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Research Article

IMMEDIATE EFFECT OF BUTEYKO BREATHING TECHNIQUE IN DYSMENORRHIC FEMALES

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A R T I C L E I N F O

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Buteyko Breathing Technique, Control Pause, Numeric Pain Rating Scale, Primary dysmenorrhea.

A B S T R A C T

Objective: To study the immediate effect of Buteyko Breathing Technique in dysmenorrhic females.
Methodology
Design: An experimental study
Setting: Various schools and colleges of Belagavi city
Participants: 30 females with primary dysmenorrhea between the age group of 15-20 years were included in the study.
Intervention: The females received Buteyko breathing technique and the immediate changes were noted.
Main outcome measure: Numeric Pain Rating Scale, control pause time
Results: Significant changes in terms of pain and breath hold time was noted following Buteyko Breathing Technique at $p<0.05$
Conclusion: The present study concluded that, Buteyko breathing technique is effective in reducing pain and can be included in the treatment regime for dysmenorrhea.

INTRODUCTION

Dysmenorrhea refers to the cyclic lower abdominal or pelvic pain occurring just before or during menstruation.[1] The etiology of primary dysmenorrhea is not exactly understood, but one of the reason can be because of the action of uterine prostaglandin. As the menstrual cycle begins, the endometrial cell releases prostaglandin leading to strong uterine contractions and temporarily reduceing the blood supply to the uterus. This deprives the uterus of oxygen and can further lead to contraction and pain.[2]

Dysmenorrhea can be of two types i.e. primary and secondary. Primary dysmenorrhea is painful menstrual cramps without any underlying pathology. Secondary dysmenorrhea is painful menstruation which is associated with pelvic abnormalities.

Primary dysmenorrhea is commonly seen between the adolescent age group[3]. After 6-12 months of menarch, i.e when the ovulatory cycles are well established there are high chances of suffering from primary dysmenorrhea. The pain usually begins on the first day of the menstrual cycle or a day before menstruation and it lasts for about 8-72 hours.[4] Individuals complaint of pain in the lower abdomen and back and symptoms of headache, nausea, fatigue, nervousness, diarrhea, and syncope.[3]The prevalence of primary dysmenorrhea decreases as there is an increase in the age.[5,6] The risk factors for dysmenorrhea are nulliparity, age <20 years, depression, heavy menstrual flow, and anxiety.[7]

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The reported prevalence of dysmenorrhea in western turkey, was 72.7%[6] and 60%.in Canada. [5] In India, the prevalence rate of primary dysmenorrhea was found to be between 45% - 73.83%.[4,7]

Medically, primary dysmenorrhea can be treated with drugs such as pain killers, NSAID's, Oral contraceptives, Glyceryl trinitrate.[8] The non-medical treatments include the application of Hot moist pack,TENS,[8] Yoga and Relaxation techniques.[9,10]

Another such treatment is the Buteyko breathing technique which was developed in 1952 by a Russian doctor, Konstantin Buteyko. According to Buteyko, low carbon dioxide levels can aggravate many medical conditions. The primary aim of this technique is to elevate carbon dioxide levels and thereby helps in relaxation.[11] It is known that carbon dioxide affects many systems of the body either directly or through subsequent depletion of bicarbonate, pH disturbance, and reduced tissue oxygen levels.[12]Since carbon dioxide is so vital to the body, it creates a defense mechanism such as constriction of blood vessels and airway to retain carbon dioxide.

The Buteyko breathing technique is a series of breathing exercises to control the rate and volume of each breath. One of its components is the relaxation technique. The main breathing technique of this method is reduced volume breath. It uses relaxation, breath control, and breath holding exercises to treat a wide range of health conditions such as asthma, sleep apnea, anxiety, muscle cramping.[11]

A study was conducted to find out the immediate effect of buteyko breathing technique on cardio-Respiratory parameters

in young adults, where 80 healthy individuals between the age of 18-30 years underwent Buteyko Breathing Technique and it had a significant effect on cardio-respiratory parameter such as heart rate, systolic blood pressure and Rate of Perceive Exertion.[13]

As suggested by various studies dysmenorrhea is a common complaint among adolescent girls due to which absenteeism and decreased school performance is observed.[6] There is paucity of literature on Buteyko Breathing Technique , hence this study was implemented.

METHODS

This study was a Pre-Post Experimental study carried out in Belagavi city, India prior to which the ethical clearance was obtained from the Institutional Ethical Committee. The Investigator visited various schools and girls between the age of 15-20 years having primary dysmenorrhea were included in the study. Subjects diagnosed with polycystic ovarian disease were excluded. Participants were briefed about the nature of the study and the intervention and only those willing to participate were recruited and a written informed consent was obtained from all the subjects.

Procedure

The subjects were asked to lie down on their back or sit in a comfortable relaxed position. The pain value was noted using the numeric pain rating scale and then the subjects were asked to tense as many muscles as possible and then relax. This produces quiet, spontaneous and light exhalation. At the end of the exhalation, the subjects were asked to pinch their nose and hold their breath this gives the control pause value. (The breath hold time should be till the initial discomfort is felt). After the breath hold the subjects were asked to take a little amount of air in through the nose (less than they desire) and immediately relax all the muscles again with quiet exhalation. The subjects were again asked to hold the breath and then were asked to inhale a little amount of air and relax with exhalation. The subjects were asked to repeat this session for about 20-40 minutes.[11] The pain score and control pause was noted again at the end of the session.

