RINGKASAN

Pengaruh Kombinasi Teknik Pernapasan Buteyko Dan Latihan Berjalan Terhadap Arus Puncak Ekspirasi Paksa Dan Kontrol Asma Pada Pasien Asma Dewasa

Oleh: Wiwik Udayani

Tujuan penatalaksanaan asma jangka panjang adalah mencapai asma tekontrol. Kontrol asma yang buruk dan eksaserbasi asma akan menimbulkan *airway remodeling* dan penurunan faal paru (Reddel *et al.*, 2009). Pasien asma yang tidak melakukan latihan napas secara teratur dapat memperberat gejala sesak napas yang muncul saat serangan karena pasien tersebut tidak mengetahui teknik pernapasan yang benar. Hal ini dapat menimbulkan ketidakseimbangan ventilasi-perfusi pada paru. Penatalaksanaan nonfarmakologis dapat dilakukan melalui aktivitas fisik dan latihan napas (GINA, 2018). Tujuan penelitian ini adalah untuk menganalisis pengaruh kombinasi teknik pernapasan Buteyko dan latihan berjalan terhadap Arus Puncak Ekspirasi Paksan dan kontrol asma.

Latihan fisik yang melengkapi latihan napas dalam rehabilitasi paru dapat meningkatkan faal paru dan kontrol asma (Juhariyah dkk., 2012). Latihan napas yang direkomendasikan untuk asma adalah teknik pernapasan *Buteyko* (Godfrey, 2010). Latihan fisik berupa berjalan dapat meningkatkan faal paru dan kontrol asma dengan mengurangi reaksi hiperesponsivitas dan meningkatkan daya tahan kardiorespirasi (Pakhale *et al.*, 2013). Kombinasi teknik pernapasan Buteyko dan latihan berjalan merupakan gabungan antara latihan napas dan latihan fisik yang dapat meningkatkan Arus Puncak Ekspirasi Paksa dan kontrol asma.

Teori keperawatan model *"Self care*" oleh Orem dapat dijadikan sebagai landasan dalam melakukan asuhan keperawatan pada pasien asma. Dalam teori keperawatan *self care*, pasien asma merupakan agen perawatan diri. Saat proses inflamasi, pasien asma tidak mampu melakukan perawatan mandiri dalam melakukan aktivitas harian dan pemenuhan kebutuhan dasar atau *self care deficit*. Beberapa kondisi tersebut menyebabkan permintaan perawatan diri. Kondisi ini membutuhkan penatalaksanaan non farmakologis untuk menunjang terapi farmakologis.

Jenis penelitian ini adalah *quasi experimental* dengan *pretest – postest control group design.* Nilai APEP dan kontrol asma diukur 3x yaitu pre test dan post test 2x yaitu minggu ke 4 dan minggu ke 8. Kelompok perlakuan diberikan intervensi kombinasi teknik pernapasan Buteyko dan latihan berjalan selama 8 minggu yang dilakukan secara mandiri di rumah. Latihan meliputi teknik pernapasan Buteyko dilakukan selama 15 menit, latihan berjalan selama 40 menit sehingga total latihan 55 menit. Latihan dilakukan 3x/minggu selama 8 minggu. Kelompok perlakuan dilakukan di Klinik Paru Rumah Sakit Umum Daerah Kabupaten Sidoarjo. Kelompok kontrol tidak diperkenankan melakukan latihan napas dan atau latihan fisik lainnya. Kelompok kontrol dilakukan di Klinik Paru Rumah Sakit Umum Daerah Bangil Kabupaten Pasuruan. Sampel dalam penelitian ini diambil dengan *simple random sampling*. Besar sampel dalam penelitian ini

adalah 38 responden untuk kelompok perlakuan dan 38 responden untuk kelompok kontrol. Pengukuran Arus Puncak Ekspirasi Paksa menggunakan *peak flow meter*. Pengukuran kontrol asma menggunakan *Asthma Control Test* (ACT). Uji Statistik menggunakan GLM-RM (*General Linear Model-Repeated Measure)* ANOVA *within subject* untuk mengetahui perbedaan nilai Puncak Ekspirasi Paksa dan kontrol asma dalam tiap kelompok. Uji GLM-RM *between subject* digunakan untuk perbedaan nilai Puncak Ekspirasi Paksa dan nilai kontrol asma antar kelompok.

