



COMBINATION EFFECT AMONG GIVING TRIPOD POSITION AND PURSED LIP BREATHING TO RESPIRATION RATE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS

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ABSTRACT	Keywords
<p>The purpose of this study was to analyze the effect of a combination of tripod position and pursed lip breathing on respiration rate in COPD patients at Bangil Hospital. In this study, a pre-experimental method was used to determine the effect of giving a combination of tripod position and pursed lip breathing on respiration rate in COPD patients at Bangil Hospital, Pasuruan. The population in this study were all COPD patients at Bangil Hospital Pasuruan in June 2021 as many as 30 people. The sampling technique in this study was consecutive sampling. The sample used in this study were some COPD patients at Bangil Hospital, Pasuruan. From the results of the research above, there are differences in the decrease in <i>respiration rate</i>, this can be caused by differences in the accuracy of respondents when doing <i>pursed lip breathing</i>, respondents who can do it correctly will get better results in reducing <i>respiration rate</i>. It can be concluded that there is an effect of giving a combination of tripod position and pursed lip breathing on respiration rate in COPD patients at Bangil Hospital, Pasuruan.</p>	<p>Chronic Obstructive Pulmonary Disease (COPD), tripod position, pursed lip breathing.</p>

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) It is a major global public health problem because of its high prevalence, morbidity and mortality (Wright, Twigg, & Thornley, 2015). COPD is mostly caused by smoking and long-term exposure to chemical irritants. It is characterized by progressive, partially reversible airflow

obstruction and pulmonary hyperinflation with significant extrapulmonary (systemic) manifestations. The most common forms of COPD are emphysema and chronic bronchitis. Many people with COPD experience both of these conditions. Emphysema slowly destroys the air sacs in the lungs, which interferes with the flow of air out while, bronchitis

causes inflammation and narrowing of the bronchial tubes, which allows mucus to build up. Both conditions cause obstruction of airflow in the respiratory system and cause breathing problems (Chen et al., 2021). COPD patients will experience shortness of breath so that they experience an increase in external respiratory frequency (De Miguel-Díez et al., 2019).

The results of the study (de Mello et al., 2013) at Clementino Fraga Filho University Hospital Rio de Janeiro showed that COPD patients at rest had an average RR of 19x/minute, whereas after using *pursed lip breathing* it became 15x/minute, during activity the RR was 33x /minute, whereas after using *pursed lip breathing* it becomes 32x/minute. This is also supported by research (Nacul et al., 2011) in London which showed that after the first *pursed lip breathing* , the RR of COPD patients decreased by an average of 7x/minute (between 1-13x/minute) while after being taught for a long period of time. For a long time (6-24 months), the RR of COPD patients decreased by an average of 8x/minute (between 3-16x/minute). This shows that by using *pursed lip breathing* , the RR of COPD patients has decreased.

The results of the study McFadden respiratory rate before the treatment was carried out on the patient's average breathing on the *tripod position* was 33.18x/minute, while the average breathing after the treatment was carried out the average breathing of the patient on the *tripod position* was 29.47x /minute. Research conducted by Sri Suyanti in 2016 showed that there was a *tripod effect position* to respiratory frequency in COPD patient (McFadden, Price, Eastwood, & Briggs, 1982).

Based on the preliminary study, there were approximately 4 patients with a doctor's diagnosis of COPD who had come to the ER at the Bangil Hospital on November 22 – November 30, 2020. The results of interviews with COPD patients found that 4 people (100%) experienced shortness of breath and breathed quickly (RR > 20 times/minute) to reduce the feeling of shortness of breath, the patient only relied on medicine from the doctor, did not make other non-pharmacological efforts to reduce the frequency of his breath. In general, the positioning of patients in the ER at Bangil Hospital in *dyspnea conditions* is only done in an upright sitting position (*high -level*). *fowler position*), and half sitting (*semi fowler position*), but never used a *tripod position* and *pursed lip breathing* is also not done. After that the patient on RR monitor with *bedside monitors*.

