



# JNK

JURNAL NERS DAN KEBIDANAN  
(JOURNAL OF NERS AND MIDWIFERY)

<http://jnk.phb.ac.id/index.php/jnk>



## Tripod Position and Pursed Lip Breathing on Respiration Rate in COPD Patients



Lutfi Wahyuni<sup>1</sup>, Catur Prasastia Lukita Dewi<sup>2</sup>

<sup>1,2</sup>Nursing Department, Universitas Bina Sehat PPNI Mojokerto, Indonesia

### Article Information

#### History Article:

Received, 22/11/2022

Accepted, 24/04/2023

Published, 30/04/2023

#### Keywords:

copd, respiration rate,  
pursed lip breathing,  
tripod position

### Abstract

Many people with COPD develop emphysema and chronic bronchitis. Both conditions cause obstruction of airflow in the respiratory system and cause an increase in the frequency of external respiration. One of the non-pharmacological management is tripod position and pursed lip breathing. This study aimed to determine the effect of giving a tripod position and pursed lip breathing on respiration rate in COPD patients. The design of this study used a one group pretest-post test design. The population in this study were all COPD patients at Bangil Hospital, Pasuruan in June 2021. The sampling technique of this study was consecutive sampling, the sample was obtained by 25 respondents. The instrument used observation and SOP. The results showed that the average respiration rate before giving the combination of tripod position and pursed lip breathing was 28.8x/minute, and the average value of respiration rate after giving the tripod position and pursed lip breathing was 23.2x/minute. Wilcoxon test results value = 0.000 on respiration rate before and after the combination of tripod position and pursed lip breathing, which means that tripod position and pursed lip breathing are proven to be effective on respiration rate in COPD patients. Tripod position and pursed lip breathing will loosen the chest cavity, provide positive pressure on the lungs so that air can go in and out more smoothly and reduce shortness of breath.

© 2023 Journal of Ners and Midwifery

✉Correspondence Address:

Universitas Bina Sehat PPNI Mojokerto – East Java, Indonesia

Email : [caturdewi86@gmail.com](mailto:caturdewi86@gmail.com)

DOI: <https://doi.org/10.26699/jnk.v10i1.ART.p100-107>

This is an Open Access article under the CC BY-SA license (<http://creativecommons.org/licenses/by-sa/4.0/>)

P-ISSN : 2355-052X

E-ISSN : 2548-3811

## INTRODUCTION

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 which causes alveolar hypoventilation and weakened bronchial walls and alveolar damage (Fernandez, 2018). The action taken is the provision of non-pharmacological therapy, namely breathing exercises and positioning. Breathing exercises, namely, deep breathing exercises, diaphragmatic breathing exercises, for positioning exercises include the semi-fowler position (Roberts, Schreuder, Watson, & Stern, 2017). 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 (Suyanti, 2016). 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 can create a resistance to the air coming out of 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 (Pamungkas et al., 2016). Chronic Obstructive Pulmonary Disease (COPD) is a major global public health problem because of its high prevalence, morbidity and mortality (Handa et al., 2018). 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 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 of these conditions cause obstruction of air flow in the respiratory system and cause breathing problems (Prasad, 2020). COPD patients will experience shortness of breath so that they experience an increase in the frequency of external respiration (Pamungkas et al., 2016).

The results of the study (Cabral et al., 2015) 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 (Roberts et al., 2017) 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 (Susilowati et al., 2019) the 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 an effect of tripod position on respiratory frequency in COPD patients (Suyanti, 2016). Based on a preliminary study, there were approximately 4 patients with a doctor's diagnosis of COPD who came to the ER at 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 relies on drugs from the doctor, does 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 fowler position), and half sitting (semi-fowler position), but never using a tripod position and pursed lip breathing is also not done. After that the patient is monitored RR with a bedside monitor.

## METHOD

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

certainty (Notoatmodjo, 2016). The population in this study was all COPD patients at Bangil Hospital Pasuruan in June 2021. The sampling technique in this study was consecutive sampling. In consecutive sampling, sampling is carried out based on research criteria within a certain time so that the number of samples is met (Hidayat, 2015). The sample used in

this study was 25 people of COPD patients at Bangil Hospital, Pasuruan. The independent variable was giving tripod position and pursed lip breathing, while the dependent variable was respiration rate. The instruments in this study were observation sheets for respiration rate and SOP tripod position and pursed lip breathing.

