

Conference Paper

Effect of Pursed Lip Breathing Exercise on Respiratory Frequency Among Tuberculosis Patients at Balai Besar Kesehatan Paru Masyarakat Makassar

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Pulmonary tuberculosis patients tend to experience high respiratory frequency. The breathing muscles in patients who experience shortness of breath can work when respiratory abnormalities occur. This study aims to determine the effect of Pursed Lip Breathing Exercise on Respiratory Frequency among Pulmonary Tuberculosis Patients. The design in this study is a Quasi-Experimental design with a two-group approach, and a pre-test and post-test design. The sample is comprised of 20 patients in the Balai Besar Kesehatan Paru Masyarakat Makassar between 6 January – 8 February 2020. The instruments used in this study were the standard operational procedure of the Pursed Lip Breathing Exercise and the Respiratory Frequency Observation Sheet to determine the changes in the respiratory frequency of patients in the treatment and control groups. Statistics were analyzed using the T dependent test and Wilcoxon test. The Wilcoxon test result on the intervention group obtained the value of $p = 0.004$ or $p < 0.05$ and control group achieved p value = 0.157 or $p > 0.05$, it means the intervention group indicated influence and control group did not get any it. The intervention group that was treated by Pursed Lip Breathing Exercise acquired influence of breathing frequency on the pulmonary TB patients, but in another hand control group that only was measured the breathing frequency did not get any influence on the pulmonary TB patients.

Keywords: Tuberculosis, Breathing Frequency, Pursed Lip Breathing Exercise

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Published: 15 March 2021

Publishing services provided by
Knowledge E

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Selection and Peer-review under the responsibility of the IVCN Conference Committee.

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1. Introduction

Tuberculosis lungs is an infectious disease caused by bacterial infection mycobacterium tuberculosis and has become global attention. A source of transmission of which is the patient tuberculosis basil is acid resistant (smear) positive through tiny percik sputum. the issuance of Tuberculosis lungs with basil is acid resistant (smear) negative also still

have the possibility of transmitting disease tuberculosis lungs although. small level of exposure So as not preclude the possibility the number of patients with tuberculosis lungs from year to year are growing increasingly. In 2016 tuberculosis lungs attack 10,4 million people in the world and cause of death on 1,4 million patients with tuberculosis lungs. India, indonesia, and china is a country with tuberculosis sufferers lungs most namely berturut-turut with the number of cases 23 %, 10 %, and 10 % of all patients in the world [5].

World Health Organization tuberculosis report, pulmonary tuberculosis (TB) is one of the 10 causes of death in the world [12]. In Indonesia since 2016 stated that there were 156,723 cases [3]. Based on preliminary studies The number of tuberculosis prevalence obtained at the Balai Besar Kesehatan Paru Masyarakat Makassar in 2017 was 384 people. whereas in 2018 the number of visits and hospitalizations of pulmonary tuberculosis patients with the TB patient category totaled 442 people. whereas in 2019 from January to August the number of visits and hospitalizations of pulmonary tuberculosis patients with the TB patient category totaled 433 people.

Pulmonary tuberculosis patients tend to experience high respiratory frequency. The breathing muscles in patients who experience shortness of breath can work when respiratory abnormalities occur. This aims to optimize breath ventilation. Shortness of breath occurs due to the condition of perfect lung development due to the part of the lung that is affected does not contain air or collapses [1].

Handling shortness of breath requires proper handling. Handling shortness of breath can be done by adjusting the position, breathing exercises, effective coughing, and chest physiotherapy, administering nasal oxygen, masks, and administering bronchodilator drugs. One of the breathing exercises is the Pursed Lip Breathing Exercise, the Pursed Lip Breathing is a breathing exercise that consists of two mechanisms, namely strong and deep inspiration and long and active expiration. Breathing exercises using closed lips aim to slow down expiration, prevent lung collapse, control the frequency of breathing into exhalation [11].