COPD in both developed and developing countries is smoking . Most people with COPD are at least 40 years old and have at least a history of smoking. The risk of COPD is even greater if a person has asthma and is a smoker. Several other factors such as people exposed to chemicals and fumes at work, being in heavily polluted air, long-term exposure to air pollution and inhaling dust can also develop COPD. People with COPD have a deficiency in a protein called alpha-1-antitrypsin. This deficiency causes the lungs to deteriorate and can also affect the liver (Jullian-Desayes et al., 2021). Chronic Obstructive Pulmonary Disease (COPD), can have a wide impact if not treated immediately. COPD patients will experience *dyspnea* (shortness of breath) due to airway obstruction due to inflammation that causes alveolar hypoventilation and weakness of the

bronchial walls. and alveolar damage (O'Donnell, Milne, James, de Torres, & Neder, 2020).

Actions that done is giving therapy non-pharmacological, namely by breathing and feeding exercises position. Breathing exercises are: deep breathing exercises, exercises *diaphragmatic breathing exercise* , for positioning practice includes *semi fowler's position* (Mulhall & Criner, 2016). Giving the body position with a *tripod position* will affect the strength of the inspiratory muscles and can reduce *dyspnea* because this position helps improve lung function (Dębczyński, Guziejko, & Mróz, 2021). In addition to body position, breathing exercises also affect the *respiration rate* of COPD patients. One of the independent therapies that can be given is *Pursed Lip Breathing*. *Pursed Lip Breathing* (PLB) is recommended to help a person control their breathing. This breathing is indicated because it creates a resistance to the air leaving the lungs, which then increases the pressure on the bronchi (main airways of air) and further minimizes the collapse of the narrower airways, which is a major problem in people with COPD (Hurst et al., 2020).

METHOD

The research design used in this study was a pre-experimental type of experimental research with a *one group pretest-post test design approach* , namely experiments carried out in one group without a comparison group (control). This model already uses an initial test (*pretest*) so that the magnitude of the effect (*posttest*) from the experiment can be known with certainty (Tobi & Kampen, 2018). This

study analyzed the effect of giving a combination of tripod position and pursed lip breathing on respiration rate in COPD patients at Bangil Hospital, Pasuruan.

The population in this study were all COPD patients at Bangil Pasuruan Hospital in June 2021 as many as 30 people. The sampling technique in this study was consecutive sampling. The sample used in this study were some COPD patients at Bangil Hospital, Pasuruan. The sample in this study must meet the inclusion criteria and exclusion criteria. The inclusion criteria in this study were COPD patients who were still in composmentis state. The exclusion criteria in this study were the patient could not sit and the patient was not willing to be a respondent. The variable in this study is the *respiration rate* . In this study, the instrument was a digital glucometer to determine the respiration rate in COPD patients. The location of this research was conducted at Bangil Hospital, Pasuruan. This research was conducted from November 2020 to August 2021.

The research data processing step, the researcher did the editing after giving treatment to COPD patients, ensuring that the observation sheet was filled in. Researchers do coding because the results of the study are written in accordance with the results of observations on the sample. Researchers scored in this study because the results of the study were recorded in the form of respiration rate. The scoring given is Bradypnea or slow breathing (less than 12 per minute), Normal if the respiratory rate is 12-20x/minute, Tachypnea or fast breathing (more than 20 times per minute). Then the researcher made tables after the general data and special data were collected. The table created in

the form of a master sheet, frequency distribution table. The data analysis technique used univariate analysis which was carried out by measuring the mean respiration rate before and after giving a combination of tripod position and pursed lip breathing. Univariate analysis produces distribution and percentage tables. Analysis of the effect of a combination of tripod position and pursed lip breathing on the respiration rate of COPD patients using the Wilcoxon test.

