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ORIGINAL RESEARCH

Assessment of slow deep breathing on heart rate and blood pressure in healthy

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Abstract

Background: Slow breathing practices have gained popularity in the western world due to their claimed health benefits. The present study was conducted to assess slow deep breathing on heart rate and blood pressure in healthy.

Materials & Methods: 60 patients of healthy young adults of both genders were enrolled. Baseline/resting heart rate, systolic blood pressure and diastolic blood pressure were measured. All were subjected to slow deep breathing (6 breaths/min) for 5-6 minutes. After slow deep breathing, heart rate and blood pressure were again measured. In slow deep breathing inhalation is equals to exhalation.

Results: Out of 60 patients, males were 35 and females were 25. The mean heart rate at baseline was 76.2 beats/ min and after breathing was 70.4 beats/min. The difference was significant (P< 0.05). The mean SBP at baseline was 116.2 mm Hg and after breathing was 104.8 mm Hg. The difference was significant (P< 0.05). The mean DBP at baseline was 76.4 mm Hg and after breathing was 72.6 mm Hg. The difference was significant (P< 0.05).

Conclusion: Practicing of slow deep breathing (respiratory rate 6/minute) for 5 minutes could improve autonomic nervous system imbalance towards parasympathetic dominance. The decline in heart rate and blood pressure due to improvement in autonomic functions by slow deep breathing which causes decrease in sympathetic and increase in parasympathetic activity.

Key words: Stress, heart rate, blood pressure

Introduction

Stress is very common nowadays due to busy life and advancement in technology. According to researchers, problem is distinguished through set point of action of hypothalamo-pituitary axis causing aggravation of autonomic nervous system, out coming in instant impacts in blood pressure, heart rate, respiratory rate andtemperature.[1] Various yoga are there which relief stress and cause well-being of an individual, both mentally and physically. Pranayama is primitive method involving rhythmic and slowbreathing.[2] This is proven that constant practice of pranayama decreases sympathetic activity, enhances vagal tone, upgrades physical and mental health, decrease the impact of strain and stress on the body and reforms respiratory and cardiovascularfunctions.[3]

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Slow breathing practices have gained popularity in the western world due to their claimed health benefits, yet remain relatively untouched by the medical community. Investigations into the physiological effects of slow breathing have uncovered significant effects on the respiratory, cardiovascular, cardiorespiratory and autonomic nervous systems.[4]
Various studies show that pranayama and yoga are beneficial for the treatment of psychologic or stress-related disorders, cardiopulmonary diseases and autonomic nervous system imbalances. Slow breathing has been proven as the most effective relaxation technique.[5]The present study was conducted to assess slow deep breathing on heart rate and blood pressure in healthy.

Materials & Methods

The present study comprised of 60 patients of healthy young adults of both genders. Out of 60 patients, males were 35 and females were 25. All gave their written consent for the participation in the study. Data such as name, age, gender etc. was recorded. General anthropometric parameters such as height, weight and body mass index (BMI) were recorded. Baseline/resting heart rate, systolic blood pressure and diastolic blood pressure were measured. All were subjected to slow deep breathing (6breaths/min) for 5-6 minutes. After slow deep breathing, heart rate and blood pressure were again measured. In slow deep breathing inhalation is equals to exhalation. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 60		
Gender	**Males**	**Females**
Number	35	25

Table I shows that out of 60 patients, males were 35 and females were 25.

Table II Assessment of heart rate

Heart rate	Mean	P value
Baseline	76.2	0.02
After breathing	70.4	

Table II shows that mean heart rate at baseline was 76.2 beats/ min and after breathing was 70.4 beats/min. The difference was significant (P< 0.05).

Table III Assessment of systolic blood pressure

Systolic blood pressure	Mean	P value
Baseline	116.2	0.01
After breathing	104.8	

Table III shows that mean SBP at baseline was 116.2 mm Hg and after breathing was 104.8 mm Hg. The difference was significant (P< 0.05).

Table IV Assessment of diastolic blood pressure

Diastolic blood pressure	Mean	P value
Baseline	76.4	0.05
After breathing	72.6	

Table IV shows that mean DBP at baseline was 76.4 mm Hg and after breathing was 72.6 mm Hg. The difference was significant (P< 0.05).