Hasil uji GLM-RM (*General Linear Model-Repeated Measure*) ANOVA *within subject*, pada kelompok perlakuan ada perbedaan nilai APEP sebelum dan sesudah 4 minggu intervensi, 8 minggu intervensi, antara minggu ke 4 dan minggu ke 8 intervensi (p = 0.000). Dan pada kelompok kontrol tidak ada perbedaan nilai APEP sebelum dan 4 minggu evaluasi (p=0.337), 8 minggu evaluasi (p=0.590), antara minggu ke 4 dan minggu ke 8 evaluasi (p = 0.864). Pada kelompok perlakuan ada perbedaan nilai kontrol asma sebelum sebelum dan sesudah 4 minggu intervensi, 8 minggu intervensi, antara minggu ke 4 dan minggu ke 8 intervensi (p = 0.000. Dan pada kelompok kontrol tidak ada perbedaan nilai kontrol asma sebelum dan 4 minggu evaluasi (p=0.899), 8 minggu evaluasi (p=1.000), antara minggu ke 4 dan minggu ke 8 evaluasi (p = 1.000).). Hasil uji GLM-RM (*General Linear Model-Repeated Measure*) ANOVA *between subject* menunjukkan ada perbedaan rerata nilai APEP antara kelompok perlakuan dan kontrol pada pengukuran minggu ke 8 (0.001). Dan ada perbedaan rerata nilai kontrol asma antara kelompok perlakuan dan kontrol pada pengukuran minggu ke 4 (0.002) dan minggu ke 8 (0.000).

Hiperventilasi yang terjadi pada asma dapat mengurangi kadar CO_2 dalam darah (Ritz *et al.*, 2008)(Prem, Sahoo and Adhikari, 2013). Penelitian yang dilakukan (Grover and Afle, 2014) bahwa teknik pernapasan Buteyko dapat meningkatkan Arus Puncak Ekspirasi Paksa melalui mekanisme *control pause* yang dapat meningkatkan konsentrasi CO_2 yang akan mengatur kembali pernapasan melalui pusat pernapasan di medulla (Courtney, 2013), pernapasan hidung yang menghasilkan *nitric oxide* (NO) yang berefek bronkodilatasi, mengurangi volume pernapasan dengan menggunakan kombinasi peningkatan otot abdominal dan relaksasi otot asesoris pernapasan, napas panjang dapat mengembalikan pertukaran gas karbondioksida, vasodilatasi serebral sebagai hasil dari penurunan oksigen dan peningkatan CO_2 (Grover & Afle, 2014). Asma merupakan penyakit inflamasi kronis pada saluran napas yang ditandai dengan obstruksi saluran napas dan hiperesponsifitas bronkial (GINA, 2018). Latihan yang dapat mengurangi hiperesponsif saluran napas dan inflamasi sistemik dengan pengurangan nilai IL-6 dan *monocyte chemoattractan protein 1 (CMP-1)* adalah aerobik (França-Pinto *et al.*, 2015).

Kombinasi teknik pernapasan Buteyko dan latihan berjalan dapat meningkatkan Arus Puncak Ekspirasi Paksa (APEP) dan kontrol asma. Pasien asma dapat menjadikan latihan kombinasi teknik pernapasan Buteyko dan latihan berjalan sebagai penunjang terapi farmakologis untuk meningkatkan arus puncak ekspirasi paksa dan kontrol asma.

SUMMARY

The Effects Of Combination Of Buteyko Breathing Technique And Walking Exercise On Forced Peak Expiratory Flow And Asthma Control In Adult Asthma Patients

By: Wiwik Udayani

The goal of long-term management of asthma is to achieve asthma control. Poor control of asthma and exacerbation of asthma will lead to airway remodeling and decreased lung function (Reddel et al., 2009). Asthma patients who do not do breathing training regularly can aggravate the symptoms of shortness of breath that arise during an attack because these patients do not know the correct breathing technique. This can cause ventilation-perfusion imbalance in the lungs. Breathing training and physical activity or exercise that is not carried out by asthmatic patients have an impact on the weakness of the respiratory muscles so that there is a decrease in lung function, in addition to respiratory disorders and symptoms of shortness of breath will increase and tolerance to activity decreases. Non-pharmacological management can be done through physical activity and breathing training (GINA, 2018). The aim of this study was to analyze the effect of a combination of Buteyko breathing technique and walking exercise on the Forced Peak Expiratory Flow and asthma control.

