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Original Research Article

A Study on Immediate Effect of Buteyko Breathing Technique on Cardio-Respiratory Parameters in Young Adults

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ABSTRACT

Background: The Buteyko Breathing Method is a unique breathing therapy that uses breath control and breath-holding exercises to treat a wide range of health conditions believed to be connected to hyperventilation and low carbon dioxide. The therapy involves instructing patients in controlled shallow breathing through the nose only, with breath-holding at the end of the exhalation and resuming normal breathing calmly and gently.
Aim: To Study the immediate effect of Buteyko breathing technique on cardio-respiratory parameters in young Adults
Methodology: 80 subjects recruited for the study were explained the entire procedure and subject were taught how to perform Buteyko Breathing Technique (BBT). Baseline HR, BP, RPE and PFT were noted as pre-test evaluation. Post-BBT for 12 min, evaluation was done for outcome measures like HR, RPE, BP and PFT (PEFR, FEV1 and FEF_{25-75}).
Results: When subject performed five minute Buteyko at rest it was seen that HR increased and SBP decreased, the RPE also increased significantly for both males and females and an increase in FEF_{25-75} was also observed after five minute of BBT at rest, but it was significant only in females.
Conclusion: Buteyko Breathing technique used at rest has significant effect on certain cardio-respiratory parameters in young adults like HR, SBP and RPE.

Keywords: Buteyko breathing technique, immediate effect, at rest, Sedentary

INTRODUCTION

Life is absolutely dependent upon the act of breathing. Breathing is considered the most important of all the functions of the body as all other functions depend upon it. [1] In this modern era we eat more processed foods, overeat, do less physical exercise and experience more stresses. Jobs in the modern economy tend to be service-based. As a result they entail very little physical activity and many hours of talking which entails a lot of over breathing i.e. breathing a volume of air greater than which we require. [2]

The Buteyko Breathing Method is a unique breathing therapy that uses breath control and breath-holding exercises to treat a wide range of health conditions believed to be connected to hyperventilation and low carbon dioxide. A number of clinical trials indicate that it is a successful treatment for asthma; however, there is little support for the carbon dioxide theory that underpins the Buteyko Method. There are, however, many other possible reasons that the breathing techniques used by the Buteyko Method

work. These reasons include change in symptom perception and improved sense of control, improved biomechanics of breathing, beneficial effects of low-volume breathing, altered nitric oxide levels, and resetting of respiratory rhythm generation by breath-holding techniques. [3] Thus the study was taken up to evaluate the immediate effect of Buteyko Breathing Technique on cardio-respiratory parameters in young adults

METHODOLOGY

This was an Observational Study with a sample size of 80 subjects of the age group 18-30 years, both sexes, by convenient sampling, from a reputed institute, New Delhi.

The subjects who consented to participate, with Normal BMI, Sedentary lifestyle and who understand written and verbal English language were included whereas those with any history of medical, surgical, musculoskeletal or systematic condition which can affect the outcome of the study, with negative comment on PARQ, smokers and alcoholic and on regular medications were excluded.

Instruments used were: Motorized treadmill, Stop watch, Aneroid BP Apparatus, An RPE worksheet, Pulse oximeter and Spirometer.

The subjects were monitored for their Heart Rate(HR)- bpm, Blood Pressure(BP)- mmHg, Rate of Perceived Exertion(RPE)-Scores, Peak Expiratory Flow Rate(PEFR) -L/sec, Forced expiratory volume in one second(FEV_1)-L/sec and Forced Expiratory $Flow_{(25-75)}$-L/sec

Trial and Familiarization session was given and entire procedure was explained. Subject was demonstrated how to perform Buteyko Breathing Technique (BBT) and he was then asked to perform BBT (Illustration 1). Baseline HR, BP, RPE and PFT were noted on the Data Collection Form (DCF) as the readings for BBT at rest. [2-4] The Control Pause time was noted on the DCF for the particular individual and it was minimum 10 to 40 seconds for the subject to be included in the study. [1,3] He/she was then asked to practice the controlled breathing with the amount of Control Pause noted for each breath cycle, for 12 min and after this he/she was evaluated for outcome measures.

The subject was observed for vitals for 30 min and was thanked for his efforts.