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Discussion

Breathing mediates neuromusculoskeletal responses through its influence on the autonomic nervous system (ANS) and the central nervous system (CNS).Breathing can be affected by biomechanical, biochemical, psychological, physiological, and/or unknown factors.[6,7] Various examination and treatment paradigms such as, dynamic neuromuscular stabilization, selective functional movement assessment, Buteyko method, and the Janda approach support the concept that breathing is the foundation of allostasis and functional movement.[8] In a typical rehabilitation clinic, assessing breathing patterns may seem like a foreign concept due to the lack of emphasis placed on breathing in the traditional patient examination. However, breathing assessment may be an overlooked and essential tool to address a patient's primary complaint of musculoskeletal pain.[9] The present study was conducted to assess slow deep breathing on heart rate and blood pressure in healthy.

We found that out of 60 patients, males were 35 and females were 25. Bhavana et al[10] in their study heart rate and blood pressure of the subjects (n=140, age=18-25 years) was recorded following standard procedure. First, subject had to sit comfortably. The subject is directed to inhale through both nostrils slowly up to maximum for about 5 seconds and then exhale slowly up to maximum through both nostrils for about 5 seconds. These steps complete one cycle of slow deep breathing (respiratory rate 6/min).After 5 minutes of this breathing practice, both the parameters were recorded again. It was noted that after slow deep breathing (respiratory rate 6/min) for 5 minutes, heart rate and blood pressure decreased.

We found that the mean heart rate at baseline was 76.2 beats/ min and after breathing was 70.4 beats/min. Pal GK et al[11]found that after 3 months practice of slow pranayamic breathing exercises, enhanced vagal activity was observed caused a substantial decrease in basal heart rate.

We found that the mean SBP at baseline was 116.2 mm Hg and after breathing was 104.8 mm Hg. The mean DBP at baseline was 76.4 mm Hg and after breathing was 72.6 mm Hg. Pramanik T et al[12] found after 5 minutes of slow bhastrika pranayamic breathing (respiratory rate of 6 per min), decline in both systolic and diastolic occurred substantially with a minute reduction in heart rate because pranayamic breathing enhances the recurrence and length of inhibitory neural impulses through the stimulation of pulmonary stretch receptors like in Hering Bruer reflex, that leads the reduction of sympathetic tone in the blood vessels of skeletal muscle, causing widespread vasodilatation, thus leading to reduction in peripheral resistance and thus falling in the diastolic blood pressure.

The limitation the study is small sample size.

Conclusion

Authors found that practicing of slow deep breathing (respiratory rate 6/minute) for 5 minutes could improve autonomic nervous system imbalance towards parasympathetic dominance. The decline in heart rate and blood pressure due to improvement in autonomic functions by slow deep breathing which causes decrease in sympathetic and increase in parasympathetic activity.

References

1. Joseph CN, Porta C, Casucci G, Casiraghi N, Maffeis M, Rossi M, et al. Slow breathing improves arterial baroreflex sensitivity and decreases blood pressure in essential hypertension. Hypertension 2005;46:714-8.
2. Pinheiro CH, Medeiros RA, Pinheiro DG, MarinhoMde J. Spontaneous respiratory modulation improves cardiovascular control in essential hypertension. Arq Bras Cardiol2007;88:651-9.

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3. Sakakibara M, Hayano J. Effect of slowed respiration on cardiac parasympathetic response to threat. Psychosm Med1996;58:32-7.
4. Brown RP Gerbarg PL. Sudarshan Kriya Yogic breathing in the treatment of anxiety and depression: Part 1.Neurophysiological model. J Altern Complement Med 2005;1:189-201.
5. Frank C KobesovaA Kolar P. Dynamic neuromuscular stabilization & sports rehabilitation. Int J Sports Phys Ther. 2013;8(1):62.
6. Perri M. Rehabilitation of breathing pattern disorders. Liebenson C. Rehabilitation of the spine: a practitioner's manual, 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2007:93-109.
7. Chaitow L. Breathing pattern disorders, motor control, and low back pain. J Osteop Med. 2004;7(1):33-40.
8. Clifton-Smith T Rowley J. Breathing pattern disorders and physiotherapy: inspiration for our profession. PhyslTher Rev. 2011;16(1):75-86.
9. Simons DG Travell JG Simons LS. Travell& Simons' myofascial pain and dysfunction: upper half of body. Vol 1: Lippincott Williams & Wilkins; 1999.
10. Bhavana et al. Immediate effect of short duration of slow deep breathing on heart rate and blood pressure in healthy young adults International Journal of Health and Clinical Research, 2021;4(11):100-102.
11. Pal GK, Velkumary S, Madan Mohan. Effect of short-term practice of breathing exercises on autonomic functions in normal human volunteers. Indian J Med Res 2004;120:115-21.
12. Pramanik T, Sharma HO, Mishra S, Mishra A, Prajapati R,Singh S. Immediate effect of slow pace bhastrika pranayamaon blood pressure and heart rate. J Altern Complement Med2009;15:293-5.