

# THE EFFECTS OF COMBINATION ORTHOPNEIC POSITION AND PURSED LIPS BREATHING ON RESPIRATORY STATUS OF COPD PATIENTS

Maya Ardilla Siregar<sup>1</sup>, Amira P. Tarigan<sup>2</sup>, Yesi Ariani<sup>3</sup>

<sup>1</sup>Master Student, Faculty of Nursing, Universitas Sumatera Utara

<sup>2</sup>Lecturer, Faculty of Medicine, Universitas Sumatera Utara

<sup>3</sup>Lecturer, Faculty of Nursing, Universitas Sumatera Utara

mayaardilla.siregar@gmail.com

*Abstract: Chronic obstructive pulmonary disease is a disease condition characterized by a progressive and not reversible airflow previously associated with an abnormal inflammatory response in the lungs to harmful substances. This can overcome the nursing problem in the form of gas transfer problems. As a nurse, the thing that can be done is to do an independent intervention consisting of orthopneic position and to try to improve breathing status based on the results of the classification of nursing results, namely breathing frequency, oxygen saturation, and chest wall retraction. The study aimed to investigate the combination of orthopneic position and breathing lips on the respiratory status of COPD patients. The study was quantitative with the quasi-experimental approach. Seventy-two were sample divide into two groups, namely, 36 control and 36 intervention group using purposive sampling. Data were analyzed using Wilcoxon signed-rank test and Mann Whitney Test. The results found significant differences between before and after the intervention with values for respiratory frequency 0,001, oxygen saturation 0,001, and chest wall retraction 0,005, then found differences between the control group and comparison of respiratory frequencies and oxygen saturation <0.005. The Intervention of combination orthopneic position and pursed-lips breathing can improve the respiratory status of COPD patients, namely: respiratory frequency, oxygen saturation, and chest wall retraction.*

*Keywords: COPD, orthopneic position, pursed-lips breathing, respiratory status*

## 1. INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a disease state characterized by progressive airflow limitation that is not reversible previously associated with an abnormal inflammatory response of the lungs to noxious particles [1]. One of the specific symptoms of COPD is breathlessness caused due to the occurrence of patient peripheral airway obstruction due to changes in inflammation such as airway edema and mucus hypersecretion. COPD causes the lung function of patients is not functioning properly, a decrease in force expiration volume, the expiration elongated, reduced forced vital capacity, so that the respiration status into effect, such as an increase in respiratory patients, decreased oxygen saturation of the patient, and includes value analysis arterial blood gas COPD patients[1], in nursing COPD according to Lewis, Heitkemper, and Dirksen said that the priority of nursing problems in patients with COPD is a disorder gas exchange, ineffective airway clearance, and breathing pattern ineffective[2].

Management of patients with COPD can be done by pharmacological and non-pharmacological. In his intervention, the nurse can perform non-pharmacological management as a standalone intervention that can be done by a nurse[3], Based Nursing

Intervention Classification (NIC), the intervention independently can be done by nurses in COPD patients is in the form instruct the patient to breathe exercises, such as breathing techniques with pursed lips, or called with pursed lips breathing (PLB), and other interventions, namely the setting position for reduces breathlessness as orthopneic position [4]. Both of these interventions are an intervention that can be performed independently by nurses in patients with COPD, both interventions normally are done respectively. However, According to study [5], This intervention can be done both on a consolidated basis starting from the setting position is the position of the tripod in advance and then pause (break) followed by breathing exercises PLB. Merging these two interventions in COPD patients can adjust the frequency and pattern of the patient's airway, thereby reducing trapping water, improve the function of the diaphragm, improve ventilation of the alveoli and to improve the mobility of the thoracic cage, organize and coordinate the patient's respiratory rate so breathe more effectively and reduce the work of breathing [5].

## 2. METHODS

The study was quasi-experimental. The sample consisted of 36 COPD patients at PoliParu RSU USU Medan. The study was conducted from April to May 2019. The sample was divided into a control group and an intervention group. Previously the patient was given an acute exacerbation by encouraging the patient to do a 6-minute walk test, then patients will do a respiratory status check using a breathing observation sheet consisting of oxygen saturation, respiratory frequency, and chest wall retraction. The orthopneic position was intervened for 5 minutes and followed by pursed lips breathing exercise done 3 times before the orthopneic position, and 3 times after the orthopneic position, and then the patient's respiratory status was reassessed. In the control group after 6 minutes of walking, nothing was done by the researchers, only the care provided by health workers who are usually given. Before conducting the study, the researcher sought the respondent's consent with informed consent. This study was approved by the Ethics Committee of the Faculty of Nursing, USU Medan with 1590/XI/SP/2018.

