

Influence of selected components of Buteyko breathing exercise on the quality of life (QOL) of male patients with bronchial asthma

Jibril Mohammed^{1,2}, Farida Garba Sumaila¹, Fatima Ibrahim Hamza¹

¹Department of Physiotherapy, Bayero University Kano, Kano, Nigeria

²Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Gent, Belgium

Email address

Jibril.mohammed@ugent.be (J. Mohammed)

To cite this article

Jibril Mohammed, Farida Garba Sumaila, Fatima Ibrahim Hamza. Influence of Selected Components of Buteyko Breathing Exercise on the Quality of Life (QOL) of Male Patients with Bronchial Asthma. *International Journal of Nursing and Health Science*. Vol. 1, No. 5, 2014, pp. 30-33.

Abstract

The treatment of asthma with complementary medicine has been reported to have a significant positive effect on several health indicators and also reduce asthma exacerbation. The purpose of this study was to determine the influence of selected components of Buteyko breathing exercise on the health related quality of life (HRQOL) of patients with bronchial asthma. Twenty eight male patients with bronchial asthma were recruited to participate in this study from a population of patients attending the respiratory clinic of Aminu Kano Teaching Hospital, Kano, Nigeria. The patients were randomly assigned into experimental group (EG) and control group (CG). The EG participants underwent a 4-week physiotherapist supervised nasal breathing and control pause techniques in addition to their routine medications. The CG participants only took their routine medications. Mini asthma quality of life questionnaire (AQLQ) was used to assess their HRQOL pre and post treatment. The data obtained was analyzed using descriptive and inferential statistics. The results of the study reveal that the mean age of the participants were 40 ± 7.1 years and 43.6 ± 7.6 years in the EG and CG respectively ($p > 0.05$). The weight (EG: 52.4 ± 6.95 ; CG: 55.2 ± 4.5) and height (EG: 1.64 ± 0.4 ; CG: 1.59 ± 0.9) of the participants were also comparable ($p > 0.05$). Both groups had a comparable pre intervention HRQOL score ($p = 0.193$). However, in the post intervention period, the EG showed a better and significantly higher HRQOL score (60 ± 7.4) compared to the CG (34 ± 9) participants score ($p = 0.001$). It was concluded that the two (nasal breathing and control pause breathing) Buteyko breathing techniques improved the HRQOL of male patients with bronchial asthma.

Keywords

Buteyko, Quality of Life, Bronchial Asthma, Outcome, Nigeria

1. Introduction

Asthma is a one of the most common chronic inflammatory disease affecting millions people in the world, including both children and adults alike^{1,2,3}. The prevalence of asthma has increased markedly in the last century and it imposes a high disease burden on individuals, healthcare systems and society^{3,4,5}. Asthma is a major contributor to high disease morbidity and mortality, and it is also a significant cause of psychological, physical and social problems, thereby causing a negative impact on the overall

well-being of affected persons^{6,7}.

People with asthma experience sleep disturbances, anxiety, depression, breathing problems and fatigue^{8,9}. These indices are directly related to the health related quality of life (HRQOL) of asthma patients.

The HRQOL generally refers to those components of life that is determined primarily by health status of a patient. It is also defined as the functional effect of a medical condition and/or its consequent therapy upon a patient. HRQOL is subjective and multidimensional, encompassing physical and occupational function, psychological state, social interaction

and somatic sensation¹⁰. Due to the importance of HRQOL assessment in the management of several chronic diseases, Mancuso *et al* (2008)¹¹ opined that HRQOL concerns should be a routine part of outcome assessment for asthma patients.

Although, asthma generally cannot be cured, but with efficacious medication most asthma patients are reported to enjoy disease control¹². The pharmacotherapy for bronchial asthma is also effective and can provide control for many patients. However, past surveys have indicated that bronchial asthma outcomes in most patients have repeatedly remained sub-optimal¹³. Subsequently, this has led to a growing interest and use of complementary treatment in the control of asthma health indicators.

Breathing exercises and breathing techniques are among the most popular complementary medicine modalities currently being administered for patients with asthma^{12,14}. A variety of breathing and relaxation techniques such as yoga, diaphragmatic breathing, progressive muscle relaxation and breathing exercises based upon the hypoventilation principle have been advocated for the control of asthma¹⁵. Since most of these exercises are designed to reduce minute volume loads, it induces hypoventilation which counteracts the hyperventilation of the lungs present in asthma which is partly responsible for alveolar and airway constriction.