## RESULTS

### 1. General data

Characteristics of Respondents Based on Cramine, Age and Comorbidities

**Table 1: Frequency Distribution by Gender, Age and Comorbidities**

Characteristics of Respondents	Frequency	Presentase (%)
<b>Gender</b>		
Male	22	88.0
Female	3	12.0
<b>Age</b>		
36 – 45 Years	4	16.0
46 – 55 Years	11	44.0
56 – 65 Years	10	40.0
<b>Co-morbidities</b>		
DM	13	52.0
Hypertension	1	4.0
there isn't any	11	44.0
<b>Total</b>	<b>25</b>	<b>100</b>

Table 1 shows that all respondents experienced a decrease in 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 showed value = 0.000 in respiration rate before and after giving a combination of tripod position and pursed lip breathing, this proves that giving a combination of tripod position and pursed lip breathing proved effective on respiration rate in COPD patients at Bangil Hospital.

### 2. Special Data

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

**Table 2: Descriptive Statistics of Respiration Rate Before Giving the Combination of Tripod Position and Pursed Lip Breathing**

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std Deviation</i>
Pretest RR	25	26	32	28,80	1,915
Pretest SpO2	25	90	94	92,04	1,338

Based on Table 2, it 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 3: Descriptive Statistics of Respiration Rate After Giving the Combination of Tripod Position and Pursed Lip Breathing**

	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std Deviasion</i>
Posttest RR	25	20	26	23,20	1,633
Posttest SpO2	25	93	97	95,32	1,282

Table 3 shows that the average respiration rate after giving a combination of tripod position and pursed lip breathing is 23.2x/minute with the highest value 26x/minute and the lowest 20x/minute and standard deviation of

1,633, while the average oxygen saturation is 95.32% with the highest value of 97% and the lowest value of 93% and the standard deviation of 1.282.

**3. Effect of Tripod Position and Pursed Lip Breathing Combination on Changes in Respiration rate**

**Table 4: Effect of Tripod Position and Pursed Lip Breathing Combination on Respiration Rate**

		N	Mean Rank	Sum of Ranks
Posttest RR –	<i>Negative Ranks</i>	25 <sup>a</sup>	13.00	325.00
Pretest RR	<i>Positive Ranks</i>	0 <sup>b</sup>	.00	.00
	<i>Ties</i>	0 <sup>c</sup>		
<i>Total</i>		25		

- a. Posttest RR < Pretest RR
- b. Posttest RR > Pretest RR
- c. Posttest RR = Pretest RR

Table 4. shows that all respondents experienced a decrease in 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 showed value = 0.000 in respiration rate before and after giving a combination of tripod position and pursed lip breathing, this proves that giving a combination of tripod position and pursed lip breathing proved effective on respiration rate in COPD patients at Bangil Hospital.

**DISCUSSION**

***Respiration Rate Before Giving Tripod Position and Pursed Lip Breathing Combination at Bangil Hospital***

The results in table 2 show that the average respiration rate before the combination of tripod position and pursed lip breathing was 28.8x/minute with the highest value 32x/minute and the lowest 26x/minute and a standard deviation of 1,915. Factors that affect the speed of respiratory frequency are age where the older you get, the intensity of breathing will decrease, gender, where women's breathing tends to be faster than men's breathing, body temperature where the higher the body temperature (fever) the respiratory frequency will be faster and body position, activity (Giovani, 2019). According to (Tarwoto et al., 2015) many factors affect respiratory function, for example those related to the ability to expand the lungs and diaphragm, the ability to transport or perfusion. According to the researchers, the high respiration rate that is classified as tachypnea in COPD patients is caused by obstruction and restriction of the lungs so that it is difficult for air to enter the lungs due to narrowing of the airways, and when air enters the lungs, it will be difficult to expel due to decreased lung expansion. Therefore, COPD patients will try to meet their oxygen needs by increasing the respiratory rate.

