



## RESEARCH ARTICLE

URL of this article: <http://heanoti.com/index.php/hn/article/view/hn1402>**Respiratory Muscle Stretching Toward Pulmonary Vital Capacity for Asthma Patient**

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## ABSTRACT

Asthma caused dyspnea because bronchospasme. Expiration rate and inspiration volume decrease, it will reduce pulmonary vital capacity. Asthma patient need exercise to improve pulmonary vital capacity. The exercise will strengthen and endurance respiratory muscles that can increase activity tolerance. The objective of the study was to know the effect of respiratory muscle stretching toward pulmonary vital capacity of asthma patient. These study used quantitative study with quasy experiment by using randomized pretest posttest design. Intervention group used respiratory muscle stretching and control group used deep breathing exercise. The sample was 15 respondents for intervention group and 15 respondents for control group. The instruments were spirometry and observation sheet. Data analysis used T paired test where T test was 0.005 for intervention group and 0.000 for control group by hypothesis test with  $\alpha$  0.05. The mean difference between two groups used Mann Whitney test, where T test was 0.001.

**Keywords:** Respiratory muscle stretching, Pulmonary vital capacity, Asthma

## INTRODUCTION

**Background**

Asthma is obstructive airway disease that intermiten, reversible because hypersensitive reaction of trachea and bronchus toward alergen. The signs and symptoms are wheezing as episodically, cough, dyspnea, and feeling hard on the chest particularly at the night and early morning as generally tend reversible with or without medication (Smeltzer & Bare, 2001). Asthma caused dyspnea because bronchospasme will lead vasoconstriction and impairment of air movement. Expiration rate and inspiration volume decrease, it will reduce pulmonary vital capacity. Pulmonary vital capacity is maximum of air volume that get in and out lung for one sicle that after maximum inspiration dan expiration. Asthma patient need exercise to improve pulmonary vital capacity. The exercise will strengthen and endurance respiratory muscles that can increase activity tolerance (Potter & Perry, 2006). Respiratory muscles exercise can reduce dyspnea by increasing breathing pattern (Hoeman, 1996). Moreover it can improve ventilation dan oxygenation. The basic technique that will be used are deep breathing and cough, pursed lip and diaphragm breathing (Potter & Perry, 2006).

Muscle stretching can maintain and expand flexibility (Senior, 2008). It can make muscle remains long as naturally and lick into shape the elasticity and flexibility of body tissue. The other purpose are reduce stress and strain of muscle and also increase oxygenation that will give stimulation for circulation of lymph (Nurhadi, 2007). Yunani & Dian Puspitasari (2013) study shown that there was different of pulmonary vital capacity between pre and post swimming. Yohana and Dwi Kustriyanti (2014) mentioned that there was effect of gymnastics asthma towards pulmonary vital capacity of asthma patients.

**Purpose**

The objective of the study was to know the effect of respiratory muscle stretching toward pulmonary vital capacity of asthma patient. The scope of study included modality therapy and pulmonary vital capacity.

## METHODS

These study used quantitative study with quasy experiment by using randomized pretest posttest design. The study compared pulmonary vital capacity before and after intervention of two groups. Intervention group

used respiratory muscle stretching and control group used deep breathing exercise. The population of study were asthma patient in public hospital of Semarang City. The sample of study were asthma patient who fulfill inclusion criteria: age 20<sup>th</sup>-60<sup>th</sup> years old, stable hemodynamics (systolic pressure 90-130 mmHg, pulse 60-100 x/mnt, normothermia, RR 20-24 x/mnt). The exclusion criteria was patient who had cardiac disease history. The sample of the study were 30 respondents that divided 15 respondents for intervention group and 15 respondents for control group. Sampling technique was purposive sampling. The instruments were spirometry to measure pulmonary vital capacity and observation sheet.

Data collection was done for May till October 2017. All group were measured for pulmonary vital capacity before intervention. After that intervention group given deep breathing exercise and respiratory muscle stretching twice daily for two days. The control group only received deep breathing exercise twice daily for two days. After intervention all group were measure for pulmonary vital capacity. the researcher measured the different of pulmonary vital capacity of two groups. Data analysis used T paired test to know the mean difference pre and post intervention, where p-value was 0.005 for intervention group and 0.000 for control group by hypothesis test with  $\alpha$  0.05. For looking the mean difference between two groups used Mann Whitney test, where p value was 0.001 less than T table it means the hypothesis was received.

## RESULTS

Intervention group after received respiratory muscle stretching shown the enhancement of the mean difference of pulmonary vital capacity was 26.13. The minimum result shown increasing there was difference 17 and also for maximum 39. There was difference of pulmonary vital capacity between pre and post respiratory muscle stretching with p-value was 0.005

Table 1. The mean difference of pulmonary vital capacity of intervention group

Intervention group	Mean	p-value
Pretest	68.07	0.005
Posttest	94.20	

Control group received deep breathing exercise shown the enhancement of the mean difference of pulmonary vital capacity was 6.33. The minimum result shown increasing there was difference 5 and for maximum value decreased 7. There was difference of pulmonary vital capacity between pre and post respiratory muscle stretching with p-value was 0.000

Table 2. The mean difference of pulmonary vital capacity of control group

Intervention group	Mean	p-value
Pretest	52.67	0.000
Posttest	59.00	

There was difference of pulmonary vital capacity between intervention and control group with p value 0.001. Pulmonary vital capacity for group who received respiratory muscle stretching greater than control group.

Table 3. The mean difference of pulmonary vital capacity between intervention and control group

Group	Mean	p-value
Intervention	20.83	0.001
Control	10.17	

## DISCUSSION

Asthma patient used respiratory auxiliary muscles excessively so caused fatigue, pain, and muscle tension. It would make muscles became retracted. Respiratory muscles stretching will restore the muscle size and improve circulation in the cell that can stimulate lymph drainage system. These exercise can enhance muscle relaxation and eliminate lactate acid. These can reduce pain for respiratory muscles. Because the function of respiratory become normal, it will help to increase pulmonary vital capacity for asthma patient (Gunardi, 2007).

Pursed lip breathing that done regularly by patient can restore ventilation and enhance air flow and pulmonary volume. These procedure could prevent air trapped and attain ventilation more efficient and reduce breathing effort, make activity of respiratory muscles regularly and lower respiratory rate (Saryono, 2009).

The study shown that respiratory muscles stretching more effective increase pulmonary vital capacity than pursed lip breathing for asthma patient. It because respiratory muscle stretching help to exercise respiratory muscles that can restore not only ventilation but also the muscle function (Gunadi, 2007). But pursed lip breathing only help to improve ventilation not train the respiratory muscles (Saryono, 2009). Asthma patient having problems not only in the ventilation function but also in the anatomy of respiratory system. The result of the study same with research before from Yunani (2008) mentioned that respiratory muscles stretching could reduce the pain level patient post coronary artery bypass grafting than pursed lip breathing.

### CONCLUSION

Respiratory muscles stretching and pursed lip breathing could improved pulmonary vital capacity. Respiratory muscles stretching more effective than pursed lip breathing toward pulmonary vital capacity for asthma patient. Respiratory muscles stretching can be one of modality therapy in nursing for caring asthma patient

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