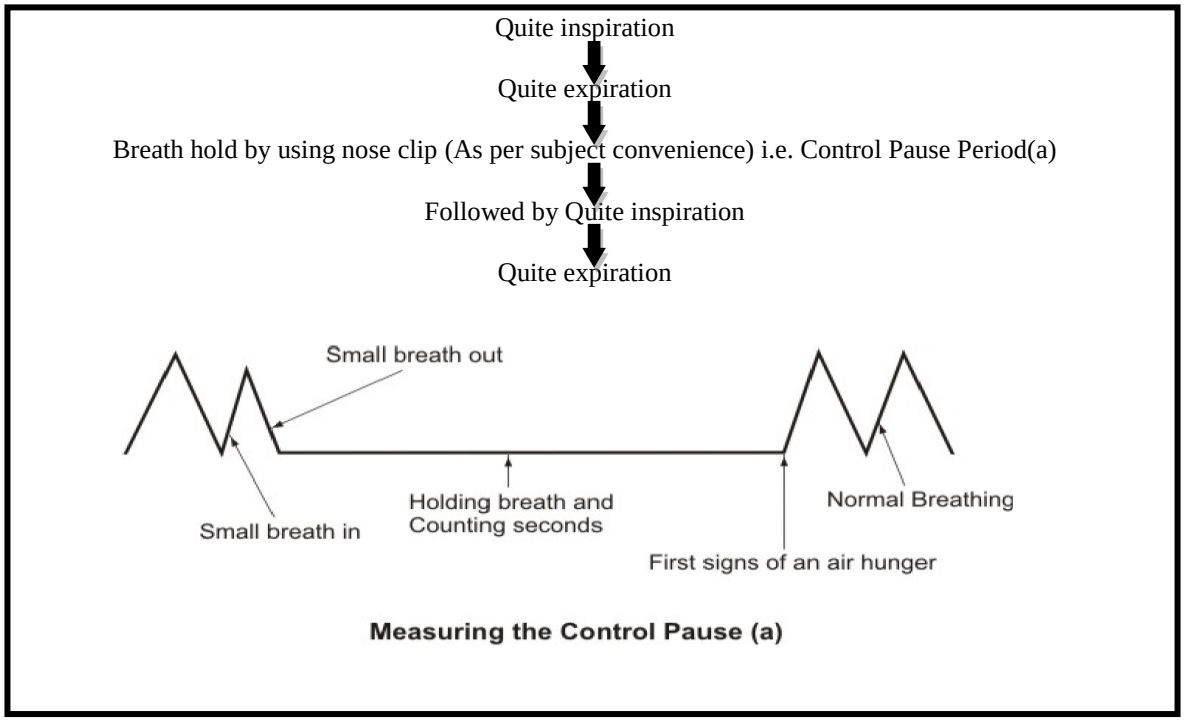

Illustration 1: Buteyko Breathing Technique

RESULT

A total of 80 subjects both males and females with a mean age of 20.92 ± 1.98 and 20.74±1.71years respectively and a BMI of 22.81±1.66 and 20.75± 1.59kg/m^2 respectively were recruited for the study, amongst which- 15 (18.8%) were males and 65(81.3%) were females. Paired t Test was used for data analysis by SPSS software and a p value of < 0.05 was considered to be significant. The Cardiac parameters were analyzed for both the genders at rest. The mean value for heart rate at rest for males was found to be 73.60 ± 5.19 bpm and for females was 73.91 ±4.70 bpm which did not differ statistically (p =0.14). The mean value of SBP for males and females were 119.00 ± 8.90 mmHg and 115.00 ± 8.66 mmHg respectively, which differed and were statistically significant (p=0.000).The respiratory parameters were also analysed - The PEFR at rest for males was 4.67± 1.42 and that for females was 3.94± 1.42 L/sec, which differed statistically (p=0.034). The other Cardio-respiratory parameters analyzed did not differ significantly.

