES

Research-related information is found on some journal databases such as MEDLINE, PubMed, Ebsco, CINAHL, Elsevier, Science Direct, which is a respiratory journals and a collection of abstract research that identified from 2010 until 2017. All reference list consists of original articles which also conducted a review to identify other relevant studies. All publications and abstracts of the english language which is also taken into consideration.

2.2 DATA EXTRACTION

The inclusion criteria were used as standard samples are:

Participants - study population included healthy adults, adults with known history of chronic obstructive airways disease or breathlessness, including patients described as having COPD, terminal cancer with breathlessness, emphysema, chronic bronchitis. There were no age restrictions.

Intervention-the study population received from of therapy non-pharmacology included diaphragm breathing exercise, fan electric to improve of dyspnea and pulmonary function.

Comparison-where there was a comparator, the diaphragm breathing exercise and fan electric intervention was compared against a control period, a sham technique or alternative interventions.

Outcome-measures e studies were included if they measured any lung function parameter, however the primary outcomes sought were performance based measures such as FEV1, FVC, and FEV1/FVC. Patient reported measures, such as breathlessness were also recorded. Short and long term follow up periods were considered in light of the scoping search.

Study designs-the ideal study design would have been the randomised controlled trial (RCT), but a scoping review of the literature suggested limited data available therefore we also included quasi experimental studies; non-randomised controlled trials, study qualitative, and before-and-after studies.

3 RESULT

3.1 EFFECT OF DIAPHRAGM BREATHING ON DYSPNEA OR BREATHLESSNESS

DIAPHRAGM BREATHING CAN REDUCE DYSPNEA AFTER 4 WEEKS WAS OBSERVED BY A 10-POINT REDUCTION IN TOTAL ST. GEORGE’ S RESPIRATORY QUESTIONNAIRE SCORE (F = 9.7; P<0.001) AND TOTAL MMRC DYSPNEA SCALE (F = 5.1; P<0.03) (YAMAGUTI ET AL. 2012). HOWEVER, NO SIGNIFICANT CHANGES TO THE PARAMETER IN THE BORG DYSPNEA SCALE OF PERCEIVED DYSPNEA (P= 0.1) (MORROW ET AL. 2012). THIS DIFFERENCE SHOWED, MAYBE BECAUSE OF THE SUBJECTIVE OF DYSPNEA PARAMETERS, POTENTIAL PROBLEMS IN UNDERSTANDING THE SCALE OF THE ELEMENTS, DIFFERENCES IN IMPLEMENTATION AND TRAINING OF DIAPHRAGMATIC BREATHING (CAHALIN ET AL 2002; MORROW ET AL. 2012).

3.2 EFFECT OF DIAPHRAGM BREATHING ON PULMONARY FUNCTION
DIAPHRAGMATIC BREATHING WAS AN EFFECTIVE THERAPY TO IMPROVE PULMONARY FUNCTION. THERE ARE SOME STUDIES THAT SUPPORT THESE RESULTS. AMONG OTHER RESEARCH THAT WAS DONE IN COPD PATIENTS THERE IS A DIFFERENCE IN VALUE BETWEEN THE INTERVENTION GROUP THAN THE CONTROL GROUP (FEV1 WITH F=0.28; P=0.60, FVC WITH F=0.21; P=0.65, AND FEV1/FVC WITH F=1.86; P=0.18) (YAMAGUTI ET AL. 2012). ANOTHER STUDY CONDUCTED IN HEALTHY ADULTS ALSO SHOWED INCREASES IN PULMONARY FUNCTION THAT DIAPHRAGMATIC STRETCHING SHOWED A SIGNIFICANT IMPROVEMENT IN FVC (P=0.006) AND FEV (P=0.042) (VALENZA ET AL. 2015). RESEARCH CONDUCTED ON SHOWED SIGNIFICANT STUDENT INCREASES IN BOTH FVC AND FEV1. IN THE COMPARISON OF FVC AND FEV1 BEFORE AND AFTER, DIFFERENCE BETWEEN PRE-TEST AND POST-TEST IN THE EXPERIMENTAL GROUP, THE MEAN FEV1= 0.15 AND THE MEAN FVC = 0.18. (KIM & LEE 2013). THE SAME THING, STUDIES IN NORMAL ADULTS SHOWED SIGNIFICANT DIFFERENCE IN FEV1 AND FVC REVIEWS THOSE OF BEFORE AND AFTER THE DIAPHRAGM BREATHING EXERCISE (LEE ET AL. 2017). MEASURING INSTRUMENT USED TO MEASURE PULMONARY FUNCTION IN THESE STUDIES IS SPIROMETRY. THE CONCLUSION THAT THE DIAPHRAGM BREATHING EXERCISE IN COPD PATIENTS, NORMAL HEALTHY ADULTS OR ADULTS AND STUDENTS CAN IMPROVE PULMONARY FUNCTION.

