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The Effect of Inhaler Training on Self-Efficacy in Patients With COPD

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ABSTRACT
Patients with Chronic Obstructive Pulmonary Disease (COPD) can have low self-efficacy due to symptoms of shortness of breath and cough. Proper use of inhaler can overcome these symptoms. Most COPD patients are still using inhaler incorrectly. Inhaler use training can improve technique of inhaler use and is expected to improve self-efficacy in COPD patients. The purpose of this study was to determine the effect of inhaler training on self-efficacy in COPD patients.

The research design used quasi experiment with nonequivalent control group pretest postest. Thirty-six patients with COPD were selected using consecutive sampling and were divided into groups that followed the inhaler training and those who did not follow the inhaler training.

The results showed that there was a significant improvement on self-efficacy in COPD patients by 9.33 score after the inhaler training (p=0.001; p<0.05) and there was a significant difference on self-efficacy change of 6 scores compared to COPD patients who did not follow the inhaler training (p=0.000; p<0.05).

There was an influence of the inhaler training on self-efficacy in COPD patients so that the inhaler training is recommended to the nurses to be given to COPD patients.

KEYWORDS
Chronic Obstructive Pulmonary Disease (COPD), self-efficacy, inhaler training.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is currently the fourth leading cause of death in the world and is projected to be the third cause of death in 2020. More than 3 million people die due to COPD in 2012 or around 6 percent of all deaths globally (GOLD, 2017). Symptoms that are often complained of are shortness of breath and coughing with or without phlegm production. Globally, the burden of COPD is projected to increase in the next few decades due to exposure to risk factors for COPD and increasing elderly population (GOLD, 2017; Han et al., 2014; Kim et al., 2015).

The prevalence of COPD in Indonesia is 3.7 percent, which tends to be more prevalent in men than women and in communities with low education. South Kalimantan ranks the ninth province in the prevalence of COPD patients, which is 6 percent (Balitbangkes Ministry of Health RI, 2013). During the year 2016 was recorded in 1387 patients with COPD undergoing pulmonary outpatient Polyclinic dr. H. Moch. Ansari Saleh Banjarmasin. New patients during 2016 were 433 COPD patients and 954 old patients with COPD patients. COPD is ranked second as the most lung disease in the Lung Polyclinic of the hospital. Based on these data, it can be concluded that the number of COPD patients in South Kalimantan is quite high.

COPD patients who lack confidence in their own ability to cope with or avoid suffocation when doing specific activity although only in the form of light activity can be said to havelow self-efficacy. Rini research results (2011) showed that as many as 60.7% of respondents COPD patients have a low self-efficacy. Low self-efficacy results in COPD patients reducing activities and involvement in daily activities (Wigal,

Creer, & Kotses, 1991). Simpson & Jones's (2013) study recommends self-efficacy as one of the indicators measured in COPD patients. Self-efficacy must be the focus of investigation because of nursing intervention (Poureslami, Kwan, Lam, Khan, & Fitzgerald, 2016). Rini, (2011) also recommends further research on nursing interventions that can improve self-efficacy of COPD patients. Thus, a nursing intervention is needed which aims to improve self-efficacy of COPD patients.

Good self-efficacy is associated with decreased dyspnea, decreased anxiety levels, and decreased levels of depression in COPD patients (Simpson & Jones, 2013). Self-efficacy of COPD patients significantly increased after being given a health education program and increasing self-efficacy remained even after one month later (Kara & Aşti, 2004). Self efficacy of COPD patients increased significantly after being given health education by nurses followed by monitoring and follow-up after health education (Wong, Wong, & Chan, 2005). One important health education for COPD patients in the use of pharmacological therapy is health education about proper use of inhaler techniques (GOLD, 2017).

The use of appropriate inhalers is still difficult for COPD patients (Ilic et al., 2016). Most COPD patients do not use the inhaler properly. The use of appropriate inhalers was only found in 38.4% of users of pMDI and 67.8% of DPI users (Ramadan & Sarkis, 2017). More than two thirds of patients make at least one mistake when using an inhaler (Souza et al, 2009; Melani et al, 2011; Sanchis, 2016 in GOLD, 2017). Incorrect technique for using inhalers is a common problem that results in improper drug distribution in the airways, decreased control of disease, and increased use of ineffective inhalers (Lenney, Innes, & Crompton, 2000).