The Buteyko breathing (BB) is a form of complementary physical therapy that is based on the principle of hypoventilation. Several past studies have also acknowledged the efficacy of BB techniques in the control of asthma in both adults and children^{15, 16, 17, 18}. Unfortunately, many physiotherapists across the world hardly administer the BB technique mainly because it requires a special training which is currently scarce in most parts of the world³. However, since BB technique have different specific components such as nasal breathing and control pause that can be independently administered. We set out to investigate the effect of two components of BB. This study therefore, was designed to investigate the influence of nasal breathing and control pause technique on the HRQOL of male patients with asthma.

2. Methodology

The population of this study are all adult (> 18 years) male patients clinically diagnosed with bronchial asthma attending the respiratory medicine clinic of Aminu Kano Teaching Hospital (AKTH), Kano, Nigeria. Prior to the commencement of the study, ethical approval to was sought and obtained from the ethical committee of AKTH. Thereafter, the participants were recruited purposively based on the following criteria; nil chest deformity, nil co-morbidities like diabetes and hypertension, have not had asthma exacerbation in the past 1 month, no recent hospitalization and no history of major surgery.

In the end a sample of 28 adult male patients who fulfilled the selection criteria were recruited. Thereafter, they were randomly assigned to experimental group (EG) and control group (CG) with 14 participants in each group using

balloting technique. All the participants also gave a written consent prior to the commencement of the study procedure.

The weight and height of all participants were measured and recorded using standard procedures and their HRQOL was assessed using mini asthma quality of life questionnaire (AQLQ) prior to and after the intervention period for both experimental and control participants. The participants in the EG underwent 4 weeks of therapist supervised nasal breathing exercise and control pause techniques which was done for 12 sessions at 3 times weekly. All participants in both groups were allowed to continue to take their routine asthma medications during the course of the study.

2.1. Experimental Group (Intervention)

The patients in the EG received the selected breathing exercise techniques in the Hospital. The two breathing techniques were carried out in high sitting on a stool. Each participant was then asked to gently breathe in and out through their nostrils (nasal breathing) for 3 consecutive breathes while keeping their mouths closed. Thereafter, they were asked to hold their breath as long as possible (control pause technique). This process of nasal breathing and control pause was then repeated for a 2nd round, this time with the nasal breathing done for 5 minutes followed by another control pause. After mastering the steps, each participant was then instructed to continuously perform the two techniques a pace that was comfortable for them. One physiotherapist (F.H) was designated to continuously monitor the patients to ensure compliance. All the participants performed several repetitions of both techniques at every session. And each session lasted for about 40-60 minutes. The EG participants were also instructed to carry out the breathing techniques at home as a form of home programme on the days they didn't have to come to the hospital for therapist supervision

2.2. Questionnaire Description

The questionnaire that was used in this study for assessing HRQOL was the mini AQLQ. Its test- retest reliability has been earlier reported to be good¹⁹. The questionnaire comprised of 15 questions spread across 4 domains (symptoms, emotional function, environmental stimuli and activity limitation). The scoring of each question in three domains (symptoms, emotional function and environmental stimuli) were based on a 7-point scale as thus; 6=none of the time, 5=hardly any of the time, 4=a little of the time, 3=some of the time, 2=a good bit of the time, 1=most of the time, 0=all of the time. While for the questions in the activity limitation domain, a 6-point likert scale was used; 6=not at all limited, 5=a little limitation, 4=some limitation, 3=moderate limitation, 2=very limited, 1=extremely limited, 0=totally limited). The overall possible score across all the domains was 90 points while the minimum score possible was 0. Generally, a score range of 0-29 points was classified as poor HRQOL, 30-59 points as moderate HRQOL and a score above 60 points was classified as a good HRQOL.

The data obtained was analyzed using descriptive statistics

of mean and standard deviation and inferential statistics of paired samples t-test was utilized to compare the pre and post treatment HRQOL scores. Independent samples t-test was used to assess the group differences between the EG and CG. All statistical analysis was performed on a microcomputer using statistical package for social sciences (SPSS) version 16.0 with alpha probability level of 0.05 indicated level of significance.

