RESEARCH ARTICLE

The Effect of Bhramari Pranayama on Pregnant Women Having Cardiovascular Hyper -Reactivity to Cold Pressor

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ABSTRACT

Background: Stress has been said to be the underlying cause in the etiopathogenesis of the diseases like Bronchial asthma, Peptic ulcer, Essential hypertension and Toxemia of pregnancy. The identification of pre eclampsia and its effective management plays a significant role in the outcome of pregnancy both for the mother and the baby. Yogic exercises have been reported to be beneficial in stress related disorders by producing calming effect on nervous system.

Aims & Objective: The aim of present study was to explore the possibility of the use of Bhramari Pranayama as a preventive measure of pre eclampsia.

Materials and Methods: Fifty pregnant women in the age group of 20 to 28 years were included in the present study. The cardio vascular reactivity of these subjects was studied by application of the cold pressor test. Initially there were 28 hyper reactors to this test. These hyper reactors underwent Bhramari Pranayama for the duration of 2 months. It was observed that the hyper-reactivity of 22 subjects was converted to hypo- reactivity whereas the remaining 6 subjects did not alter their response.

Results: Regular practice of Bhramari Pranayama reduced the cardio vascular hyper- reactivity to cold stress after just 8 weeks.

Conclusion: The hyper- reactivity to cold stress may be an early indication of the developing pre eclampsia. Conversion of this response to hypo -reactivity may be used as a tool for prevention of pregnancy induced hyper tension.

KEY WORDS: Bhramari Pranayama; Cold Pressor Test; Pre-Eclampsia; Stress

INTRODUCTION

Profound emotional disturbances are expressed in effect on viscera which are innervated by the sympathetic division of the autonomic nervous system.**[1]**

The aetiology of pre eclampsia is unknown and many theories so far advanced have failed to be substantiated.[2-4] Recent data indicate an increased vascular reactivity due to an over activity of the sympathetic nervous system in women with pre eclampsia.[5]

Pre eclampsia affects 5-8% of pregnancies and is a major cause of maternal and perinatal morbidity and mortality.[6] Early detection of high risk patients is essential for prophylactic intervention to reduce morbidity and mortality associated with this syndrome.[7]

Cold pressor test devised by Hines and Brown in 1932[8] has been used from time to time to detect the cardio- vascular hyper-reactivity of pregnant women as an attempt to be used as a predictor of pre eclampsia at quite an early stage.[9]

Yoga has been effectively used in the management of stress. In Yoga pranayama is known to modulate autonomic output and restore the balance between two components – sympathetic and parasympathetic - of autonomic nervous system.[10]

Since the sympathetic over activity has been claimed to be one of the factors in aetiopathogenesis of pre eclampsia and Pranayama, especially the Bhramari Pranayama, has been reported to stimulate the parasympathetic nervous system[10], the present study was undertaken to explore the possibility of using the Bhramari pranayama as an adjuvant to therapeutic measure to prevent the occurrence of pre eclampsia .

The aim of present study was to investigate whether regular practice of Bhramari Pranayama for 2 month can reduce the cardiovascular hyper-reactivity induced by cold pressor test.

MATERIALS AND METHODS

Study group comprised 50 pregnant women in the age group of 20 to 28 years. The study protocol was explained and written consent was obtained. Approval by ethical committee of S.S. Medical College, Rewa, MP, was also obtained. All the pregnant women were clinically examined to rule out any systemic diseases. All pregnant women did not have any addiction. They were not taking any drugs, and they had similar dietary habits as well as physical and mental activities at work and home.

BP was measured in supine posture by Sphygmomanometer.[11] Two reading were taken 5 minutes apart and the mean of two was taken as the basal blood pressure. The resting pulse rate was also recorded. They were subjected to cold pressor test introduced by Hines & Brown.[8]

For this test, a thick walled thermocol box measuring 38 cm × 26 cm × 18 cm, closed from all sides, was used. A hole was made in the centre of the top of the box to allow entry to one hand of the subject. Another small hole was made at the corner of the top of the box for laboratory thermometer. Before starting the experiment the box was filled a mixture of ice and water and the laboratory thermometer was placed in such a way that its mercury bulb was immersed in the mixture of ice and water. Temperature inside the box was maintained around 3-4^{0}C. The hand was immersed in cold water up to the wrist for one minute (cold stress). An elevation above the basal level of more than 20 mm of Hg in systolic or of more than 15 mm in diastolic was considered as hyper-reactive response.[12]

Out of 50 pregnant women, 28 turned out to be hyper-reactive to this provocative test (56%). All the 28 hyper-reactive pregnant women were first trained for Bhramari Pranayama under the guidance of a certified “yoga” teacher for 15 days. They then practiced it, twice a day for two months, under supervision, in the prescribed manner, at their home. The schedule consisted of, Bhramari Pranayama for10 minutes for 02 session (morning & evening).

The pregnant women practiced this pranayama early in the morning and again in the evening, in a quiet, well ventilated room or in open air space sitting in a comfortable posture.

After the therapy of Bhramari Pranayama for 2 months, the hyper-reactivity of 21 pregnant women was converted to hypo-reactivity (75%). Other parameters like basal blood pressure, rise in blood pressure and pulse rate were also reduced significantly as revealed by student't' test.

Statistical Analysis

The data was analyzed statistically by using statistical software Graph Pad in Stat vs. 3.10 and MS Excel (2007) and Biostatistics by B.K.Mahajan. Statistical analysis of BP and pulse rate were done using student's 't' test and $p < 0.05$ was considered as significant.