Nurses as professional health workers have primary responsibilities in health education (Göriş, Taşci, & Elmali, 2013). Health education provided should be in the form of training and monitoring the results of training. Lee, Boo Lim, Kim, and Kim (2014) menya rankan to design effective nursing interventions to address the improper use of the inhaler according to the type of inhaler respectively. Step-by-step technique improvements using checklist sheets can be an effective strategy to improve the accuracy of inhaler use techniques. Al-kalaldeh, El-rahman, & El-ata (2016) also advocated the importance of interventions that ensure the accuracy of the use of inhalers in COPD patients. The use of appropriate inhalers by COPD patients can be attempted by providing inhaler training (Göriş et al., 2013; Ilic et al., 2016; Mac Hale, Costello, & Cowman, 2014; Ramadan & Sarkis, 2017). Therefore, it is very important for health professionals to train patients appropriately so that patients benefit optimal from using an inhaler to prevent exacerbations and worsening of symptoms (Ramadan & Sarkis, 2017).

The accuracy of the technique of using inhalers also needs to be monitored regularly by health workers (GOLD, 2017). Göriş et al. (2013) recommend that nurses must monitor the use of inhalers by patients, provide planned use of inhaler training, and repeat exercises regularly.

Inhaler training provided by nurses accompanied by monitoring of their use techniques can lead to significantly increased inhaler use, compliance, and self-confidence techniques (Mac Hale et al., 2014). Training in using inhalers through internet-based video conferencing in COPD patients' homes is also able to improve the accuracy of inhaler use techniques, quality of life, self-efficacy, and compliance with the use of inhalers (Thomas et al., 2017).

The effectiveness of training in using inhalers to increase self-efficacy of COPD patients needs to be scientifically proven. There has never been any research on inhaler training conducted in one training session using inhalers by nurses to COPD patients able to use the inhaler correctly and its effects on self-efficacy and quality of life of COPD patients a week after training in using inhalers. Therefore, it is important to conduct a study to determine the effect of nurses' use of inhalers on the self-efficacy of patients with chronic obstructive pulmonary disease (COPD).

METHOD

This research is a quantitative study with a quasi-experimental design with nonequivalent control group pretest-posttest (Polit & Beck, 2012). In this study the intervention group was given training in the use of inhalers while the control group was not given. Measurements of self-efficacy were carried out at the pretest at the first meeting with the intervention group and the control group and at the posttest for the two groups, which was conducted 1 week after the pretest.

The instrument used to collect data is the questionnaire of the respondent's characteristics, family support scale, and COPD patient self-efficacy scale adopted from The COPD Self Efficacy Scale (CSES) developed by Wigal (1991). The instrument used to practice the use of inhalers is the technical observation sheet using inhalers and four types of inhalers namely pMDI, Diskus, Turbuhaler, and Handihaler as well as leaflets using inhaler techniques.

The sampling technique in this study used consecutive sampling. Respondents in this study were 36 COPD patients who underwent outpatient treatment in November 2017 at the Lung Polyclinic of dr. H. Moch. Ansari Saleh Banjarmasin with inclusion criteria diagnosed with COPD at least 1 month before, received inhalation therapy using an inhaler, level of consciousness compos mentis, was able to communicate verbally well, and was willing to participate to become a respondent in the study.

Researchers have passed the ethical review by the Research Ethics Committee, Faculty of Nursing, University of Indonesia. The principles of research ethics that are considered and applied in this study to protect research respondents include beneficence, respect for human dignity, and justice (Polit & Beck, 2012). Data processing is done by editing, coding, processing, and cleaning. Bivariate data analysis using dependent t test and Mann-Whitney test.

RESULTS AND DISCUSSION

The difference in self-efficacy of COPD patients in the intervention group (following inhaler training) between before and after training in the use of inhalers was analyzed by adependent t test whose results are shown in table 1.