Previous research has found this technique to be effective in pulmonary rehabilitation approaches used to increase the peak flow of expiration and relieve patient tightness [10]. in the treatment room of AIIMS Hospital in India using a random crossover design with 30 COPD patients over the age of 40 showed results that pursed lip breathing increased the peak current of expiration and oxygen saturation in patients as well as decreased respiratory frequency [9]. Pursed lip breathing exercise breathing exercises can increase the peak current of expiration and increase the oxygen saturation of patients, and this

exercise has been performed in several hospitals in Indonesia to minimize congestion in patients with chronic obstructive pulmonary disease [13]

Pulmonary tuberculosis patients will experience shortness of breath or the frequency of breathing increases due to decreased oxygen saturation. To increase oxygen saturation, it can be done with proper breathing exercises, one of the right breathing exercises is Pursed Lip Breathing, therefore researchers are interested in examining whether the effect of Pursed Lip Breathing Exercise on Respiratory Frequency in Pulmonary TB Patients at the Center for Community Lung Health Makassar.

2. Methods and Equipment

2.1. Methods

The design in this study is a Quasi-Experimental design with a two group approach-pre test and post test design. The intervention or treatment given in the intervention group was giving the Pursed Lip Breathing Exercise is carried out 2 times a day for 3 days and is evaluated. while the control group only measured the frequency of breathing. Sample in this study were 20 patients, the sample were selected by using purposive sampling technique. This research was conducted at the DOTS Center in the Balai Besar Kesehatan Paru Masyarakat Makassar on 6 January – 8 February 2020.

2.2. Equipment

Instruments used in this study are SOP and Pursed Lip Breathing Exercise guidelines in respiratory exercises and respiratory frequency observation sheets to determine changes in patients' Respiratory Frequency in treatment groups and control groups, as well as stopwatches to calculate time in measuring respiratory frequency. Statistic analyzed using T dependent test and Wilcoxon test with the significance degree of 95% ($\alpha=0,05$).

3. Results

Based on table 1 show that in the intervention group the number of male was 7 respondents (70%) and the number of female was 3 respondents (30%). Meanwhile, based on gender in the control group the number of men was 10 respondents (100%) and the number of women was not there. Based on the mean age of the respondents in

TABLE 1: Demographic characteristics of pulmonary Tuberculosis patients at the Balai Besar Kesehatan Paru Masyarakat Makassar.

*Frequency Test **T dependent test

Variable	Intervention Group n	Control Group n
Gender		
Male	7	10
Female	3	-
Age (Year)		
Mean, ± SD	56.60, ± 6.818	59.70, ± 8.932
Min-Max	45 – 71	48 – 72
Education Level		
Primary school education	4	1
Junior high school	4	3
Senior high school	1	6
Diploma	1	0

the intervention group was 56.60, ± 6,818 (45 - 71) years, while those in the control group were 59.70, ± 8,932 (48 - 72) years. Based on the education level of respondents in the intervention group, 4 respondents (40%) had primary school education, 4 respondents (40%) had junior high school education, 1 respondent (10%) had high school education (10%), and 1 respondent (10%) had D3 education. Whereas in the control group, 1 respondent (10%) had primary school education, 3 respondents (30%) had junior high school education, 6 respondents (60%) had high school education, and no Diploma education.

TABLE 2: Mean respiratory rate in patients Pulmonary tuberculosis at the Balai Besar Kesehatan Paru Masyarakat Makassar.

Respiratory Frequency		Average	Standard Deviation	Min-Max
Intervention Group	Pre-Test	26,60	0,966	26-28
	Post-Test	21,40	1,646	20-24
Control Group	Pre-Test	24,80	1,032	24-26
	Post-Test	25,00	1,154	24-27

* dependent t test

Based on table 2, it show that the average respiratory frequency in the pre-test intervention group was 26.60 ± 0.996 (26-28) and the post-test was 21.40 ± 1.646 (20-24) while the average respiratory frequency for the group the control pre-test was 24.80 ± 1.032 (24-26) and the post-test was 25.00 ± 1.154 (24-27).