## 3. RESULTS

Based on table 1, the results of the study can be concluded that: respondents with Stable COPD disease at PoliParu RSU USU Medan with the characteristics of the majority of male patients were 88.9%, aged 61-70 years 83.3%, Christians 55, 6% in the control group, and 50% in the intervention group, had a history of retired civil servants reaching 30.6%, body mass index with bodyweight at risk reached 52.8% for the intervention group, and 72.2 for the control group, long suffered 6-10 years reached 50.0% in the intervention group, and 58.3% in the control group, smoking history was 88.9%, with the type of COPD Stable group B reached 63.9 in the intervention group, and 58.9% in the control group.

Table I: Characteristics Respondents of COPD Patient at PoliParu RSU USU Medan

Characteristics	Intervention Group			Control Group		<i>p-value</i>
	n=36			n=36		
	n	%	n	%		
Gender						
Male	32	88,9	32	88,9		0,321
Female	4	11,1	4	11,1		
Age						
41-50 years	1	2,8	2	5,6		0,852
51-60 years	4	11,1	9	25,0		

61-70 years	30	83,3	25	69,4	
>70 years	1	2,8	0	0	
Job Experiences					
Privat company	10	27,8	8	22,2	0,951
Civil officer ritered	11	30,6	10	27,8	
Farmer	7	19,4	8	22,2	
Fisherman	2	5,6	3	8,3	
Housewife	2	5,6	4	11,1	
Others	4	11,1	3	8,3	
Body Massa Index (BMI)					
Thin	1	2,8	1	2,8	0,019
Normal	15	41,7	9	25,0	
Weight risk	19	52,8	26	72,2	
Obesity	1	2,8	0	0	
Long Suffered					
<1 year	0	0	2	5,6	0,852
1-5 years	9	25,0	7	19,4	
6-10 years	18	50,0	21	58,3	
>10 years	9	25,0	6	16,7	
Smoking History					
Yes	32	88,9	32	88,9	0,775
No	4	11,1	4	11,1	
COPD Types					
Stable COPD Group A	2	5,6	5	13,9	0,351
Stable COPD Group B	23	63,9	21	58,3	
Stable COPD Group C	8	22,2	7	19,4	
Stable COPD Group D	3	8,3	3	8,3	

Based on table 2, it can be concluded that in the intervention group, the respiratory frequency before the intervention had a median of 24 at the time before the intervention and 22 after the intervention, with a p-value of 0,001. Based on the values it can be concluded that there was a difference between the frequency of breathing before and after the orthopneic position intervention and pursed lips breathing conducted in the intervention group.

Table 2: Results of Analysis of the Effects of Before and After Orthopneic Position and Pursed Lips Breathing on Respiratory Status of COPD Patients in the Intervention Group

Intervention Group	Median	Min-Max	Z	p-value
Breathing Frequency				
Before	24,00	22-28	-5,110	0,001
After	22,00	20-24		
Oxygen Saturation				
Before	92,50	77-99	-5,168	0,001
After	98,00	96-100		
Chest wall Retraction				
Before	2,00	1-2	-2,828	0,005
After	2,00	1-2		

Based on the results of the study to analyze the effect of orthipneic position and pursed lips breathing on respiratory status in the control and intervention groups, the difference can be seen in Table 3, the results that there were differences in respiratory status values on respiratory frequency and oxygen saturation that were significant between the control group and the intervention group. Respiratory frequency values and oxygen saturation in the

intervention group were lower ( $U = -3,565$ ;  $p=0,001$  and  $U = -4,649$ ;  $p=0,001$ ;  $p <0.05$ ) compared to the control group. However, the chest wall retraction did not have a significant difference ( $U = -0.276$ ;  $p = 0.783$ ;  $p > 0.05$ ).