Table 1. Differences in self-efficacy of COPD patients in the intervention group between before and after inhaler training (n = 18)

Variable		Mean	*p value*
Self-efficacy	Before	79.61	0.001*
	After	88.94	

*Significant at p<0.05; α=0.05

Self-efficacy score of COPD patients who underwent inhaler training changed from 79.61 to 88.94. The increase in self efficacy rate by 9.33 showed an increase in self-efficacy of COPD patients. The results of the analysis showed that there were significant differences in self-efficacy scores between before and after the use of inhalers in the intervention

group (p = 0.001; p <0.05).

Table 2. Differences in changing self-efficacy of COPD patients between intervention group and control group (n = 36)

Variable		Median	Min-Max	*p value*
Self-efficacy changes	Intervention	6	0-36	0.000*
	Control	0	(-1)-3	

Changes on self-efficacy score of COPD patients who follow the practice of the use of inhaler was 6 scores while scores of self-efficacy COPD patients who did not follow the practice of the use of inhalers unchanged. There were differences in changes in self-efficacy scores by 6 scores. The results of the analysis showed that there were significant differences in changes in the self-efficacy score of COPD patients between groups that took training in using inhalers and groups that did not take inhaler training. (p = 0,000; p <0,05).

COPD patients who followed the use of inhalers showed an increase in self-efficacy of 9.33 scores after training in using an inhaler. The results showed that there were significant differences in self-efficacy scores between before and after training in using inhalers in COPD patients who took part in inhaler training (p = 0.001; p <0.05). In addition, changes in the self-efficacy score of COPD patients who took training in using inhalers were higher than 6 scores compared with COPD patients who did not take training in using inhalers. The results showed that there were significant differences in changes in the self-efficacy score of COPD patients between COPD patients who took training in using inhalers and COPD patients who did not participate in the use of inhalers (p = 0,000; p <0.05). This shows that there is an effect of training in using inhalers on self-efficacy of COPD patients, which can improve self-efficacy of COPD patients.

The results obtained in this study are in line with the results of Poureslami et al. (2016) which showed the results of an audiovisual educational intervention on the achievement of COPD patients' self-management abilities in the form of improved inhaler use techniques accompanied by an increase in self-efficacy of COPD patients. Structured health education proved to be able to significantly increase the score of self-efficacies as measured by CSES (Kara & Aşti, 2004).

The results of this study are also in line with the results of Thomas et al. (2017) which also showed that training in using inhalers for 35 COPD patients used the teach-to-goal method or taught until patients were able to use the inhaler correctly as much as one monthly session carried out up to three sessions through home video conferencing using the internet proved to be able to improve self-efficacy of COPD patients in the use of an inhaler of +5.5 to +7 with a scale of -7 to +7. The research was conducted to overcome the limitations of distance and time to meet face to face, but there were reported technical problems in 64% of video conference sessions in the form of software, audio, and video program problems in the inhaler training session through the video conference.

Inhaler training in this study was conducted face-to-face so that training in the use of inhalers was more effective without technical problems related to the use of hardware and software that was not familiar to COPD patients. Effective inhaler training is expected to make COPD patients able to use the inhaler with the correct technique in just one training session.

Monitoring the application of the use of inhalers after inhaler training in this study was carried out through telephone calls to COPD patients. Follow-up care through telephone calls by nurses has been shown

to improve self-efficacy of COPD patients in dyspnea management (Wong et al., 2005). Health education by nurses in the form of training in using inhalers conducted 3 times in 6 months is also able to increase confidence in the use of inhalers correctly, the effectiveness of using inhalers, and compliance in the use of inhalers (Mac Hale et al., 2014).

Self-efficacy to overcome breathing difficulties possessed by COPD patients is formed from various sources of self-efficacy. The experience of COPD patients achieving success, the experience of others, verbal persuasion, physiological and affective status, as well as the integration of information about self-efficacy from the 4 previous sources play a role as a source of formation of self-efficacy of COPD patients (Bandura, 1997). The experience of COPD patients who successfully overcome breathing difficulties when experiencing a situation or doing certain activities, have witnessed or heard from other COPD patients that breathing difficulties can be controlled with appropriate management such as the use of inhalers as recommended, verbal persuasion from health workers and those closest to remain optimistic and eager to overcome breathing difficulties, as well as physiological and psychological conditions that are felt in good condition to be a source of formation of self-efficacy for COPD patients.