3.3 EFFECT OF ELECTRIC FAN ON DYSPNEA OR BREATHLESSNESS

ELECTRIC FAN OR HAND-HELD FAN COULD REDUCE DYSPNEA OR BREATHLESSNESS ON RESPONDENTS. THERE ARE DIFFERENT CHARACTERISTICS OF RESPONDENTS, THE RESEARCH IN CHINESE PATIENTS WITH TERMINAL CANCER, THEY WERE USE OF ELECTRIC FAN COULD BE EFFECTIVE IN ALLEVIATING DYSPNEA. THIS RESEARCH SHOWED SIGNIFICANT DIFFERENCE IN THE NRS SCORES OF THE EXPERIMENTAL GROUP (P<0.01), INDICATING A SIGNIFICANT REDUCTION IN THE PATIENTS' SENSATION OF BREATHLESSNESS AFTER FAN THERAPY (WONG ET AL. 2016). ANOTHER STUDY CONDUCTED IN CHRONIC REFRACTORY BREATHLESSNESS PATIENTS USE ELECTRIC FAN COULD REDUCTION IN BREATHLESSNESS RELATIVE TO THE MEAN BASELINE SCORES FOR THE SAMPLE WAS 27% FOR THE VISUAL ANALOG SCALE (VAS) AND 19% FOR THE NUMERICAL RATING SCALE (NRS) (BOOTH ET AL. 2016). THE STUDY SUPPORTS THE HYPOTHESIS THAT A HANDHELD FAN DIRECTED TO THE FACE REDUCES THE SENSATION OF BREATHLESSNESS. THERE WAS A SIGNIFICANT DIFFERENCE IN THE VAS SCORES BEFORE AND AFTER THERAPY, WITH A REDUCTION IN BREATHLESSNESS WHEN THE FAN WAS DIRECTED TO THE FACE (P=0.003) (GALBRAITH ET AL. 2010). FINDINGS SUGGEST THAT A HAND-HELD FAN IS A PORTABLE INTERVENTION WITH FEW DISADVANTAGES FROM THE WHICH MOST PATIENTS WITH CHRONIC BREATHLESSNESS WILL DERIVE BENEFIT ALONGSIDE OTHER NON-PHARMACOLOGICAL AND PHARMACOLOGICAL STRATEGIES (LUCKETT ET AL. 2017).

THE TECHNIQUE BREATHING EXERCISES IS KNOWN THAT ARE MOST EFFECTIVE WHEN IMPLEMENTED FOR 4 TO 12 WEEKS, 2 TO 5 TIMES PER WEEK, WITH EACH SESSION LASTING NO MORE THAN 20 TO 30 MINUTES. CONSIDERING THIS, THE SELECTED DURATION TIME IS 30 MINUTES 3 TIMES A WEEK FOR 4 WEEKS (SEO ET AL. 2015)

5 CONCLUSION

DIAPHRAGM BREATHING EXERCISE AND ELECTRIC FAN WAS AN EFFECTIVE THERAPY AGAINST A DECREASE IN DYSPNEA AND IMPROVEMENT OF LUNG FUNCTION. DIAPHRAGM BREATHING EXERCISE AND ELECTRIC FAN THAT IN WHICH WILL BE APPLIED IN DAILY LIFE ACTIVITIES, THIS THERAPY IS RECOMMENDED AS THE PRIMARY NON-PHARMACOLOGICAL TREATMENT FOR COPD PATIENTS WHO EXPERIENCE DYSPNEA ON EXERTION.

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