Table 3: Results of Analysis of the Effects of Before and After Orthopneic Position and Pursed Lips Breathing on Respiratory Status in COPD Patients in Control and Intervention Groups

Respiratory status variables	Control Group (n= 36)		Intervention Group (n= 36)		<i>U</i>	<i>p-value</i>
	Median	Min-Max	Median	Min-Max		
Respiratory frequency	23	20-24	22	20-24	-3,565	0,000
Oxygen saturation	97	95-99	98	96-100	-4.649	0.000
Chest wall retraction	2	1-2	2	1-2	-0.279	0.783

#### 4. DISCUSSION

Pursed lips berating (PLB) and Orthopneic position, both of these interventions affect the muscles respiratory, during inspiration and expiration, especially for the position orthopnoea focus on gravity to increase the pressure in the alveoli thus improving chest expansion and help the muscles of the respiratory muscles, making it easier to breathe and improve respiratory statuses such as frequency respiration, oxygen saturation and retraction of the chest wall, The position assumed orthopnea in COPD patients can make breathing. In this case that the position orthopneic can maximize the expansion of the patient's chest, so that the status of the patient's breathing increased[6]. This is consistent with the results of Agussalim, that the respiratory rate may decrease and increase the value of peak flow expiration at the position orthopneic compared to high Fowler with a p-value of 0.001. The orthopneic position will provide inspiration and expiration become regular clients because the composition of the oxygen into the lungs would be optimum and lowers the pressure in the lungs, making breathing frequency decrease and increase oxygen saturation in combination with pursed lips breathing [7].

The nursing management priority of patients with COPD is to teach patients for COPD management, namely maintenance of airway, breathing techniques, positions, effective cough, oxygen therapy, exercise conditional, suction, hydration, the use of positive pressure vibration, and some drug treatment. Breathing techniques that can be done are diaphragmatic breathing, abdominal breathing, or PLB. While the position in question is a position that can improve chest expansion and maintain the diaphragm, this position is to support the arms and upper body, which can be done by sitting in a chair or at the bed 1-3 times per day. So following the intervention in this study is in the form of breathing techniques and positions, breathing techniques used PBL combined with the position that is the position orthopneic. Both of these interventions can be carried Self-Management Education for COPD patients at home at the time of relapse or experience breathlessness on roads or heavy activity [6].

Breathing exercises PLB can help slow expiration, preventing the collapse of the airways, and control the frequency and depth of breathing, to reduce shortness of breath with breathing frequency decreased, and oxygen saturation was increased, PLB also increases the relaxation so that the respiratory muscles relax and retraction of the chest wall is missing [7]. The position of this orthopneic helpful in maximizing the benefits of breathing increases COPD patients with a combination of breathing exercises PLB. PLB is a breathing exercise that consists of a mechanism that is the strong and deep inspiration and active expiration and length. The normal expiration process is a process of exhaling without using energy. PLB

breathing involves the forced expiratory that increase intra-abdominal muscle contraction strength so that intra-abdominal pressure increases exceeded during passive expiration [8].

The combination of both of these interventions in COPD patients for inspiration and expiration will be more optimal, decreased inspiratory muscle load, so that the air trapped/hyperinflation decreased, residual capacity also decreased and gas exchange also increase. Increasing gas exchange will improve the transfer of oxygen to the pulmonary capillaries, will increase the amount of oxygen bound to hemoglobin. Thus the intervention will improve oxygen saturation, respiratory rate lowers, and the retraction of the chest wall. The study that supports a combination of both interventions that research has shown that breathing exercises are controlled in this case PBL and sitting posture proved as an intervention in COPD patients who demonstrated can reduce breathlessness and improve ventilation with p-value <0.005. In the study Kim, sitting posture was done in 3 forms, whereas in the study only in the form orthopneic position [9].

Another study supports that by Purwaningsih and Herawati that there is effected before and after treatment/intervention in the form of relaxed sitting and breathing with pursed lips p-value is 0.001 on the degree of breathlessness in patients with COPD Lung Health Center for Public Surakarta. The combination of both of these interventions can maximize relaxation in COPD patients by maximizing the chest expansion, helping the development of the lungs, and reduce the pressure of the abdomen on the diaphragm by the assistance of gravity [10].

Based on Table 3, it was found there was no difference between the control group and intervention. This can happen because the patients getting the usual care by hospitals in the form of breath, which may improve chest wall retraction, so there is no difference between the two groups.

## 5. CONCLUSIONS

There are differences in respiratory status: oxygen saturation and respiratory frequency in the control group and the intervention group with the results of the Mann-Whitney statistical test Asymp.Sig. (2-tailed) 0,001, while for chest wall retraction there was no difference in the two groups both the intervention group and the control group with an Asymp.Sig (2-tailed) value of 0.783 > 0.05. As for the effect of the combination of orthopneic position and PBL on respiratory status before and after the intervention with respiratory frequency (p-value 0,001), oxygen saturation (p-value 0,001), and chest wall retraction (p-value 0,001) in the intervention group in stable COPD patients at RSU USU Medan.

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