

# Effect of Buteyko Breathing Technique on Stress in Physiotherapy Students

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## ABSTRACT

**BACKGROUND:** Perceived stress scale is the psychological instrument used for measuring the perception of stress. It is a measure of degree to which situations in one's life are appraised as stressful. The Buteyko Method incorporates reduced-volume breathing as its fundamental technique, which is done by sitting in an erect posture and relaxing the muscles of respiration until one feels a slight lack of air. This sensation of slight breathlessness is then maintained by a combination of relaxation of breathing muscles, erect posture, and a little tension of the abdomen. This study concentrates on effect of Buteyko breathing technique on stress in Physiotherapy students.

**AIM:** To study the effect of Buteyko breathing technique on stress in physiotherapy students.

**METHODOLOGY:** The design of study is experimental and type of sampling is purposive convenient sampling. The sample size taken was 40 and the place of study was physiotherapy OPD.

**RESULTS:** The results were obtained using perceived stress scale on the basis of pre and post data collected. Statistical analysis shows the positive effectiveness of Buteyko breathing technique on stress in physiotherapy students.

**CONCLUSIONS:** The stress can be reduced significantly with Buteyko breathing technique.

**Keywords:** Stress, Buteyko Breathing Technique, Perceived Stress Scale, Physiotherapy students.

## INTRODUCTION

Stress is the general word which is known to everyone but it is not a situation or a condition which occurs during any adverse conditions. Our body overcomes a demanding or undesirable situation by a way and that is stress. Our body tries to maintain homeostasis and defend itself against such events by embracing certain "changes". Stress is a series of events that our body goes through to deal with these situations.

On the other hand, stress is also represented as any effect that threatens the homeostasis. Stressor is any factor or event that leads to stress. Stressors can be of many types: Physical or Physiological changes in the body, changes in the environment, life events or behaviours or even an unreal (imaginary) situation. Thus, individual perception has an influence on the stress mechanical.[1]

Whenever the body is exposed to a stressor, a response is elicited to overcome it. The response is not uniform in all individuals. Hans Selye developed General Adaptation Syndrome (GAS), a profile of how organisms respond to stress [1,2]. There are three stages in stress response: 1. Alarm 2. Adaptation and 3. Exhaustion or recovery. Alarm is the first stage that involves the 'fight-or-flight' response. This is the step that allows us to face difficult (adverse) situations. The scene triggers various

reactions in the body, such as the release of stress hormones: cortisol, epinephrine and adrenaline from the adrenal glands, increased heart rate, increased blood sugar, increased blood pressure, etc.

If the stressful situation isn't resolved the body uses all its resources (for example, continuous secretion of stress hormones to provide energy to deal with the situation) to adapt to the stressful situation. This is the adaptation stage. This causes all kinds of physical (difficulty sleeping, general fatigue, muscle aches, indigestion, allergies, minor infections like colds, etc.), mental (lack of concentration), emotional (impatience and irritability), and behavioral (smoking and alcohol). If the body's compensation mechanisms have succeeded in overcoming the stressor's effect there follows the recovery stage. But if the body has used up its resources and is unable to maintain normal function it leads to exhaustion stage. If the state of exhaustion goes on for a long time, it can lead to long-term effects where the person may have more serious health problems. It may lead to depression, hypertension and coronary diseases.[1]

After a stressful event, the body works on multiple levels to deal with the stress. This is accomplished through two major changes in the body: 1. A change in the pattern/amount of energy released and 2. B change in the distribution of energy. Several events occur to bring these changes. All of these events are collectively referred to as stress or the stress response. Stress is a multidimensional phenomenon which involves both nervous and endocrine system. The sympathetic system accounts for the flight-or-flight response. In response to a stressor, the catecholamines epinephrine (adrenaline) and norepinephrine (noradrenaline) are released at various nerve synapses. The release of these catecholamines causes a variety of changes such as B. increased heart rate and myocardial contractile strength, vasodilation of arteries in active muscles and vasoconstriction of arteries in inactive

muscles. Dilation of the pupils and bronchi and decrease in the digestive functions of the body. All these changes are required to prepare the body for fight-or-flight response. The effect of these hormones - adrenaline and noradrenaline - lasts a few seconds.

