



The Effect of Buteyko Method on Oxygen Saturation Values in Covid-19 Patients

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ABSTRACT

The mortality rate can be reduced with first aid in patients who experience happy hypoxia by adjusting the breathing pattern using breathing techniques to maintain or increase oxygen saturation values. People do not fully know that there are breathing techniques that can increase oxygen saturation. This study aims to determine the effect of Buteyko's breathing on the value of oxygen saturation in Covid-19 patients. This study used a quasi-experimental type of research with pretest and posttest methods in two groups with 2 interventions, the Buteyko technique and deep breathing relaxation. Samples were taken 32 respondents at the Quarantine House. Analysis test using the Wilcoxon test obtained p-value 0.005, so there is a difference in SaO₂ between respondents who use breathing with the Buteyko technique. Buteyko has an influence on the patient's SaO₂ value. Buteyko breathing therapy is a complementary therapy or complementary therapy that cannot be done alone, however, to be able to carry out the Buteyko breathing technique intervention, nurses must be able to carry it out properly so that it is necessary to increase knowledge and skills through training or breathing seminars, especially regarding Buteyko breathing techniques.

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ABSTRAK

Angka kematian dapat diturunkan dengan pertolongan pertama pada pasien yang mengalami hipoksia bahagia dengan mengatur pola pernapasan menggunakan teknik pernapasan untuk mempertahankan atau meningkatkan nilai saturasi oksigen. Masyarakat belum sepenuhnya mengetahui bahwa ada teknik pernapasan yang dapat meningkatkan saturasi oksigen. Penelitian ini bertujuan untuk mengetahui pengaruh pernapasan Buteyko terhadap nilai saturasi oksigen pada pasien Covid-19. Penelitian ini menggunakan jenis penelitian eksperimen semu dengan metode pretest dan posttest pada dua kelompok dengan 2 intervensi yaitu teknik Buteyko dan relaksasi nafas dalam. Sampel diambil 32 responden di Rumah Karantina. Uji analisis menggunakan uji Wilcoxon diperoleh p-value 0,005, sehingga terdapat perbedaan SaO₂ antara responden yang menggunakan pernapasan dengan teknik Buteyko. Buteyko berpengaruh terhadap nilai SaO₂ pasien. Terapi pernapasan buteyko merupakan terapi komplementer atau terapi komplementer yang tidak dapat dilakukan sendiri, namun untuk dapat melakukan intervensi teknik pernapasan buteyko, perawat harus dapat melaksanakannya dengan baik sehingga diperlukan peningkatan pengetahuan dan keterampilan melalui pelatihan atau seminar pernafasan khususnya mengenai teknik pernafasan Buteyko.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an acute respiratory disease caused by droplet-borne SARS-CoV-2 which causes a global pandemic and crisis that is very challenging for health systems worldwide. (Archer et al., 2020). The first case of COVID-19 was found in Wuhan, the capital of Hubei province in China in December 2019 which then spread to various countries around the world (Acharya, Lee, Lee, Lee, & Moon, n.d.). World Health Organization (WHO) menetapkan COVID-19 sebagai pandemi pada tanggal 11 Maret 2020, dan pada 1 Mei 2020, pandemi penyakit ini telah menyebabkan 3.3 juta infeksi, lebih dari 235.000 kematian, dan kekacauan perdagangan global (Tannor, Archer, Kapembwa, Schalkwyk, & Davids, 2017). In Indonesia, the first confirmed positive COVID-19 patient was found on March 2, 2020, and since then the disease has spread to various provinces in Indonesia. The National Disaster Management Agency (BNPB) on October 8, 2020 at 12:00 WIB stated that the confirmed cases of COVID-19 were 320,564, recovered 244,060, died 11,580 people.

Happy hypoxia is a condition where there is severe arterial hypoxemia in the patient but there are no complaints of shortness of breath or signs of proportional respiratory distress. Cases of happy hypoxia in COVID-19 were first reported in April 2020, and subsequently this phenomenon became more and more found in patients with confirmed COVID-19, where patients came to the hospital with mild symptoms, but experienced a rapid and rapid worsening of the condition. ends with death (Pratiwi & Chanif, 2021).