Physical exercise that completes breathing exercises in pulmonary rehabilitation can improve pulmonary function and asthma control (Juhariyah et al., 2012). The recommended breathing training for asthma is Buteyko breathing technique (Godfrey, 2010). Walking exercises can improve lung function and control asthma by reducing hypersensitivity reactions and increasing cardiorespiratory endurance (Pakhale et al., 2013). The combination of Buteyko breathing techniques and walking exercises is a combination of breathing trainig and physical exercise that can increase the Forced Peak Expiratory Flow (FPEF) and asthma control.

Nursing theory model "Self care" by Orem can be used as a basic in carrying out nursing care in asthma patients. In the theory of nursing self care, asthma patients as self-care agents. During the inflammatory process, asthma patients are unable to carry out self-care in carrying out daily activities and meeting basic needs or self care deficits. Some of these conditions lead to requests for self-care. This condition required non-pharmacological management to support pharmacological therapy.

The design of research was quasi-experimental with pretest-posttest control group design. FPEF rate were measure in the pre-test and post-test 2x, on 4^{th} week and 8^{th} week. The treatment group was given a combination of Buteyko breathing techniques and walking exercises for 8 weeks conducted independently at home. The exercises which included Buteyko breathing technique were carried out for 15 minutes, the walking exercise for 40 minutes so that the total exercise was 55 minutes. Exercise was done 3 times a week for 8 weeks. The treatment group was conducted at the pulmonary Clinic in the Regional General Hospital of Sidoarjo

Regency. The control group was not permitted to do breathing exercises and or other physical exercises. The control group was conducted at the Pulmonary Clinic in the Bangil Regional General Hospital in Pasuruan Regency. The sample technique used probability sampling with simple random sampling. The sample size in this study was 38 respondents for the treatment group and 38 respondents for the control group. Measurement of FPEF used a peak flow meter. Measurement of asthma control used Asthma Control Test (ACT). Statistical tests using the GLM-RM (General Linear Model-Repeated Measure) ANOVA within subjects to determine the difference in Forced Peak Expiratory Flow rate and asthma control in each group. GLM-RM ANOVA Test between subjects was used for differences difference in Forced Peak Expiratory Flow rate and asthma control between groups

The result of GLM-RM ANOVA within subject test showed, in the treatment group there were differences in FPEF rate before and after 4 weeks of intervention, 8 weeks of intervention, between 4^{th} week and 8^{th} week of intervention ($p = 0.000$). And in the control group there were no differences in the FPEF rate before and 4 weeks of evaluation ($p = 0.337$), 8 weeks of evaluation ($p = 0.590$), between the 4^{th} week and the 8^{th} week of evaluation ($p = 0.864$). In the treatment group there were differences in the value of asthma control before and after 4 weeks of intervention, 8 weeks of intervention, between week 4 and week 8 of intervention ($p = 0.000$). And in the control group there were no differences in the asthma control values before and 4 weeks of evaluation $p = 0.899$), 8 weeks evaluation ($p = 1.000$), between week 4 and week 8 evaluation ($p = 1.000$).). The GLM-RM ANOVA between subject test results showed that there was differences in the mean FPEF rate between the treatment and control groups at the 8^{th} week measurement (0.001). And there were a difference in mean asthma control values between the treatment and control groups at the 4^{th} week ($p=0.002$) and 8^{th} week measurement ($p=0.000$).

Hyperventilation that occurs in asthma can reduce levels of CO_2 in the blood (Ritz et al., 2008; Prem, Sahoo and Adhikari, 2013). The research was conducted (Grover and Afle, 2014) that Buteyko breathing technique can increase Forced Peak Expiratory Flow rate through a control pause mechanism that can increase CO_2 concentration which will regulate breathing through the respiratory center in the medulla (Courtney, 2013) nose breathing produces nitric oxide (NO) which has bronchodilating effects, reduces breathing volume by using a combination of increased abdominal muscle and relaxation of respiratory accessory muscles, long breath can restore the exchange of carbon dioxide gas, cerebral vasodilation as a result of decreased oxygen and increased CO_2 (Grover & Afle, 2014). Asthma is a chronic inflammatory disease of the airways characterized by airway obstruction and bronchial hypersensitivity (GINA, 2018). Exercises that can reduce airway hyperresponse and systemic inflammation with a reduction in the value of IL-6 and monocyte chemoattractan protein 1 (CMP-1) are aerobic (França-Pinto et al., 2015).

