

Original Research Article

Effect of short term “Deep breathing” on GSR in young individuals of B.G. Nagara

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Abstract: Breathing is the most vital function for maintenance of life. Studies showed that yogic type of breathing exercises increase GSR. However, there are no conclusive studies on the effects of short term deep breathing exercise for short term GSR. The present study was planned to know the effect of deep breathing on GSR. This study was conducted to determine the effect of Deep breathing (Db) on GSR in healthy young individuals. The present study was a case-control study consisting of 30 healthy individuals in the age group of 18-24 years. This study was conducted in the Department of Physiology, Adichunchanagiri institute of medical sciences, B.G. Nagara, Nagamangala Taluk, Mandya district, after the institutional ethical clearance and written consent from each participant. GSR was recorded before & after practicing deep breathing exercise daily for three months. The parameters thus recorded was analyzed for statistical significance using Students ‘t’ test and $p < 0.05$ was considered the level of significance. GSR were significantly increased at ($p < 0.001^{**}$) after practicing deep breathing. The results of this study indicate that a simple maneuver of practicing deep breathing daily as indicated in the method, is suggestive of lowering sympathetic activity & increasing parasympathetic activity.

Keywords: GSR- Galvanic skin resistance.

INTRODUCTION

Benefits of practicing deep breathing have been found in Hindu Sanskrit texts from as early as the fifth century. However, the fact that it is such a vital component in Eastern meditation systems, such as Taoist qi gong, tai chi and pranayama yoga, suggests that the practice of deep breathing in the pursuit of health and enlightenment is probably much older.

Slow and deep breathing is economical because it reduces dead space ventilation as well decreases the workload on the heart. It also renews air throughout the lungs in contrast with shallow breathing which renews air only at the base of the lungs[1]. It is also suggested that the practice of deep breathing without breath holding phase, can also strengthen the respiratory muscles and increase the elastic properties of lungs and chest and thereby improve some of the ventilator functions of lungs[2]. In bronchial asthma patients also deep breathing is shown to significantly improve the respiratory parameters[3]. Among hypertensive patients, deep breathing exercise has been found to reduce the heart rate variability [4]. Regular

practice of slow breathing has been shown to improve cardiovascular and respiratory functions and to decrease the effects of stress. *Pranayama*, meaning ‘breath control’, is an ancient technique involving slow and rhythmic breathing. It is known that the regular practice of *pranayama* increases parasympathetic tone, decreases sympathetic activity, improves cardiovascular and respiratory functions, decreases the effect of stress and strain on the body and improves physical and mental health[5-8]. Regular practice of rhythmic slow breathing has been shown to increase baroreflex sensitivity and reduce chemoreflex activation[9], and to reduce systolic, diastolic and mean blood pressures as well as heart rate variations in hypertensive patients [10]. Practice of slow breathing has also been advocated for the treatment of anxiety disorders as it attenuates cardiac autonomic responses in such patients[11]. GSR is increased in people who practiced deep breathing[12].

The present study is designed to know if deep breathing for a short duration regularly among

apparently healthy young adults, benefits the autonomic system

MATERIALS & METHODS

Subjects were healthy volunteers in the age group of 18 – 25 years medical students of AIMS B.G NAGAR, With BMI of 19 to 25 kg/m². All the subjects were non- smokers and were not on any medications. Those already performing some form of yoga or breathing exercises were excluded from the study. The study was prior reviewed and approved by the Institutional ethical committee. Each subject gave a written consent before participating in the study.

A sample size of 30 subjects was calculated based on the results of a pilot study done on similar subjects.

The selected groups of subjects were made to practice the deep breathing daily for 10 minutes between 7am-8am, for a period of one months. Subjects

were instructed to sit erect while performing this exercise concentrating on breathing. Subjects were asked to take slow & maximal inspiration lasting for five seconds, followed by maximal expiration which also lasts for five seconds at a rate of 6 breaths per minute during each practice. They were then given an audio CD with the recorded commands, prompting the timed inhalation and exhalation. GSR was recorded using polygraph (8 channel) on both the occasion.

Statistical analysis of the data obtained was done using Student-‘t’ test, and other relevant statistical tools.

RESULTS

The parameters thus recorded were analyzed for statistical significance using Students’t’ test and p<0.05 was considered the level of significance. GSR was significantly increased at (p < 0.001**) after practicing deep breathing.

Table-1: Distribution of Height (cms) of subjects studied

Height (cm)	Number of subjects	%
<150	1	3.3
150-160	10	33.4
160-170	13	43.2
>170	6	19.9
Total	30	100.0

Table-2: Distribution of Weight (kg) of subjects studied

Weight (kg)	Number of patients	%
40-50	11	36.5
51-60	14	46.6
61-70	5	16.6
Total	30	100.0

Table-3: Statistical significance of deep breathing

Parameter	Before practicing deep breathing	After practicing deep breathing for one months	Significance
GSR	188.78±113.90	248.51±67.73	< 0.001**

DISCUSSION

GSR was increased in subjects who practiced deep breathing & it was statically highly significant it thus implies that people who practice deep breathing have lower sympathetic activity. Various mechanisms have been proposed to explain this decrease in sympathetic tone, and the associated increase in parasympathetic tone following *pranayama*. These include an increase in vagal tone following the slow breathing exercise[5] an increase in baroreflex sensitivity[9], an increase in tissue oxygenation [10], interaction of *pranayamic* breathing with the nervous

system affecting metabolism and autonomic functions[13]. The result of the present study was also consistent with study done by lavender[14], in their reaserch reported that increase in blood flow during practice of deep breathing suggesting deep relaxation & decrease sympathetic activity. Shasi[15]found that GSR increased during deep breathing & subjects were more relaxed after practicing deep breathing. Kanchan[16] reported that GSR tend to increase during meditation which is suggestive of increase in parasympathetic activity & decrease in sympathetic activity

CONCLUSION

Considering the findings of our study deep breathing have been found to be useful in inducing a state of psychological & physiological well being. And these findings are suggestive of lower level of sympathetic activity & increase in parasympathetic activity in subject who practiced deep breathing

Limitations of the study-The limitations of the present study were less number of the subjects.

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