For 'Subject Performing BBT on Rest' for five minutes, pre and post BBT session, cardio respiratory parameters were compared for males and females separately as we saw there was a significant difference at rest between certain cardio respiratory parameters. The result is as seen in Table 1 and Table 2

Table 1: 'Subject Performing BBT at Rest': Cardiac Respiratory parameters for Females

Mean ±SD of Variables	PRE±SD	POST±SD	Difference of mean (Post-Pre)	p-VALUE
HR(BPM)	73.91± 4.70	75.38± 6.57	1.47	0.021*
SBP(mmHg)	115.00± 8.66	110.07± 11.68	(-4.93)	0.000**
DBP(mmHg)	78.77± 4.5	78.31± 4.53	(-0.46)	0.410
RPE	0	1.06± 0.496	1.06	0.000**
PEFR(lit/sec)	3.93±1.42	3.87± 1.34	(-0.06)	0.154
$FEF_{(25-75)}$ (lit/sec)	3.34± 0.86	3.39± 0.85	0.05	0.009**
FEV_1(lit/sec)	2.99± 0.66	3.03± 0.67	0.04	0.068

Table 2:'Subject Performing BBT at Rest': Cardiac Respiratory parameters for males

Mean ±SD of Variables	PRE±SD	POST±SD	Difference of mean (Post-Pre)	p-VALUE
HR(BPM)	73.60± 5.19	77.20± 7.83	3.6	0.049
SBP(mmHg)	119.00± 8.90	121.00± 9.67	2	0.164
DBP(mmHg)	79.33± 4.58	80.6± 4.58	1.34	0.433
RPE	0	1.13± 0.63	1.13	0.000**
PEFR(lit/sec)	4.67± 1.66	4.62± 1.42	(-0.05)	0.740
$FEF_{(25-75)}$ (lit/sec)	3.27± 0.86	3.39± 0.84	0.12	0.079
FEV_1(lit/sec)	3.12± 0.69	3.18± 0.71	0.06	0.258

DISCUSSION

A. Dhawarkar did a comparative study of Breath holding time (BHT) as index of Central Ventilatory Response in young healthy adults of both sexes & suggested that Progesterone, Estrogen and Testosterone can influence respiratory function in humans. [3] Thus in our study we analyzed our data for males and females separately.

According to Buteyko breathing manual, overbreathing is just a habit. The part of the brain (central chemoreceptor) that regulates the amount of air one breathes becomes accustomed to breathing too much. In a paper entitled Hyperventilation Syndrome and Asthma, Dr Stephen Demeter states "prolonged hyperventilation (for more than 24 hours) seems to sensitize the brain, leading to a more prolonged hyperventilation."[5] Hyperventilation becomes habitual or long term, so even when the primary cause is removed, the behavior is maintained and leads to hypocapnea. There are different theories as to why over breathing and loss of CO_2 causes airways to narrow. One is that airways cool and/or dehydrate from having exposed to condition such a large volume of air. A paper by Davis and Freed published in the European Respiratory Journal concluded that repeated dry air challenge in dogs in vivo causes persistent airway obstruction and inflammation similar to that found in human asthma. [6] Professor Buteyko and others point to the loss of Carbon Dioxide (CO_2), there is clear evidence that low CO_2 plays a role in

bronchoconstriction and many other types of physiological dysfunction. [7] During normal conditions 75% of the intake of Oxygen is exhaled, while breathing a healthy volume of 4 - 6 litres per minute. Even during exercise, it is estimated that 25% of our intake of Oxygen is exhaled. Breathing a volume greater than normal does not improve the amount of Oxygen in the blood, as it is already 97-98% saturated. Instead it lowers CO_2 levels, firstly in the lungs, then in the blood, tissues and cells and this reduces the delivery of Oxygen from the hemoglobin within the red blood cells. Studies have proved that Carbon Dioxide relaxes smooth muscle which surrounds airways, arteries and capillaries. The heavier one breathes- the more he feeds hyperventilation-related problems by increasing histamine levels of the body.

When subject performed five minute Buteyko at rest it was seen that HR increased and SBP decreased significantly, which is a normal physiological response after a breathing technique. [8-11] The RPE also increased significantly for both males and females (Table 1 & 2) and an increase in FEF_{25-75} was also observed after five minute of BBT at rest, but it was significant only in females as seen in Table(1). Brutona, G.T. Lewith's study provides the background for BBT, reviews the available evidence for its use and examines the physiological hypothesis claimed to underpin it. Their study results indicated that higher CO_2 may exert some bronchoprotective effect as seen in our study indicated by FEF_{25-75}

Further study is thus recommended to evaluate the immediate effect of Buteyko Breathing Technique during sub-maximal exercise on cardio-respiratory parameters in young Adults.

Thus, a normal physiological response was observed as an immediate effect of Buteyko Breathing Technique on cardio-respiratory parameters in young adults.

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