Based on table 3 show the statistical test with the Nonparametric Wilcoxon Sign Rank Test in the pre-test and post-test intervention groups was obtained (p = 0.004) or

TABLE 3: Influence of Pre Post Respiratory Frequency in the Intervention and Control Group on Pulmonary TB at the Balai Besar Kesehatan Paru Masyarakat Makassar.

Respondent Group		Mean	Standard Deviation	Min-Max	Nilai P
Intervention Group	Pre-Test	26.60	0.966	26-28	0.004
	Post-Test	21.40	1.646	20-24	
Control Group	Pre-Test	24.80	1.032	24-26	0.157
	Post-Test	25.00	1.154	24-27	

*t dependent test * Wilcoxon test

($p \leq 0.05$), it means that there is a significant difference in the frequency of breathing before and after being given Pursed Lip Breathing Exercise with the average value before the Pursed Lip Breathing Exercise was 26.60 with a minimum value of 26 and a maximum of 28. And after being given the Pursed Lip Breathing Exercise it was 21.40 with a minimum value of 20 and a maximum of 24. While the pre-test and post-test control groups were obtained ($p = 0.157$) or ($p \geq 0.05$) means that there is no difference in respiratory frequency. From the average results of the pre-test and post-test control group research scores there is an increase, namely the pre-test of 24.80 with a minimum value of 24 and a maximum of 26. and a post-test of 25.00 with a minimum value of 24 and a maximum of 27, so that respondents who do not getting treatment or action will increase the frequency of breathing.

4. Discussion

Based on the results of this study indicate that the frequency of breathing before being given the Pursed Lip Breathing Exercise (Pre Test) In the Intervention group, the average value was a minimum of 26 and a maximum of 28, while for the control group the average respiratory frequency was at least 24 and a maximum of 26. shows baseline values before comparing with values after 3 days of Pursed Lip Breathing Exercise.

Application of the Pursed Lip Breathing Exercise theory, The breath-assisting muscles in patients who experience shortness of breath can work when there is an abnormality in respiration, aiming to optimize breath ventilation. Shortness of breath occurs due to the condition of perfect lung development due to the lung that is attacked does not contain air or collapse. So it requires the right therapy to reduce the frequency of breathing such as the Pursed Lip Breathing Exercise by doing it repeatedly. In this study, pulmonary tuberculosis patients who routinely did the Pursed Lip Breathing Exercise for 3 days could reduce their respiratory rate[6, 9, 13].

Pursed lip breathing technique increases oxygen saturation and tidal volume and reduces the rate of breathing frequency. the Pursed Lip Breathing Exercise with the aim of increasing expiration makes it easier for the patient to remove the amount of carbon dioxide trapped in the lungs and measuring inspiration regularly will help the patient reduce the use of the respiratory muscles. So in this condition, there will be a decrease in the frequency of breathing. This is because the Pursed Lip Breathing Exercise increases the partial pressure of oxygen in the arteries which causes a decrease in pressure on the oxygen demand in the body's metabolic process, which causes a decrease in shortness of breath and the frequency of breathing [2, 7, 8, 13]

Pursed lip breathing breathing exercises allow physiologically positive pressure on the lungs to expel air in the lungs, which can increase the current of the expiration peak. With the increase in the peak current of expiration, the volume of pulmonary residue decreases, this provides a great return to oxygen inflow through more inspiration that can increase the saturation of oxygen in the lungs so that the need for oxygen decreases. With the fulfillment of oxygen needs can decrease the frequency of breathing or decrease the frequency of breathing in patients who are claustrophobic.

5. Conclusion

There was a decrease in Respiratory Frequency in pulmonary TB patients who were given Pursed Lip Breathing exercise in the Intervention group with a larger number, while in the Control group the decrease in respiratory frequency was with a small number of values of the patients with pulmonary tuberculosis at Balai Besar Kesehatan Paru Masyarakat Makassar.

Funding

This work was supported by Balai Besar Kesehatan Paru Masyarakat Makassar dan STIKES Panakkukang Makassar.