This phenomenon is known as "happy hypoxia" where a more appropriate term used is "silent hypoxemia" (the use of the term happy hypoxia only developed during the COVID-19 pandemic, namely in May 2020) referring to a state of hypoxemia without shortness of breath. (Shianata, Engka, & Pangemanan, 2021). This contrasting clinical picture is a challenge for the decision to refer patients to intensive care units in hospitals (Dhont, Derom, Braeckel, Depuydt, & Lambrecht, 2020). Science assesses this phenomenon which later became known as "happy hypoxia" against basic biological principles (Sun, Lu, Xu, Sun, & Pan, 2020). These reasons make happy hypoxia worthy to be investigated in more detail, related pathophysiology is studied and even studied in a paper, so that the existing hypotheses can be examined for truth, and so that medical personnel can take anticipatory action and be more prompt in determining whether or not to immediately refer patients with happy hypoxia to intensive care facilities so that it can reduce the death rate.

The mortality rate can be reduced if there are early steps to provide first aid to patients who experience happy hypoxia. This step can be by adjusting the breathing pattern using the Buteyko breathing technique or using deep breathing relaxation techniques to maintain or increase the oxygen saturation value. The general public does not fully know that there are breathing techniques that can increase oxygen saturation, so that the output of this research will be compiled as a pocket book as a guide for people to carry out the Buteyko breathing technique. Until now, research on the effect of Buteyko's breathing on oxygen saturation values is still limited in Indonesia. Based on this, the authors are interested in conducting a study entitled "The Effect of the Buteyko Method on Oxygen Saturation Values in Covid-19 Patients".

METHOD

The quantitative research design used in this study was a quasi-experimental with pretest and posttest methods in two groups (two-group pretest-posttest design) which was a study that manipulated independent variables with two interventions. In this study, respondents were given a pretest, oxygen saturation was checked using pulse oximetry before treatment, then after treatment, the respondent (Posttest) was reassessed the oxygen saturation to see the difference in oxygen saturation values between the two interventions that had been given. The treatments given to the respondents were Buteyko breathing exercises and deep breathing relaxation techniques. The researcher provided a breathing intervention with the Buteyko technique on the first day by providing education to the respondents beforehand. After the respondent was able to perform well, the researcher measured the oxygen saturation of each respondent and motivated the respondent to maintain breathing with the Buteyko technique 5 times for half an hour, after which the oxygen saturation value was re-evaluated. The same thing is done with deep breathing techniques, on the next day.

The design of this study used two groups with research interventions in the form of Buteyko breathing exercises and deep breathing relaxation techniques which aimed to see the difference in oxygen saturation values that occurred between before and after the intervention in the two intervention groups. The population in this study were patients who were confirmed positive. It is known that the number of quarantine patients at the Baturaden Education and Training Center is 62 patients. The sample in this study were some students who were confirmed to have COVID-19. In this study, the sampling used was by using total sampling by doing a lottery. The total population is known as 62 patients, so that the entire population is used as a sample of 62 students. The instrument used in this research is a pulse oximetry device.

RESULTS AND DISCUSSION

The results of the bivariate analysis of the Buteyko technique using the Wilcoxon test p-value 0.005, so there is a difference in SaO₂ between respondents who use breathing with the Buteyko technique. Here is the table presentation:

Table 1
Mean and SD of Intervention and Control Group

Group	Mean	SD	<i>p</i> -value
Buteyko Method Pretest	2,66	0,49	0,005
Buteyko Method Posttest	3,03	0,54	
Deep Breathing Relaxation Pretest	3,00	0,51	0,739
Deep Breathing Relaxation Posttest	2,97	0,18	

Based on table 1, in the breathing group with the Buteyko technique there was an increase in the mean value with a difference of 0.37 with a p-value of 0.005, indicating that there was an effect of Buteyko's breathing on the oxygen saturation value. While in the deep breathing relaxation technique, there is a decrease in the mean with a difference of 0.03 with a p-value of 0.739, so that there is no effect of deep breathing relaxation on the oxygen saturation value.

The results of this study show that the Covid 19 patient who breathing technique intervention Buteyko twice per day for 1 week on the first day showed a significant difference in the mean pulmonary oxygenation function before and after the Buteyko breathing technique intervention ($p= 0.000, = 0.05$). Thus, it can be concluded that there is an effect of Buteyko's breathing technique intervention on oxygen saturation values in Covid 19 patients.