RESULTS

30 participants were included in this study. Two outcome measures were used namely the Numeric pain rating scale (NPRS) and Control pause.

Statistical Analysis

Statistical analysis for the present study was done using the statistical package of social sciences (SPSS) version 21 so as to verify the results obtained. For this purpose, the data was entered into an excel spreadsheet, tabulated and subjected to statistical analysis. Mean, standard deviation, test of significance was calculated. Nominal data from the subject's demographic data i.e. age, height, weight, BMI were analyzed using t-test. All the other parameters which included NPRS and control pause does not follow a normal distribution, therefore the non-parametric tests were applied. Comparison of the pre and post intervention outcome measures was done by using Wilcoxon matched pairs test which was utilized to measure the reduction of pain intensity, increase in breath hold time at $p<0.05$

Demographic Profile

The pre-interventional score for NPRS was 5.66 ± 1.71 and the post-interventional score was 3.90 ± 1.93. The mean difference between the pre-post values was 1.77 ± 1.40 and the z-value for pre-post comparison was 4.424 with p-value 0.000 which was statistically significant. This indicates that there was a significant improvement in pain intensity. (table 3)

The pre-interventional score for Control Pause was 14.53 ± 4.05 and the post-interventional score was 20.46 ± 6.07. The mean difference between the pre-post values was 5.93 ± 4.51 and the z-value for pre-post comparison was 4.794 with p-value 0.000 which was statistically significant. This indicates that there was a significant improvement in the breath hold time.

Table 1 Distribution of Demographic data in the sample group

Demographic Parameter	MEAN	SD
Age (years)	17.13	1.70
Height(cms)	153.67	3.63
Weight(kg)	49.10	4.76
BMI(kg/m^2)	20.85	1.70
Menarche (agein years)	12.27	0.78

Table 2 Distribution of Cycles and flow

	Regular	Irregular	Heavy	Normal
Frequency	28	2	7	23
Percentage	93%	7%	23%	77%

Table 3 pre-post NPRS and CONTROL PAUSE scores

Particular	PRE - TEST (Mean ± SD)	POST - TEST (Mean ± SD)	DIFFERENCE (Mean ± SD)	Z-value	p-value
NPRS	5.66 ± 1.71	3.90 ± 1.93	1.77 ± 1.40	4.424#	0.000*
CONTROL PAUSE	14.53 ± 4.05	20.46 ± 6.07	5.93 ± 4.51	4.794#	0.000*

*Significant at 5% level, *p<0.05
#Wilcoxon matched pair test
All values in absolute form [ignored negative sign for statistical convenience]

DISCUSSION

From the statistical analysis, it was observed that Buteyko breathing technique is effective in treating primary dysmenorrhea. The breath hold time had increased, which could have been due to an increase in the aCO_2 concentration penetrating the Blood-Brain-Barrier,[14] which is said to reset the main part of the breathing center located in the brain. One essential function of CO_2 is to maintain the body's acid-base balance and any change in this balance can have a massive effect on the muscle function, pain perception and emotional liability.[15]

Another biochemical mechanism stated by buteyko is the influence on Nitric Oxide level in the body.[16] Nitric oxide is involved in various biophysiological responses such as bronchodilation, vasodilation, tissue permeability, oxygen transport. Diminished levels of nitric oxide induces myometrial contraction which is seen in dysmenorrhe.[8] According to this theory Buteyko Breathing Technique works on the tissue nitric oxide causing uterine relaxation, thus relieving pain.

Buteyko also stated that a very good control pause amounts to 40 seconds and a control pause of 15 seconds or less is

indicative of various symptoms such as respiratory complication, pain, fatigue, etc.[17] In the present study, the subjects had low control pause which was 14.53 ± 4.05 which can be a reason for dysmenorrhea. Various studies were conducted to assess breathing pattern and its relation with musculoskeletal pain. One such study was done by Chapman on Breathing Pattern Disorder which concluded that by restoring proper breathing mechanics there may be a decrease in pain, improved patient Quality of Life, and physical function which was associated with the primary musculoskeletal complaint.[18]

A study conducted by perri et.al which included 111 participants between the age of 12 to 67 years. The subjects were asked to fill a self reported questionnaire on severity of pain and the respiratory rate and the type of breathing was observed. There was 56.4% of the population with faulty breathing mechanics and 75% showed faulty breathing while taking a deep breath. [15]

Another study conducted To Study The Effectiveness Of Buteyko Breathing Technique Versus Diaphragmatic Breathing In Asthmatics on 46 subjects between the age of 20-65 concluded that Buteyko breathing technique is more effective than diaphragmatic breathing technique in asthmatics.[14] According to this study stopping and then restarting when the respiratory impulses intensify may help to reset the abnormal breathing pattern.

Limitation

The intervention was given to a considerably smaller population and only one session was delivered to the participants.

CONCLUSION

The present study concludes that the Buteyko breathing technique showed significant improvement in reducing pain in participants suffering from dysmenorrhea.

Disclosure

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article**.**

Informed consent was obtained from all individual participants included in the study.

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