***Respiratory Rate After Giving Tripod Position and Pursed Lip Breathing Combination at Bangil Hospital***

The results of the study in table 3 show that the average respiration rate before giving 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 a standard deviation of 1.633.

Giving the body a tripod position will affect inspiratory muscle strength and can reduce dyspnea because this position helps improve lung function (Suyanti, 2016). 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 someone control their breathing. This breathing is indicated because it can create a resistance to the air coming out of the lungs, which then increases the pressure on the bronchi (the main airways) and further minimizes the collapse of narrower airways, which is a major problem in COPD sufferers (Soeroto & Suryadinata, 2014). Researchers do not use categories in the respiration rate variable, because if you use categories, the effect of decreasing frequency will not be seen, because the reduction in respiration rate.

### ***Effect of Tripod Position and Pursed Lip Breathing Combination on Respiration Rate in COPD Patients***

The results in table 3 show that all respondents experienced a decrease in 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 showed value = 0.000 in respiration rate before and after the combination of tripod position and pursed lip breathing, which means that the combination of tripod position and pursed lipbreathing proved effective on respiration rate in COPD patients at Bangil Hospital.

These results are in accordance with research conducted (Roberts et al., 2017) 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 studie (Susilowati et al., 2019) the respiratory rate before the treatment is carried out on the patient's average breathing on a tripod position, which is 33.18x/minute, while the average breathing after treatment is the patient's average breathing on a tripod. position is 29.47x/minute.

The tripod position increases intra-abdominal pressure and decreases pressure on the diaphragm against 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 strenocleidomastoid muscles increased significantly in the forward leaning position with the arm supported on the thigh or arm supported by the head compared to the neutral position. Several mechanisms that can be explained from these results are restriction of diaphragm movement, increasing intra-abdominal pressure by bringing the bones closer together The ribs to the pelvis and this increased abdominal pressure make it difficult for the diaphragm to push the abdomen backward during inspiration, with the return of muscle activity to strength maintained by the hands supported by

the face/head and arms supported by the thighs and stabilization of the hands and arms of the sternum, clavicle and ribs. The ribs can be pulled up by the scalene and sternocleidomastoid muscles (Kim et al., 2015). 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 et al., 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 breathing decreases (Isnainy & Tias, 2020). 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.

### **CONCLUSION**

Respiration rate in COPD patients at Bangil Hospital the average respiration rate before giving tripod position and pursed lip breathing was 28.8x/minute and after giving a combination of tripod position and pursed lip breathing was 23.2x/minute. Wilcoxon test results showed value = 0.000 in respiration rate before and after administration of a combination of tripod position and pursed lip breathing which proved effective for COPD patients. Tripod position and pursed lip breathing will loosen the chest cavity, provide positive pressure on the lungs so that air can go in and out more smoothly and reduce shortness of breath.



## SUGGESTIONS

Combination of tripod position and pursed lip breathing for COPD patients can be routinely done 3 times a day to stabilize the breathing rate of COPD patients. Making the combination of tripod position and pursed lip breathing as one of the adjuvant therapies to reduce respiration rate for patients with respiratory system disorders. Carrying out research development related to COPD disease and can be beneficial for the development of nursing knowledge such as the influence of other non-pharmacological methods to reduce respiration rate in COPD patients.

## ACKNOWLEDGEMENT

The researcher would like to thank profusely to:

Director of Bangil Hospital who has given permission to researchers to conduct preliminary studies and research. Dr. Ivan Rovian as Chancellor of the Regency PPNI Healthy Bina University who provided opportunities for researchers. Nurse friends in the Emergency Room at Bangil Hospital who assisted in this research

## FUNDING

Funding for this research was obtained from the Institute for Research and Community Service (LPPM) STIKes Bina Sehat PPNI Mojokerto. As a 2022 Funding Internal Grant

## CONFLICTS OF INTEREST

The author declares that there are no conflicts of interest with the topic or any associated objects upon the publication of this study.

## AUTHOR CONTRIBUTIONS

In this study the first author as a correspondence author who is responsible for the research process to publication by writing articles that have been adjusted to journal guidelines. The second author assisted in the research process and data analysis. The third author helps research in the data collection process.