The practice of using inhalers in this study is a source of formation of self-efficacy for COPD patients through experience of verbal success and persuasion (Bandura, 1997). The success of COPD patients when they can use an inhaler with the right technique when practicing the use of an inhaler becomes a personal experience of success. Experience of success is the most influential source of efficacy in self-efficacy (Bandura, 1997; Peterson & Bredow, 2004) so that it becomes the largest source of self-efficacy for COPD patients. Success or success in doing something will build strong confidence in the form of self-efficacy. Efficacy development through achievement or success in forming cognitive and self-regulation to perform effective performance (Bandura, 1997). COPD patients are involved in the practice of using inhalers, interpreting the results of training in using inhalers, using these interpretations to develop beliefs about the ability to use an inhaler independently at home, and use the inhaler correctly according to the beliefs they have (Peterson & Bredow, 2004).

Giving verbal motivation to COPD patients to maintain their ability to use inhalers by nurses as a form of verbal persuasion also acts as a source of formation of self-efficacy of COPD patients. COPD patients form and develop self-efficacy from social persuasion received from others (Peterson & Bredow, 2004). Social persuasion from others provides reinforcement for the belief of COPD patients that they can use the inhaler correctly. A person who is verbally persuaded tends to make more effort to achieve goals. Providing positive support and feedback can build one's self-efficacy (Bandura, 1997).

COPD patients who have taken training in using an inhaler and are able to use the inhaler properly are expected to apply the correct use of an inhaler while at home. Using the correct inhaler can overcome or reduce the symptoms of difficulty breathing in COPD patients (Francis, 2011; GOLD, 2017; NICE, 2010). This decrease in symptoms makes COPD patients feel physiologically and psychologically better than before using the inhaler correctly. These good physiological and psychological conditions also contribute to the formation of self-efficacy of COPD patients to be able to overcome breathing difficulties (Bandura, 1997).

Therefore, it can be concluded that there is an effect of training in the use of inhalers on self-efficacy of COPD patients that is able to improve self-efficacy of COPD patients.

CONCLUSION

The conclusion in this study is that there is an effect of inhaler training on self-efficacy of COPD patients. Inhaler training can improve self-efficacy of COPD patients. Inhaler training is recommended to the nurses to be given to COPD patients.

REFERENCES

Al-kalaldeh, M., El-rahman, M. A., & El-ata, A. (2016). Effectiveness of Nurse-Driven Inhaler Education on Inhaler Proficiency and Compliance Among Obstructive Lung Disease Patients: A Quasi-Experimental Study, *48*(2), 48–55. http://doi.org/10.1177/0844562116676119

Balitbangkes Kemenkes RI. (2013). *Riset Kesehatan Dasar 2013*. Jakarta.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: W. H. Freeman and Company.

Francis, C. (2011). *Perawatan Respirasi*. (A. Safitri, Ed., S. T. Hasianna, Trans.). Jakarta: Penerbit Erlangga.

GOLD. (2017). *Global Strategy for The Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease*. Retrieved from www.goldcopd.org

Göriş, S., Taşci, S., & Elmali, F. (2013). The effects of training on inhaler technique and quality of life in patients with COPD. *Journal of Aerosol Medicine and Pulmonary Drug Delivery*, *26*(6), 336–44. http://doi.org/10.1089/jamp.2012.1017

Han, J.-M., Jung, I.-C., Kang, W., Kim, S.-S., Yeo, Y., & Park, Y.-C. (2014). Reliability and validity of Leicester Cough Questionnaire Korean version. *Chronic Respiratory Disease*, *11*(3), 147–152. http://doi.org/10.1177/1479972314536206

Ilic, A. D., Zugic, V., Zvezdin, B., Kopitovic, I., Cekerevac, I., Cupurdija, V., … Barac, A. (2016). Influence of inhaler technique on asthma and COPD control: A multicenter experience. *International Journal of COPD*, *11*(1), 2509–2517. http://doi.org/10.2147/COPD.S114576