The functions of parasympathetic nervous system are opposite to that of sympathetic nervous system and help in energy conservation and relaxation.[2]

A Ukrainian Doctor K P Buteyko developed a set of breathing exercises called The Buteyko Method in the 1950s. This therapeutic breathing method uses apnea exercises to control respiratory rate and tidal volume. The aim was to develop breathing patterns that helps to maintain the correct ratio of oxygen and carbon dioxide in the bloodstream, in a healthy way. The benefits of Buteyko breathing include enhanced breath control, which helps to prevent breathlessness and promote proper breathing patterns. It's used to manage and improve a variety of conditions, including asthma, anxiety, and sleep concerns. [3,4]

The Buteyko Method incorporates reduced-volume breathing as its fundamental technique, which is done by sitting in an erect posture and relaxing the muscles of respiration until one feels a slight lack of air. This sensation of slight breathlessness is then maintained by a combination of relaxation of breathing muscles, erect posture, and a little tension of the abdomen. During a formal training session, a combination of breath-hold techniques is used to perform low-volume breathing, the two most important being short breath-holds, called the control pause, and longer breath-holds, called the maximum pause. The breathing here is a nasal breathing pattern. [3,4] the concept of Buteyko lies precisely in reducing the hyperventilation as it is known that hyperventilation leads to low carbon dioxide levels in the blood. This leads to not only the disturbance in Krebs's cycle but also disturbance of various vital homeostatic chemical reactions in the body.[4]

Perceived stress scale is the psychological instrument used for measuring the perception of stress. It is a measure of degree to which situations in one's life are appraised as stressful. Items were formed to know how unpredictable, uncontrollable, and overloaded respondents find their lives. This scale also includes number of queries that includes current level of experienced stress. The PSS was formed for the use of community samples with at least a junior high school education. The items are lucid, and very easy response alternatives. Moreover, the questions are generally free of specific content to any specific sub population group. The questions are based on the feelings, experienced of the last months. In each of the cases the subject is as how often they felt a certain way. Evidence for validity: Higher PSS score were associated with (for example) Failure to quit smoking, Failure among diabetics to control blood sugar level, Greater vulnerability to stressful life-event-elicited depressive syndrome, More colds. Scoring: PSS scores are obtained by reversing responses (e.g., 0= 4, 1=3, 2, 3= 1 & 4=0) to the four positively stated items (items 4,5,7, &8) and then summing across all scale items. A short 4 items scale can be made from questions 2, 4, 5 and 10 of the PSS 10 items scale.[5]

**MATERIALS & METHODS**

The study is an experimental study done in Dr. B.R. Ambedkar College of Physiotherapy in Bengaluru, Karnataka. The physiotherapy students of age 18 to 23 years were taken and those on anti-psychotic drugs, anti-depressant drugs and substance addictions were excluded. The Perceived Stress Scale was taken as outcome measure [5].

Buteyko Breathing Technique was taught for 20 minutes. 40 subjects were screened for Inclusion and Exclusion criteria and consent was taken. Basic demographic data was collected. Baseline assessment of stress was done using Perceived Stress Scale (PSS). Buteyko breathing technique was taught for 20 minutes per session. The

session was carried for three days a week for four weeks. Again the reading was taken using Perceived Stress Scale. Data was analyzed and statistical inference was made.

**RESULT**

The present study was conducted on 40 Physiotherapy students with an average age of 21.6±1.127years. The minimum age seen in the study population was 19 years and maximum were 23 years.

	Minimum	Maximum	Mean	Std. Deviation
Age	19.00	23.00	21.60	1.12774

Table 1: Showing mean and standard deviation of age

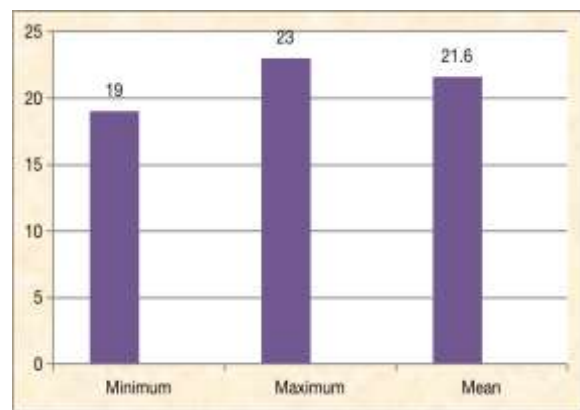


Figure 1: Showing average age of Physiotherapy students

	Frequency	Percent
Female	33	82.5
Male	7	17.5
Total	40	100.0

Table 2: Distribution of Physiotherapy students on the basis of gender

Out of 40 Physiotherapy students 33(82.5%) were female and 7(17.5%) were male.