## REFERENCE

- A. Wisman, B., Mardhiyah, R., & Tenda, E. D. (2015). Pendekatan Diagnostik dan Tatalaksana Penyakit Paru Obstruktif Kronik GOLD D: Sebuah Laporan Kasus. *Indonesian Journal of Chest*, 2 No.4, 180–190.
- Ajay Handa, Sahajal Dhooria, Inderpaul Singh Sehgal, & Ritesh Agarwal. (2018). Primary cavitary sarcoidosis: A case report, systematic review, and proposal of new diagnostic criteria. *Lung India*, 35(1), 41–46.  
<https://doi.org/10.4103/lungindia.lungindia>
- Arikunto Suharsimi. (2013). Prosedur penelitian suatu pendekatan praktik. *Jakarta: Rineka Cipta*, p. 172. Retrieved from <http://r2kn.litbang.kemkes.go.id:8080/handle/123456789/62880>
- Asmadi. (2018). *Teknik prosedural keperawatan konsep dan aplikasi kebutuhan dasar klien*. Jakarta: Salemba Medika.
- Bakhtiar, A., & Amran, W. S. (2019). Faal Paru Statis. *Jurnal Respirasi*, 2(3), 91. <https://doi.org/10.20473/jr.v2-I.3.2016.91-98>
- Berman, A., Snyder, S. J., & Frandsen, G. (2016). *Kozier and Erb's Fundamentals of Nursing Concepts, Process, and Practice* (Tenth Edit). Jakarta: EGC.
- Bhatt, S. P., Guleria, R., Luqman-Arafath, T. K., Gupta, A. K., Mohan, A., Nanda, S., & Stoltzfus, J. C. (2019). Effect of tripod position on objective parameters of respiratory function in stable chronic obstructive pulmonary disease. *The Indian Journal of Chest Diseases & Allied Sciences*, 51(2), 83–85. [https://doi.org/10.1378/chest.132.4\\_meetingabstracts.610b](https://doi.org/10.1378/chest.132.4_meetingabstracts.610b)
- Bozarth, A. L., Covey, A., Gohar, A., & Salzman, G. (2014). Chronic obstructive pulmonary disease: clinical review and update on consensus guidelines. *Hospital Practice (1995)*, 42(1), 79–91. <https://doi.org/10.3810/hp.2014.02.1095>
- Cabral, L. F., D'Elia, T. D. C., Marins, D. D. S., Zin, W. A., & Guimarães, F. S. (2015). Pursed lip breathing improves exercise tolerance in COPD: a randomized crossover study. *European Journal of Physical and Rehabilitation Medicine*, 51(1), 79–88.

- Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/24691248>
- Curtis, K., Ramsden, C., Shaban, R., Fry, M., & Considine, J. (2019). *Emergency and Trauma Care for Nurses and Paramedics*. Chatswood: Elsevier Australia.
- Ealias, J., & Babu, B. (2016). Effectiveness of Pursed Lip Breathing Exercise on Selected Physiological Parameters among COPD Patients. *International Journal of Science and Research (IJSR)*, 5(5), 19–22. <https://doi.org/10.21275/v5i5.nov163210>
- Fernandez, G. J. (2018). Tinjauan Kepustakaan Sistem Pernapasan. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. Retrieved from <http://erepo.unud.ac.id/id/eprint/20418/1/1267ef1a6941f10cd436af892efd71b1.pdf>
- Giovani, P. S. (2019). *Rumus Pocket Biologi*. Jakarta: Grasindo.
- Hidayat, A. A. (2014). *Metode Penelitian Keperawatan dan Teknik Analisis Data*. Jakarta: Salemba Medika.
- Hidayati, A. N., Akbar, M. I. A., & Rosyid, A. N. (2018). *Gawat Darurat Medis dan Bedah*. Surabaya: Universitas Airlangga Press.
- Muttaqin, A. (2015). *Buku Ajar Asuhan Keperawatan Dengan Gangguan Sistem Pernafasan*. Jakarta: Salemba Medika.
- Notoatmodjo, S. (2016). *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta.
- Isnainy, U. C. A. S., & Tias, S. A. (2020). Pengaruh posisi condong kedepan dan terapi pursed lips breathing terhadap derajat sesak napas penderita Penyakit Paru Obstruktif Kronik (PPOK). *Holistik Jurnal Kesehatan*, 13(4), 389–395. <https://doi.org/10.33024/hjk.v13i4.1670>
- Kim, K. S., Byun, M. K., Lee, W. H., Cynn, H. S., Kwon, O. Y., & Yi, C. H. (2016). Effects of breathing maneuver and sitting posture on muscle activity in inspiratory accessory muscles in patients with chronic obstructive pulmonary disease. *Multidisciplinary Respiratory Medicine*, 7(1), 1–6. <https://doi.org/10.1186/2049-6958-7-9>
- PDPI. (2015). Chronic Obstructive Pulmonary Disease (COPD). *Pedoman Diagnosis & Penatalaksanaan Di Indonesia*.
- Ratnaningtyassih, Arif, S., & Pamungkas. (2016). Efektifitas Pursed Lip Breathing dan Deep Breathing terhadap Penurunan Frekuensi Pernapasan pada Pasien PPOK di RSUD Ambarawa. *Jurnal Ilmu Keperawatan Dan Kebidanan (JIKK)*, 5(1), 1–7.
- Rehatta, M. (2015). *Pedoman Keterampilan Medik I*. Surabaya: Universitas Airlangga Press.
- Roberts, S. E., Schreuder, F. M., Watson, T., & Stern, M. (2017). Do COPD patients taught pursed lips breathing (PLB) for dyspnoea management continue to use the technique long-term? A mixed methodological study. *Physiotherapy (United Kingdom)*, 103(4), 465–470. <https://doi.org/10.1016/j.physio.2016.05.006>
- Setiadi. (2015). *Konsep Dan Praktik Penulisan Riset Keperawatan* (Edisi 2). Jakarta: Graha Ilmu.
- Smeltzer, S. (2016). *Buku Saku Ilmu Keperawatan Medikal Bedah*. EGC.
- Smeltzer, S., & Bare, B. (2015). *Keperawatan Medikal Bedah Brunner & Suddarth*. Jakarta: EGC.
- Soeroto, A. Y., & Suryadinata, H. (2014). Penyakit Paru Obstruktif Kronik. *Ina J Chest Crit and Emerg Med \ Vol. 1, No. 2 \ June - August 2014, 1(2)*, 83–84.
- Sugiyono. (2016). *Metode Penelitian Kuantitatif dan Kualitatif R & D*. Alfabeta.
- Susilowati, Agustin, W. R., & Kanita, M. W. (2019). Perbedaan Tripod Position Dan Respiratory Muscle Exercises Terhadap Frekuensi Pernapasan Dan Saturasi Oksigen Pada Pasien Ppok Di Ruang Igd Rsud Dr Soediran Mangun Sumarso Wonogiri. *Jurnal Keperawatan Universitas Kusuma Husada Surakarta*, 31, 1–15.
- Suyanti, S. (2016). Pengaruh Tripod Position Terhadap Frekuensi Pernafasan Pada Pasien Dengan Penyakit Paru Obstruktif Kronik (Ppok) Di Rsud Dr. Soediran Mangun Sumarso. *Pengaruh Tripod Position Terhadap Frekuensi Pernafasan Pada Pasien Dengan Penyakit Paru Obstruktif Kronik (Ppok) Di Rsud Dr. Soediran Mangun Sumarso*.
- Tarwoto, Aryani, R., & Wartolah. (2015). *Anatomi dan fisiologi untuk mahasiswa keperawatan*. Jakarta: Trans Info Media.

- Uyainah, A. (2014). Update knowledge in respirology. *Indonesian Journal of Chest*, 1, 35–38.
- Vestbo, J., Hurd, S. S., Agustí, A. G., Jones, P. W., Vogelmeier, C., Anzueto, A., ... Rodriguez-Roisin, R. (2013). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease GOLD executive summary. *American Journal of Respiratory and Critical Care Medicine*, 187(4), 347–365. <https://doi.org/10.1164/rccm.201204-0596PP>.