RESULTS

General data

1. Characteristics of Respondents Based on Age

Table 1 Frequency Distribution by Age at Bangil Hospital Pasuruan in 2021

Age	Frequency	Percentage (%)
< 26 years old	0	0
26-35 years old	0	0
36-45 years old	4	16.0
46-55 years old	11	44.0
56-65 years old	10	40.0
> 65 years old	0	0
Amount	25	100.0

Source: Research primary data in 2021

Table 4.1 shows that almost half of the respondents are aged 46-55 years, namely 11 people (44%).

2. Characteristics of Respondents Based on Gender

Table 2 Distribution of Respondents Frequency by Gender at Bangil Hospital Pasuruan in 2021

Gender	Frequency	Percentage (%)
Man	22	88.0
Woman	3	12.0
Amount	25	100.0

Source: Primary Data for 2021

Table 4.2 shows that almost all of the respondents were male, namely 22 people (88%).

3. Characteristics of Respondents Based on Comorbidities

Table 3 Distribution of Respondents Frequency Based on Comorbidities at Bangil Hospital Pasuruan in 2021

Comorbidities	Frequency	Percentage (%)
DM	13	52.0
Hypertension	1	4.0
There isn't any	11	44.0
Amount	25	100.0

Source: Primary Data for 2021

Table 4.3 shows that the majority of respondents have co-morbidities with diabetes mellitus, namely 13 people (52%).

Specific Data

1. Respiration Rate Before Giving the Combination of Tripod Position and Pursed Lip Breathing

Table 4 Descriptive Statistics of Respiration Rate before Giving the Combination of Tripod Position and Pursed Lip Breathing at Bangil Hospital Pasuruan in 2021

	N	Minimum	Maximum	mean	Std. Deviation
Pretest RR	25	26	32	28,80	1,915
Pretest SpO2	25	90	94	92.04	1.338

Source: Research primary data in 2021

Table 4.4 shows that the average *respiration rate* before the combination of *tripod position* and *pursed lip breathing* was 28.8x/minute with the highest value of 32x/minute and the lowest of 26x/minute and the standard deviation of 1,915, while the average oxygen saturation was 92.04% with the highest value of 94% and the lowest value of 90% and a standard deviation of 1.338.

2. *Respiration Rate* After Giving the Combination of *Tripod Position* and *Pursed Lip Breathing*

Table 5 Descriptive Statistics of *Respiration Rate* After Giving the Combination of *Tripod Position* and *Pursed Lip Breathing* at Bangil Hospital Pasuruan in 2021

	N	Minimum	Maximum	mean	Std. Deviation
Posttest RR	25	20	26	23.20	1,633
Posttest SpO2	25	93	97	95.32	1,282

Source: Research primary data in 2021

Table 4.5 shows that the average *respiration rate* before the combination of *tripod position* and *pursed lip breathing* was 23.2x/minute with the highest value being 26x/minute and the lowest being 20x/minute and the standard deviation of 1,633, while the average oxygen saturation was 95.32% with the highest value of 97% and the lowest value of 93% and a standard deviation of 1.282.

3. The Effect of Combination of *Tripod Position* and *Pursed Lip Breathing* on

Changes in *Respiration Rate* at Bangil Pasuruan Hospital in 2021

Table 6 The Effect of Combination of *Tripod Position* and *Pursed Lip Breathing* on the *Respiration Rate of COPD* Patients at Bangil Hospital, Pasuruan in 2021 in 2021

	N	Mean Rank	Sum of Ranks
Posttest RR – Negative Ranks	25 ^a	13.00	325.00
Pretest RR Positive Ranks	0 ^b	.00	.00
Ties	0 ^c		
Total	25		

a. Posttest RR < Pretest RR

b. Posttest RR > Pretest RR

c. Posttest RR = Pretest RR

Table 4.6 shows that all respondents experienced a decrease in their *respiration rate* after giving a combination of *tripod position* and *pursed lip breathing* (negative ranks). The results of the normality test show that the p value of the data <0.05 means that the data distribution is not normal, so the statistical test used is the Wilcoxon test. Wilcoxon test results show *value* = 0.000 in *respiration rate* before and after giving a combination of *tripod position* and *pursed lip breathing*, which means that H₀ is rejected and H₁ is accepted, meaning that the effect of giving a combination of *tripod position* and *pursed lip breathing* on *respiration rate* in COPD patients at Bangil Hospital, Pasuruan in 2021.