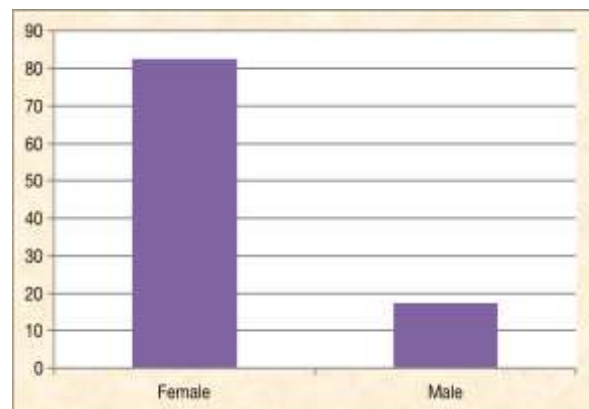


Figure 2: Distribution of Physiotherapy students on the basis of gender

	Minimum	Maximum	Mean	Std. Deviation
Systolic BP	92.00	120.00	110.7250	6.25110
Diastolic BP	70.00	90.00	75.9500	4.17532

Table 3: Showing mean and standard deviation of systolic blood pressure and diastolic blood pressure

The average systolic blood pressure is  $110.72 \pm 6.251$  mm Hg with a minimum of 92 mm Hg and maximum of 120 mm Hg. The average diastolic blood pressure is  $75.95 \pm 4.175$  mm Hg with a minimum of 70 mm Hg and maximum of 90 mm Hg.

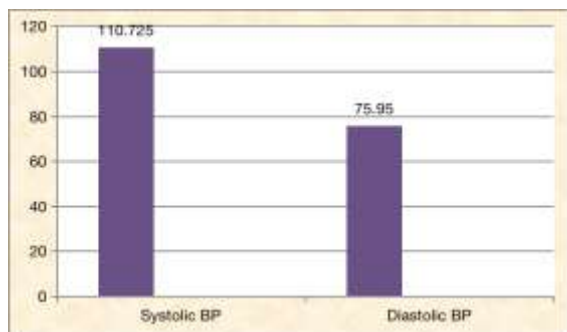


Figure 3: Showing mean systolic and diastolic pressure

	Minimum	Maximum	Mean	Std. Deviation
Pulse rate	67.00	105.00	86.9500	9.87083
Oxygen saturation	92.00	99.00	97.4750	1.61702

Table 4: Showing mean and standard deviation of pulse rate and oxygen saturation

The average pulse rate is  $86.95 \pm 9.87$  with a minimum of 67 and maximum of 105. The average oxygen saturation level is  $97.47 \pm 1.617$  with a minimum of 92 and maximum of 99.

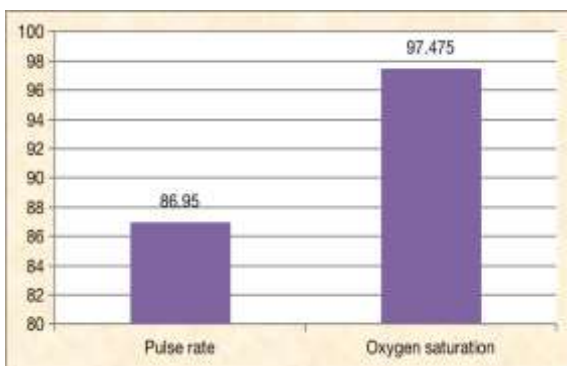


Figure 4: Showing mean pulse rate and oxygen saturation

	Mean	Std. Deviation	t value	p value
Pre	23.8500	3.46077	3.703	0.001
Post	21.3000	3.35276		

Table 5: Showing pre post comparison in PPS score

The comparison between pre and post PPS score is shown in the above table. The average pre PPS score was  $23.85 \pm 3.46$  and post PPS score was  $21.3 \pm 3.352$  with an average improvement of 2.55 with P value of 0.001 (significance as  $p < 0.005$ )