The combination of Buteyko breathing techniques and walking exercises increase Forced Peak Expiratory Flow and asthma control. Asthma patients can apply the combination of Buteyko breathing technique and walking exercises for supporting pharmacological therapy to increase FPEF and asthma control.

ABSTRAK

Pengaruh Kombinasi Teknik Pernapasan Buteyko Dan Latihan Berjalan Terhadap Arus Puncak Ekspirasi Paksa Dan Kontrol Asma Pada Pasien Asma Dewasa

Oleh: Wiwik Udayani

Latar belakang: Kontrol asma diperlukan untuk meminimalkan risiko eksaserbasi dan penurunan faal paru. Latihan yang dapat meningkatkan faal paru dan kontrol asma adalah kombinasi teknik pernapasan Buteyko dan latihan berjalan. Tujuan penelitian ini adalah menganalisis pengaruh kombinasi teknik pernapasan Buteyko dan latihan berjalan terhadap Arus Puncak Ekspirasi Paksa dan kontrol asma. **Metode:** Desain penelitian ini adalah *quasi experimental* dengan *pretest-postest control group design*. Sampel diambil dengan teknik *simple random sampling.* Responden dalam penelitian ini berjumlah 76 responden. Data Arus Puncak Ekspirasi Paksa diukur dengan menggunakan *peak flow meter*. Kontrol asma diukur menggunakan kuesioner *Asthma Control Test* (ACT). Pengukuran APEP dan kontrol asma dilakukan 3 kali (pre test, minggu ke 4, minggu ke 8). Data dianalisis menggunakan GLM-RM (*General Linear Model-Repeated Measure*) ANOVA. **Hasil dan analisis:** Hasil uji GLM-RM ANOVA *within subject*, pada kelompok perlakuan ada perbedaan nilai APEP dan kontrol asma sebelum dan sesudah 4 minggu intervensi, 8 minggu intervensi, antara minggu ke 4 dan minggu ke 8 intervensi ($p = 0.000$). Hasil uji GLM-RM ANOVA *between subject* menunjukkan ada perbedaan rerata nilai APEP dan kontrol asma antar kelompok ($p=0.000$). **Diskusi dan kesimpulan:** Kombinasi teknik pernapasan Buteyko dan latihan berjalan meningkatkan APEP dan kontrol asma melalui peningkatan CO2 dan produksi *nitric oxide* yang berefek bronkodilatasi serta peningkatan *endurance*. Latihan ini dapat dijadikan sebagai alternatif pilihan dalam menunjang terapi farmakologis asma.

Kata kunci: Asma, Buteyko, latihan berjalan

ABSTRACT

The Effects Of Combination Of Buteyko Breathing Technique And Walking Exercise On Forced Peak Expiratory Flow And Asthma Control In Adult Asthmatic Patients

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Background: Asthma control is needed to minimize the risk of exacerbations and decrease pulmonary function. Exercises that can pulmonary function and asthma control is a combination of Buteyko breathing techniques and walking exercises. The objective of this study was to analyse the effect of the combination of Buteyko breathing techniques and walking exercises on FPEF and asthma control. **Methods:** The design of this study was quasi experimental with pretest-posttest control group design. Respondents were selected by simple random sampling. Respondents in this study amounted to 76 respondents. FPEF data was measured using a peak flow meter. Asthma control data was measure using Asthma Control Test (ACT) questionaire. FPEF and asthma control measurements were carried out 3 times (pre test, week 4, week 8). Data were analyzed using GLM-RM (General Linear Model-Repeated Measure) ANOVA. **Results and analysis:** The results of GLM-RM ANOVA within subject test showed a significant difference in the FPEF rate and asthma control before and after 4 weeks of intervention, 8 weeks of intervention, between week 4 and week 8 of intervention ($p = 0.000$) in the intervension group. The results of the GLM-RM ANOVA between subject test showed that there were differences in the mean FPEF rate and asthma control between intervension group and control groups (0.000). **Conclusion and discussion:** The combination of Buteyko breathing techniques and exercise increase FPEF rate and asthma control through the mechanism of increasing CO_2 and producing nitric oxide which has bronchodilation effects and increasing endurance. This exercise can be used as an alternative choice in supporting asthma pharmacological.

Keywords: Asthma, Buteyko, walking exercise