DISCUSSION

Respiration rate Before Giving Tripod Position and Pursed Lip Breathing Combination at Bangil Hospital Pasuruan in 2021

The results in Table 4.4 show that the average *respiration rate* before the combination of *tripod position* and *pursed lip breathing* was 28.8x/minute with the highest value of 32x/minute and the lowest of 26x/minute and standard deviation of 1,915, while the average saturation oxygen is 92.04% with the highest value of 94% and the lowest value of 90% and the standard deviation of 1.338.

Factors that affect the speed of respiratory frequency are age, where you get older, the intensity of breathing will decrease, gender, where women's breathing tends to be faster than men's breathing, body temperature where the higher body temperature (fever) the respiratory frequency will be faster. and body position, activity (Shafaghat, Keyvanfar, Manteghi, & Lamit, 2016). According to (Barraza-Villarreal et al., 2015) many factors affect respiratory function, for example those related to the ability to expand the lungs and diaphragm, transport ability or perfusion.

forms of COPD are emphysema and chronic bronchitis. Many people with COPD experience both of these conditions. Emphysema slowly destroys the air sacs in the lungs, which interferes with the flow of air out while, bronchitis causes inflammation and narrowing of the bronchial tubes, which allows mucus to build up. This condition causes obstruction of air flow in the respiratory system and causes breathing problems (Prasad, 2020). COPD patients will experience shortness of breath so that they experience an increase in external

respiratory frequency (Zuriati, Surya, & Zahlimar, 2020).

According to the researchers, the high *respiration rate* that is classified as tachypnea in COPD patients is caused by obstruction and pulmonary restriction so that it will be difficult for air to enter the lungs due to the narrowing of the airways, and when air has entered the lungs, it will be difficult to expel due to decreased lung expansion. Therefore, COPD patients will try to meet oxygen needs by increasing the respiratory rate.

Respiration Rate After Giving the Combination of Tripod Position and Pursed Lip Breathing at Bangil Hospital Pasuruan in 2021

The results in Table 5 show that the average *respiration rate* before the combination of *tripod position* and *pursed lip breathing* was 23.2x/minute with the highest value 26x/minute and the lowest 20x/minute and a standard deviation of 1,633, while the average saturation oxygen is 95.32% with the highest value of 97% and the lowest value of 93% and the standard deviation of 1.282.

Giving the body position with a *tripod position* will affect the strength of the inspiratory muscles and can reduce *dyspnea* because this position helps improve lung function (Zuriati et al., 2020). In addition to body position, breathing exercises also affect the *respiration rate* of COPD patients. One of the independent therapies that can be given is *Pursed Lip Breathing*. *Pursed Lip Breathing* (PLB) is recommended to help a person control their breathing. This breathing is indicated because it creates a resistance to the air leaving the lungs, which then increases the pressure on the bronchi (main airways of air) and further minimizes the collapse of the narrower

airways, which is a major problem in people with COPD (McGrath et al., 2022).

The researcher did not use categories in the *respiration rate variable*, because if using categories, the decrease in frequency would not show the effect, because the decrease in *respiration rate* that occurred was around 4-6x/minute with an initial frequency of around 26-32x/minute (tachypnea), so with a decrease of 4-6x/minute it will still be classified as tachypnea even though the frequency has decreased significantly.

Effect of Combination of Tripod Position and Pursed Lip Breathing on Respiration Rate in COPD Patients at Bangil Pasuruan Hospital in 2021

The results in table 4.6 show that all respondents experienced a decrease in their *respiration rate* after giving a combination of *tripod position* and *pursed lip breathing* (negative ranks). The results of the normality test show that the p value of the data <0.05 means that the data distribution is not normal, so the statistical test used is the Wilcoxon test. Wilcoxon test results show *value* = 0.000 in *respiration rate* before and after giving a combination of *tripod position* and *pursed lip breathing*, which means that H_0 is rejected and H_1 is accepted, meaning that the effect of giving a combination of *tripod position* and *pursed lip breathing* on *respiration rate* in COPD patients at Bangil Hospital, Pasuruan in 2021.