Kara, M., & Aşti, T. (2004). Effect of education on self-efficacy of Turkish patients with chronic obstructive pulmonary disease. *Patient Education and Counseling*, *55*(1), 114–120. http://doi.org/10.1016/j.pec.2003.08.006

Kim, V., Crapo, J., Zhao, H., Jones, P. W., Silverman, E. K., Comellas, A., … Criner, G. J. (2015). Comparison between an alternative and the classic definition of chronic bronchitis in COPDGene. *Annals of the American Thoracic Society*, *12*(3), 332–339. http://doi.org/10.1513/AnnalsATS.201411-518OC

Lee, H., Boo, S., Lim, Y., Kim, S., & Kim, I.-A. (2014). Accuracy of Inhaler Use in Patients With Chronic Obstructive Pulmonary Disease. *Clinical Nursing Research*, *23*(5), 560–574. http://doi.org/10.1177/1054773813498269

Lenney, J., Innes, J. A., & Crompton, G. K. (2000). Inappropriate inhaler use: assessment of use and patient preference of seven inhalation devices. *Respir Med*, *94*(5), 496–500. http://doi.org/10.1053/rmed.1999.0767

Mac Hale, E., Costello, R. W., & Cowman, S. (2014). A nurse-led intervention study: Promoting compliance with Diskus Inhaler use in asthma patients. *Nursing Open*, *1*(1), 42–52. http://doi.org/10.1002/nop2.10

NICE. (2010). *Chronic obstructive pulmonary disease in over 16s: diagnosis and management*. London, United Kingdom: National Institute for Health and Care Exellence. Retrieved from nice.org.uk/guidance/cg101

Peterson, S. J., & Bredow, T. S. (2004). *Middle Range Theories: Application to Nursing Research*. Philadelphia: Lippincott Williams & Wilkins.

Polit, D. F., & Beck, C. T. (2012). *Nursing Research: Generating and Assessing Evidence for Nursing Practice* (Ninth). Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Poureslami, I., Kwan, S., Lam, S., Khan, N. A., & Fitzgerald, J. M. (2016). Assessing the effect of culturally specific audiovisual educational interventions on attaining self-management skills for chronic obstructive pulmonary disease in mandarin-and cantonese-speaking patients: A randomized controlled trial. *International*

Journal of COPD, *11*(1), 1811–1822. http://doi.org/10.2147/COPD.S105408

Ramadan, W. H., & Sarkis, A. T. (2017). Patterns of use of dry powder inhalers versus pressurized metered-dose inhalers devices in adult patients with chronic obstructive pulmonary disease or asthma. *Chronic Respiratory Disease*, 147997231668720. http://doi.org/10.1177/1479972316687209

Rini, I. S. (2011). *Hubungan antara efikasi diri dengan kualitas hidup pasien penyakit paru obstruktif kronis dalam konteks asuhan keperawatan di RS Paru Batu dan RSU Dr. Saiful Anwar Malang Jawa Timur*. Universitas Indonesia.

Simpson, E., & Jones, M. C. (2013). An exploration of self-efficacy and self-management in COPD patients. *British Journal of Nursing (Mark Allen Publishing)*, *22*(19), 1105–9. http://doi.org/10.12968/bjon.2013.22.19.1105

Thomas, R. M., Locke, E. R., Woo, D. M., Nguyen, E. H. K., Press, V. G., Layouni, T. A., … Fan, V. S. (2017). Inhaler Training Delivered by Internet-Based Home Videoconferencing Improves Technique and Quality of Life. *Respiratory Care*, 1–11. http://doi.org/10.4187/respcare.05445

Wigal, J. K., Creer, T. L., & Kotses, H. (1991). The COPD self-efficacy scale. *Chest*, *99*(5), 1193–1196. http://doi.org/10.1378/chest.99.5.1193

Wong, K. W., Wong, F. K., & Chan, M. F. (2005). Effects of nurse-initiated telephone follow-up on self-efficacy among patients with chronic obstructive pulmonary disease. *J Adv Nurs*, *49*(2), 210–222. http://doi.org/10.1111/j.1365-2648.2004.03280.x