If a person with Covid is accompanied by comorbidities such as asthma if they do deep breathing, the amount of CO₂ released will increase. This can cause the amount of CO₂ in the lungs, blood and tissues will reduce. The occurrence of CO₂ deficiency caused by deep breathing can cause blood pH to be alkaline. Changes in pH can be disturbing balance of proteins, vitamins and processes metabolism. When the pH reaches a value of 8, then this can cause fatal metabolic disorder. Happening CO₂ deficiency causes spasm of the bronchial smooth muscle, spasm of the brain, blood vessels, intestinal spastic, ducts bile and other organs. When the patient Asthma breathes deeply, the less oxygen reaches the lungs brain, heart, kidney and other organs which results in hypoxia with with arterial hypertension (Mohamed, Riad, & Ahmed, 2013). CO₂ deficiency in vital organs (brain) and nerve cells increases stimulation of the center control of breathing in the brain stimulate the breath, and further improve breathing so that the process of breathing is more intensive which is then known as hyperventilation. Over breathing can cause an imbalance of CO₂ levels in the body (lungs and circulation) so this will change the level of O₂ in the blood and reduce the amount of O₂ mobile. Body's acid base balance also influenced by breathing patterns and concentration of O₂/CO₂. At the time of attack over breathing can cause stress on body (Mohamed et al., 2013).

The Buteyko breathing technique is a method of asthma management that aims to reduce airway constriction with the principle of shallow breathing exercises. The Buteyko breathing technique aims to improve the breathing pattern of asthmatics by maintaining a balance of CO₂ levels and oxygenation values. seluler (Mohamed et al., 2013). Breathing through the nose will reduce hyperventilation (breathing deeply) so the best way to save CO₂ that comes out is to relax the respiratory muscles so that the air insufficiency that occurs during an asthma attack can be reduced (Pratiwi & Chanif, 2021).

In fact, by doing Buteyko breathing technique exercises on decrease SaO₂ patients have a positive impact to improve ventilation function pulmonary oxygenation, so that intervention Buteyko breathing technique is a very useful action for improve lung function. This intervention can be done by nurses real and independent by prioritizing professional nursing service (Letko, Marzi, & Munster, 2020).

The results of this study are in line with research conducted by Swi Swasti Pratiwi, that after being given Buteyko breathing therapy there was a change in respiratory frequency and oxygen saturation in the three patients. This is possible because before receiving Buteyko breathing therapy, the three patients had received oxygen therapy and bronchodilator therapy. Factors of age, education, and the length of time the patient has a history of asthma can also affect the patient's response.

Breathing exercises cause the lungs to receive more oxygen, the amount of oxygen entering the lungs affects the work of the body or tissues, so that it can affect the value of oxygen saturation. Buteyko breathing exercise combines deep breathing techniques and breathing control, Deep breathing is breathing with slow and deep breathing techniques, using breathing muscles, allowing the abdomen

to slowly lift and the chest to expand fully, thereby increasing the amount of air that enters the lungs. become more (Sukartini, Muna, & Wahyudi, 2020).

So the deep breathing technique breathing exercises support the Buteyko breathing technique in increasing the oxygen saturation value after exercising on the patient. When the Buteyko exercise is performed, the alveoli stretch. This stretch of the alveolus will stimulate the release of surfactant which is secreted by type II alveolus cells which causes the surface tension of the alveolus to be lowered. (Sukartini et al., 2020).

This opinion has the same goal as the Buteyko technique of breathing exercises to reduce the hyperventilation state that usually occurs in asthmatic patients. Deep breathing exercises will also result in increased beta-adrenergic activity of the respiratory tract which causes bronchial dilatation and inhibits mucus secretion, so that the lungs can enter and expel air better. The occurrence of dilatation in the bronchi and the entry of large amounts of oxygen will bind to hemoglobin as oxyhemoglobin (HbSO₂).

Buteyko pernapasan breathing technique can add and complete maintenance procedures especially nursing modality therapy existing in the context of care intensive. Monitoring must be done continuously to anticipate changes in ventilation function oxygenation inadequate so that emergency action is needed to overcome it. The most common cause of inadequate oxygenation ventilation function is airway obstruction and several underlying disease factors (M, Krueger, Ma, Drost, & The, 2019). The Buteyko breathing technique as a therapeutic option for nursing modalities in respiratory management is the latest study to be better applied to nursing services. In the end, it provides a real and independent role for the nursing profession.

CONCLUSIONS AND SUGGESTIONS

Based on the research results can concluded that there is an influence means between SaO₂ before and after intervention of breathing technique Buteyko in the intervention group. Breathing technique intervention Buteyko can be used as one independent nursing intervention on asthmatic patients with functional impairment pulmonary oxygenation ventilation.

However, to be able to carry out the Buteyko breathing technique intervention, the implementing nurse must be able to carry it out properly so that it is necessary to increase knowledge and skills through training or breathing seminars, especially regarding Buteyko breathing techniques. For nursing service managers, the Buteyko breathing technique intervention can be used as a standard operating procedure in nursing care for patients who have problems with SaO₂.

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