These results are in accordance with research conducted (Jie et al., 2019) in London which showed that after the first *pursed lip breathing*, the RR of COPD patients decreased by an average of 7x/minute (between 1-13x/minute) while after being taught in For a long period of time (6-24 months), the RR of COPD patients decreased by an average

of 8x/minute (between 3-16x/minute). This shows that by using *pursed lip breathing*, the RR of COPD patients has decreased. This result is also supported by research studies (Bhatt et al., 2009) the respiratory rate before the treatment is carried out the average breathing of the patient on a *tripod position* is 33.18x/minute, while the average breathing after treatment is the average breathing of the patient on a *tripod position* is 29.47x/minute.

Tripod position increases intra-abdominal pressure and decreasing the pressure of the diaphragm into the abdominal cavity during inspiration, with the shoulder supported by muscles (such as the pectoralis major and minor muscles) contributing significantly to rib development. Rib development with arms and head supported contributes to inspiration. The activity of the *scalene* and *sternocleidomastoid muscles* increased significantly in the forward leaning position with the arm supported on the thigh or the arm supported by the head compared to the neutral position. Some of the mechanisms that can be explained from these results are the restriction of movement of the diaphragm, increasing intra-abdominal pressure by bringing the ribs closer to the pelvis and this increased abdominal pressure making it difficult for the diaphragm to press the abdomen back during inspiration, with the return of muscle activity to the strength maintained by the supported hand. forward/head and arms supported by thighs and stable hands and arms sternum, clavicle and ribs can be pulled up by *scalene* and *sternocleidomastoid muscles* (Jia, Zhao, Chen, & Peng, 2016).

Pursed Lip Breathing can create a resistance to air coming out of the lungs, which then increases the pressure

on the bronchi (main air passages) and further minimizes the collapse of the narrower airways (Pamungkas, Arif, Jurusan, Poltekkes, & Semarang, 2016). Through this technique, the air that comes out will be blocked by both lips, which causes more positive pressure in the oral cavity. This positive pressure will spread into the narrowed airway and is useful for maintaining the airway to remain open. With the opening of the airway, air can exit easily through the narrowed airway and easily affects the strength of the respiratory muscles to reduce shortness of breath so that the frequency of breath decreases (Lilik Lestari, Wanda, & Nurhaeni, 2019).

All respondents experienced a decrease in *respiration rate* between 4-6x/minute. There is no respondent who does not experience a decrease in *respiration rate* so that the combination of *tripod position* and *pursed lip breathing* is effective in reducing COPD patients. This is because the two measures, namely *tripod position* and *pursed lip breathing*, are non-pharmacological methods to increase lung expansion, so that when combined, the effect will be stronger. This difference in the decrease in *respiration rate* can be caused by differences in the accuracy of respondents when doing *pursed lip breathing*, respondents who can do it correctly will get better results in lowering the *respiration rate*.

CONCLUSIONS

From the results of the research above, there are differences in the decrease in *respiration rate*, this can be caused by differences in the accuracy of respondents when doing *pursed lip breathing*, respondents who can do it correctly will get better results in reducing *respiration rate*. It can be

concluded that the respiratory rate in COPD patients at Bangil Hospital, Pasuruan, the average respiration rate before the combination of tripod position and pursed lip breathing was 28.8x/minute. Respiration rate in COPD patients at Bangil Pasuruan Hospital the average respiration rate before the combination of tripod position and pursed lip breathing was 23.2x/minute. For readers and further researchers, it is recommended to develop research related to COPD disease and can be useful for the development of nursing science such as the effect of other non-pharmacological methods to reduce respiration rate in COPD patients.

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