

Effect of Bhastrika and Nadisodhan Pranayama on Selected Physiological Functions of Sedentary Women

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Abstract: Aim of the present study is to assess the effect of six weeks yoga and pranayama effect on peak flow meter (PFR), heart rate (HR), systolic blood pressure (SBP), and diastolic blood pressure (DBP). Total 70 female subjects have been selected, aged 25-40 Years, from Raipur. All the female subjects were living sedentary life style. The Bhastirka Pranayama and Nadisodhan Pranayama was given for 6 weeks, 5 days in a week for 20 to 25 minutes. PFR (litter/min) was measured with the help of peak flow meter, HR (beats/min), SBP (mmHg), and DBP (mmHg) were measured with the help of digital sphygmomanometer. Descriptive and inferential (ANOVA) analyses were employed to draw meaningful result and conclusion. Results of the present revealed significant ($p < 0.05$) improvement in PFR and HR. the systolic blood pressure and diastolic blood pressure did not show significant changes. More study on large sample is required to draw more robust conclusion.

Keywords: bhastrika pranayama, nadisodhan pranayama, peak flow meter, heart rate, systolic blood pressure, diastolic blood pressure

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I. INTRODUCTION

In today's modern lifestyle people are fascinating toward luxurious sedentary life style which leads several health problems such as obesity, diabetic, asthma, hypertension etc. Sedentary lifestyle is basically a very low or no physical activity life. Human depends on the machine reducing physical efficiency. This inactivity leads many health hazards. Human being is higher vertebrates animal. Human body is designed to work maximum during photo periodic hour and zero activity during night time. Alternation in this leads serious complications. Physical activity and practice of Yoga keep human physically, mentally, socially fit which improves the quality of life of practitioners.

Yoga is a set of physical exercise synchronized with breath which improves the well-being of practitioners. Yoga is holistic modalities reduces the doses in patients and improves the quality of life suffering from different type of health issues. Yoga is preventive aspect of medical science as well as management of disorders (Madanmohan; 2008). The yogic practitioners can easily cope up with disturbances. In this study, bhastrika and nadishodhan pranayama practice is given to the subjects. Bhastrika activate and rejuvenate the entire body. The terms nadisodhan means the purification of the nerves. A slight obstruction in the nervous system may cause great discomfort and even paralyse a limb or organ. This is the combines the technique of exhalation (rechaka) as in anuloma, and of inhalation (puraka) as in pratilomapranamaya. Present study aimed to assess the six week bhastrika and nadisodhan pranayama effects on peak exploratory flow rate, heart rate, systolic blood pressure, and diastolic blood pressure on sedentary female subjects.

II. MATERIAL AND METHOD

In the present study total 70 female subjects has been selected, aged 25-40 Years, from Raipur. All the female subjects were living sedentary life style. Subjects were given six-week yogic practices. The Bhastirka Pranayama and Nadishodhan Pranayama was given for 6 weeks, 5 days in a week for 20 to 25 minutes. The effect of Pranayam was assessed by physiological parameters such as peak flow rate (PFR), heart rate (HR), systolic blood pressure (SBP), and diastolic blood pressure (DBP). PFR (litter/min) was measured with the help of peak flow meter, HR (beats/min), SBP (mmHg), and DBP (mmHg) were measured with the help of digital sphygmomanometer. The normality of the data was checked and found normally distributed. Descriptive and inferential (ANOVA) analyses were employed to draw meaningful result and conclusion.

III. Results

Table 1: Showing the comparison of characteristic of physiological parameters namely PFR, HR, SBP, and DBP before and after treatment

Variables	Pre-Test	Post -Test	ANOVA		
	Mean±SE	Mean±SE	F value	df	p-value
PFR (ltr/min)	348.50±5.77	393.33±3.96*	35.73	68	p<0.05
HR(beat/min)	79.35±0.52	74.43±0.71*	32.45	68	p<0.05
SBP (mmHg)	121.08±1.34	120.50±1.56	0.60	68	p=0.81
DBP (mmHg)	80.33±1.18	81.04±1.26	0.16	68	p=0.68

*Mean ± SE, showing the difference between the treatments at p<0.05 (based on one-way ANOVA). PFR – peak flow rate, HR – heart rate, SBP- systolic blood pressure, DBP – diastolic blood pressure

Table 1 shows the characteristics of peak flow rate, heart rate, systolic blood pressure, and diastolic blood pressure as function of treatment i.e. before and after yogic practices. It is clearly seen that the inter-individual differences are not witnessed in all studied variable in the present study. Treatment effect i.e. effect of six-week pranayama effect is seen peak flow meter, and heart rate. The lung volume is significantly (p<0.05) improved. Similarly, resting heart rate is significantly (p<0.05) decreased. In contrast, insignificant (p>0.05) difference is validated in blood pressure (SBP and DBP).