3. Results

The results of the study revealed that the mean age of the EG and CG participants were 40.0 ± 7.09 years and 43.6 ± 7.6 years respectively. The results also showed that both the EG and CG participants presented with similar baseline characteristics for weight EG: 52.4 ± 6.95 ; CG: 55.2 ± 4.5 and height (EG: 1.64 ± 0.4 ; CG: 1.59 ± 0.9) as depicted in Table 1. The pre intervention HRQOL score of both groups were also comparable (EG: 41.9 ± 9.4 & CG: 43.2 ± 8.8 ; $p > 0.05$). The table also shows the results of the post intervention HRQOL mean scores comparisons. The experimental groups mean score was (60 ± 7.4) which was significantly higher ($p = 0.001$) and also in the good HRQOL category when compared to that of the control (44 ± 9) which remained in the moderate HRQOL category.

Table 1. Baseline data and QOL scores for the two groups

Variables	experimental(14)	control(14)	t	p
Age	40.0 ± 7.09 yr	43.6 ± 7.6 yr	1.879	0.51
Weight	52.4 ± 6.95	55.2 ± 4.5	2.002	0.187
Height	1.64 ± 0.4	1.59 ± 0.9	4.685	0.204
PreHRQOL	41.9 ± 9.4	43.2 ± 8.8	1.891	0.193
PostHRQOL	60.00 ± 7.394	44.43 ± 8.9	5.817	0.001*

p = * significant at 0.05 alpha level, M \pm SD= mean and standard deviation, yr= years, PreHRQOL= Pre intervention health related quality of life; PostHRQOL= Post intervention health related quality of life

4. Discussion

This study was conducted to determine the efficacy of nasal breathing and control pause techniques on the quality of life of asthma patients. The demographic variables of age, height and weight were assessed for all the patients which the results showed was comparable between the two groups. This is mainly because the participants were randomly assigned to the experimental and control groups. The study included only adult male population, this was necessary to enable us get a fairly homogenous sample and possibly reduce gender influence on the HRQOL. Since gender alone is known to have a significant influence on HRQOL. The similar baseline variables between both groups also provides a good bases for comparison. Anthropometric variables are also widely reported to have a significant influence on markers of asthma like lung functions which in turn influence HRQOL in asthma patients²⁰.

The improvement in the HRQOL of asthma patients following the 4 weeks of nasal breathing and control pause intervention techniques in line with the findings of several past

studies supporting the role of breathing techniques as an effective complementary medicine for asthma patients^{17, 21, 22}. This further supports the efficacy of complementary medicine in the management of bronchial asthma HRQOL outcomes.

Although, the tool used in this study to assess the HRQOL was a mini questionnaire with limited domain scope. The significantly higher mean with a large margin for HRQOL in the EG (group that had nasal breathing and control pause) after the treatment sessions compared to the CG supports the effectiveness of the complimentary intervention. Also, since both groups were taking their routine medications during the course of the study. This is supported by past reports where regular medications are reported to be effective in controlling asthma symptoms which also leads to a significant positive impact on HRQOL among asthma patients^{13, 23}.

Previous findings also reported that asthma occurs more in females due to several factors such as relatively smaller body composition and airway caliber, potential influence of female sex hormones and increase bronchial hyper responsiveness^{24, 25}. However, gender has not been widely documented to present significant influence on the pathophysiology and prognosis of asthma. Therefore, the findings of this study could be provide similar outcomes among females with bronchial asthma.

We used a therapist supervised model in the administration of the intervention to the experimental group in order to ensure exercise compliance and prevent possible loss to follow up. The advantage of this was that it allowed for close monitoring and supervision of the study intervention for the participants in the experimental group during the daily sessions. Only two components of BB technique were selected, this is because they could be easily administered by both therapists and patients. But still, the outcome of these study shows these techniques were nevertheless effective in improving the HRQOL of the participants even though the duration of the study was short. Therefore, we recommend that a more broad approach comprising breathing techniques should be utilized in the management patients with bronchial asthma.

5. Conclusion

It was concluded that nasal breathing and control pause breathing) Buteyko breathing techniques adequately improved the HRQOL of male patients with bronchial asthma.

Acknowledgement

We express our profound gratitude to Dr. M. Hamza of respiratory clinic of AKTH for assisting in recruiting study participants.

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