Acknowledgement

The authors would like to thank our colleague for their contribution and support to the research. They are also thankful to all the reviewers who gave their valuable inputs to the manuscript and helped in completing the paper.

Conflict of Interest

The authors have no conflict of interest to declare.

References

- [1] Black, J. M. and Hawks, J. H. (2014). A. Suslia (Ed.), *Keperawatan Medikal Bedah*. (8th ed.). Singapore: Elsevier.
- [2] Tawangnaya, I.L., Ismonah, Arif, S. (2016). *Perbedaan Nilai Saturasi Oksigen Sebelum Dan Sesudah Diberikan Posisi Tripod dengan Pursed Lip Breathing Pada pasien TB Paru Di RSUD Ambarawa*. Retrieved from <http://ejournal.stikestelogorejo.ac.id/index.php/ilmukeperawatan/article/view/573>
- [3] Kemenkes R. I. (2018). *Riset Kesehatan Dasar (Riskesdas)*. Jakarta: Pusat Data dan Informatika Kementerian Kesehatan RI.
- [4] Kesehatan R. I. (2016). *Data profil Dinkes/Kota Se Sulsel Tahun 2015*. Retrieved from https://www.kemkes.go.id/resources/download/profil/profil_kes_provinsi_2015/27_sulsel_2015.pdf
- [5] Lange, C., et al. (2014). Be Po. *European Respiratory Journal*, vol. 44, issue 1, pp. 23–63.
- [6] Morales-Blanhir, J. J. E., et al. (2011) Six-Minute Walk Test: A Valuable Tool for Assessing Pulmonary Impairment. *Jornal Brasileiro de Pneumologia*, vol. 37, June issue, pp. 110–117.
- [7] Ramos, E. M. C., et al. (2009). Influence of Pursed-Lip Breathing on Heart Rate Variability and Cardiorespiratory Parameters in Subjects with Chronic Obstructive Pulmonary Disease (COPD). *Revista Brasileira de Fisioterapia*, vol. 13, issue 4, pp. 288–293.
- [8] Roberts, S., et al. (2013). *The Use of Pursed Lips Breathing in Stable COPD: A systematic Review of the Evidence*. Retrieved from <https://www.tandfonline.com/doi/abs/10.1179/174328809X452908>
- [9] Roberts, S., et al. (2013). Address of the Department or Institute to Which the Work should be Attributed: School of Health and Emergency Professions. *Physical Therapy Reviews*, vol. 14, issue 4, pp. 240–246.
- [10] Sachdeva, M., Shaphe, M. A. and Mahajan, D. (2013). Comparison of Active Cycle of Breathing Technique and Pursed Lip Breathing with Thera PEP® in Patients with Acute exacerbation of COPD. *International Journal of Physical Therapy Research & Practice.*, issue 1, pp,28-44.

- [11] Singh, S. and Singh, V. (2012). *Pulmonary Rehabilitation in COPD*. Retrieved from http://www.japi.org/february_2012_special_issue_copd/09_pulmonary_rehabilitation_in.pdf.
- [12] Smeltzer, S. C. and Bare, B. G. (2002). *Buku Ajar Keperawatan Medikal Bedah* (8th ed.). Jakarta: EGC.
- [13] WHO. (2018). *WHO TB Burden Report 2018, Workplace Health and Safety*. Retrieved from <https://apps.who.int/iris/handle/10665/274453>.
- [14] Wijaya, I. K., Sjattar, E.L.,Bahar,B. (2017). Pengaruh Self Care Aducation Dan Pursed Lip Breathing Exercise Terhadap Toleransi Fisik Pada Pasien Penyakit Paru Abstruksi Kronis (PPOK). *Patria Artha Journal of Nursing Science*, vol. 1, issue 1, pp. 25-35.
- [15] Suriya, M. (2018). Factors Related to the Quality of Life of Pulmonary TB Patients in Paru Lubuk Alung Pulmonary Hospital of West Sumatra. *Nursing*, vol. 2, issue 1,pp. 29-38.