Table 2: Showing the summary of characteristic of physiological parameters namely PFR, HR, SBP and DBP variables of subject after treatment between the age group

Variables	Below 30 years	30- 35 year	Above 35 years	ANOVA		
	Mean±SE (N=27)	Mean±SE (N=20)	Mean±SE (N=23)	F value	df	p-value
PFR (ltr/min)	367.40±6.79	369.00±8.85	366.95±8.65	0.01	67	p=0.98
HR(beat/min)	75.74±0.96* ^a	80.00±0.59* ^b	76.61±0.74* ^a	7.02	67	p<0.05
SBP (mmHg)	117.87±1.68* ^a	121.83±1.87* ^{a,b}	123.52±1.54* ^b	3.14	67	p<0.05
DBP (mmHg)	79.44±1.58	80.77±1.40	81.93±1.39	0.74	67	p=0.48

*Mean ± SE, means bearing similar alphabets do not differ from each other statistically significantly at p<0.05 (based on LSD multiple test). PFR – peak flow rate, HR – heart rate, SBP- systolic blood pressure, DBP – diastolic blood pressure

Table 2 shows the characteristics of peak flow rate, heart rate, systolic blood pressure, and diastolic blood pressure as function of age i.e. below 30 years, age between 30-35 years, and after 35 years. It is clearly seen that the inter-individual differences are not witnessed in all studied variable in all groups in the present study. The age effect is seen in heart rate and systolic blood pressure. The resting heart rate is significantly (p<0.05) decreased (76.61) in above 35 years group. In SBP below 30-year group and 35-35 years group showed lower pressure amongst the studied (table 2). In contrast, insignificant (p>0.05) difference is validated in peak flow rate and diastolic blood pressure.

IV. DISCUSSION

At the beginning, it was hypothesized that brastrika and nadisodhan pranayama has significant effect on cardio-respiratory (PFR), heart efficiency (HR_{resting}), and blood pressure (SBP/DBP) of individuals. Result of the present study revealed significant effect on PFR and HR. this study corroborated with previous study (Kanniyan. A.; 2014). The pranayama practices have impact on sedentary male in speed, cardio respiratory endurance, explosive power, and agility.

Similar result is found in heart rate. the heart rate is significantly decreased after six week of pranayama practice in the present study. Many previous (Veerabhadrapa et.al.;2011, Deelip and Razeena; 2014, Somvanshi et.al.; 2013, and Ahmed and Tomar; 2012) study revealed significant improvement in heart function after pranayama practice. The resting heart rate is a good indicator of fitness and training. Many athlete and coaches use resting heart to assess their fitness and coaching status (Reilly; 1990). Veerabhadrapa et.al. (2011) validated the significantly positive effect of yogic on cardiovascular autonomic reactivity. The result of the study showed a reduction in basal heart rate and systolic blood pressure on apparently healthy individuals.

In another study, they reported that 12 weeks of yoga practice results in significant increase in maximum expiratory pressure, maximum inspiratory pressure, breath holding time after expiration, breath holding time after inspiration, and hand grip strength (Madanmohan,1992). Joshi et al (1992) have also demonstrated that six weeks of pranayam breathing course resulted in improved ventilatory functions in the form of lowered respiratory rate, and increases in the forced vital capacity, forced expiratory volume at the end of 1st second, maximum voluntary ventilation, peak expiratory flow rate, and prolongation of breath holding time. Similar beneficial effects were observed by Makwana et al (1988) after 10 weeks of yoga practice. diastolic

blood pressure Dileep, N. S. & Razeena, K.L. (2014) found significant effect of Asana and Pranayama on resting heart rate among engineering students. The resting heart rate decreased among the engineering students. Sudarshan kriya is a one aspect of bhratsika pranayama which is practiced with asana and pranayama. Sudarshan kriya also influence positively the psychologically, physically, and physiology. Somwanshi, S. et. al.(2013) demonstrated significantly effect of sudarshan kriya on cardio-respiratory function of subjects.the systolic blood pressure, diastolic bold pressure, heart rate, and respiratory rate after 12 weeks practice of sudarshan kriya yoga in healthy subjects.This kriyas maintains balance in autonomic nervous system by parasympathetic dominance and decreased sympathetic drive (Somwanshi et.al; 2013). Ahmed and Tomar (2012) contradict the present study. Heart rate didn't show any changes. In this study subjects were aged from 10-16 years. Barnes et al (2004) reported decrease in heartrate and systolic & diastolic blood pressure in school children after 3 months of meditationpractice.Proper and systematic practice of Yoga leads to decrease in heart rate. Madanmohan et al (1983) revealed significantly decrease in heart rate and diastolic blood pressure. Shavasan alone has been shown to be effective in the treatment of hypertension (Datey et al 1969; Patel and North1975).

The blood pressure did not show changes after six weeks of pranayama practices. All the selected subjects in the present study showed normal range of blood pressure.Madanmohan et al (2008) have reported that yogatraining of six weeks duration attenuates the sweating response to step test and produces a markedincrease in respiratory pressures and endurance in 40 mm Hg test in both male and femalesubjects. It is presumed that the yoga including has positive effect on cardio-respiratory functions, heart rate, systolic blood pressure, and diastolic blood pressure. More study on large sample is required to draw more robust conclusion.

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