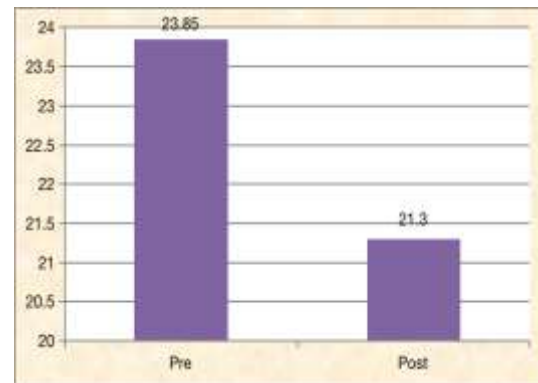


Figure 5: Showing mean pre post comparison in PPS score

	Pre		Post	
	f	%	f	%
Low	-	-	3	7.5
Moderate	28	70	37	92.5
High	12	30	-	-
Total	40	100	100	100

Table 6: Showing levels of Perceived Stress in pre and post group

The above table depicts in pre assessment, 28(30%) of the physiotherapy students had PPS score at moderate level and 12(30%) had high level. In the post assessment 3(7.5%) had low level PPS and 37(92.5%) had moderate level of PPS.

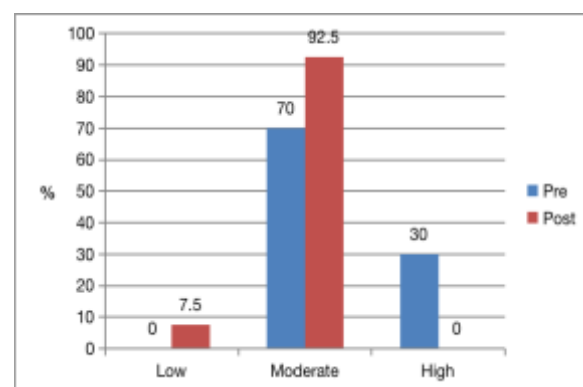


Figure 6: Showing levels of Perceived stress in pre and post group

## DISCUSSION

Table 1 and figure 1 shows that out of 40 subjects, an average age of the subject is  $21.6 \pm 1.127$  years. The minimum age seen in



the study population was 19 years and maximum were 23 years.

Table 2 and figure 2 shows that out of 40 subjects, 33 (82.5%) were female and 7 (17.5%) were male.

Table 3 and figure 3 shows the mean and standard deviation of systolic blood pressure and diastolic blood pressure. The average systolic blood pressure is  $110.72 \pm 6.251$  mm Hg with a minimum of 92 mm Hg and maximum of 120 mm Hg. The average diastolic blood pressure is  $75.95 \pm 4.175$  mm Hg with a minimum of 70 mm Hg and maximum of 90 mm Hg.

Table 4 and figure 4 shows the mean and standard deviation of pulse rate and oxygen saturation. The average pulse rate is  $86.95 \pm 9.87$  with a minimum of 67 and maximum of 105. The average oxygen saturation level is  $97.47 \pm 1.617$  with a minimum of 92 and maximum of 99.

Table 5 and figure 5 shows pre post comparison in PPS score. The average pre PPS score was  $23.85 \pm 3.46$  and post PPS score was  $21.3 \pm 3.352$  with an average improvement of 2.55 with p value of 0.001 which is significant as  $p < 0.05$ .

Table 6 and figure 6 shows level of perceived stress in pre and post group. The above table 6 depicts in pre assessment, 28(30%) of the physiotherapy students had PPS score at moderate level and 12(30%) had high level. In the post assessment 3(7.5%) had low level PPS and 37(92.5%) had moderate level of PPS. Thus, the subjects improved considerably as there were no subjects with higher stress level in post PPS score in spite of having 12 (30%) of subjects with higher stress level in pre score.

A study conducted on nursing staffs showed that the positive effects of stress reduction include more attentive perception of internal and external experiences; greater attention and awareness of actions and attitudes at every moment; and a positive influence in activities.<sup>[6]</sup>

## CONCLUSION

The study infers that with Buteyko breathing technique, the stress can be reduced significantly. Also, the levels of perceived stress are less after taking the Buteyko breathing technique sessions. Thus, this study concludes that stress and its related outcomes can be minimized with Buteyko breathing technique significantly.

### Declaration by Authors

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

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