RESULTS

Our results showed that "Bhramari Pranayama" causes significant reduction in the cardiovascular hyper-reactivity. A total of 50 pregnant women were included in the study. Out of which 28 were hyper-reactor to cold pressor test. These hyper-reactors practiced Bhramari Pranayama regularly for two months and after this period the 21 pregnant women became hypo-reactors, whereas no change in the hyper-reactivity was observed in seven. The statistical analysis was carried out using student 't' test. It was observed that the basal blood pressure, rise in BP due to cold stress (Table-1). And pulse rate was statistically significantly reduced (Table-2).

The mean basal systolic blood pressure decreased from 146.35 ± .5.93 mm Hg to 143.21 ± 4.66 mm Hg after 2 months of Bhramari Pranayama. The diastolic basal blood pressure was found in the study to change from 93.21 ± 3.18 mm Hg to 88.42 ± 2.13 mm Hg.

Pulse rate decreased from mean value of 798.96 ± 3.38 to 73.5 ± 2.8, which is significant. ($p< 0.001$).

Table-1: Changes in Blood Pressure in mm Hg in Pregnant Hyper-reactors before and after Two Months of Bhramari Pranayama

Blood Pressure (mm Hg)		Before	After 2 Months	Difference	P Value
Basal BP	Systolic	146.35 ± 5.93	143.21 ± 4.66	3.14	<0.001
	Diastolic	93.21 ± 3.18	88.42 ± 2.13	4.78	<0.001
BP after Hand dip in 4^0 C water for 1 min.	Systolic	167.85 ± 6.03	158.71 ± 6.32	9.14	<0.001
	Diastolic	106.78 ± 4.08	99.85 ± 3.35	6.92	<0.001
Rise in BP	Systolic	21.5 ± 4.5	15.5 ± 2.91	5.16	<0.001
	Diastolic	13.5 ± 2.64	11.42 ± 2.82	2.07	<0.001

Table-2: Changes in Pulse Rate in Pregnant Hyper-reactors before and after Two Months of Bhramari Pranayama

Pulse Rate (per min)	Before	After 2 Months	Difference	P Value
Pulse Rate	79.96 ± 3.38	73.5 ± 2.8	6.46	<0.001

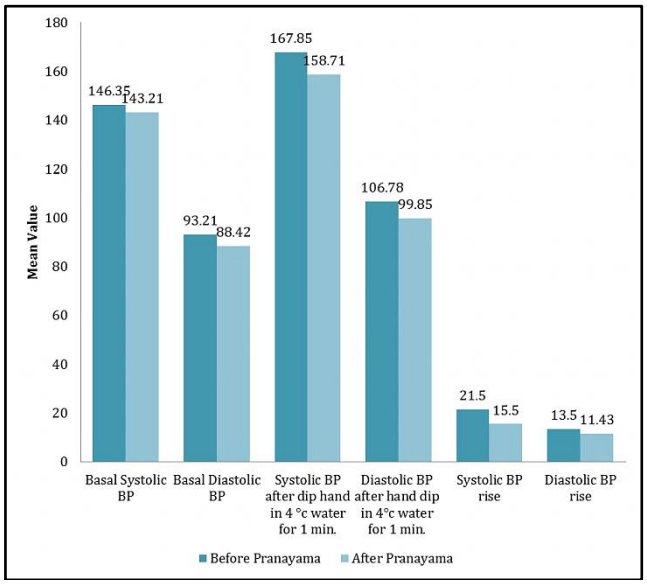

Figure-1: Change in Blood Pressure in mmHg in Pregnant Hyper-reactors before and after 2 Months of Bhramari Pranayama.

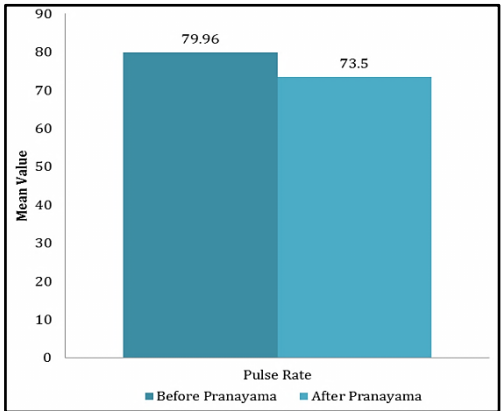

Figure-2: Changes in Pulse Rate in Pregnant Hyper-reactors before and after Two Months of Bhramari Pranayama

DISCUSSION

Pregnancy is associated with profound adaptive changes in maternal hemodynamics. Autonomic nervous system plays a central role in the adaptation.[6] The new conditions resulting from pregnancy require a considerable alteration in the mother sharply changing the reflex reactions to external and internal stimuli. In the normal state of the nervous system, there occurs an adaptation of the mother to the new nervous, chemical and physical influences and accordingly the reactions of the mother to the pregnancy are considered physiologic. Under such conditions pregnancy develops normally without giving rise to pathologic processes in the mother. On the contrary, if the physiologic functions of the nervous system or the uterus itself are disturbed, the reaction of the mother to the stimuli of the pregnant uterus may assume an unnatural character and become pathologic and there begins late toxemia.[13]

Profound emotional disturbances are expressed in effects on viscera which are innervated by the autonomic nervous system and especially by the sympathetic division of that system.[1]

Stress and severe emotions during pregnancy may have an adverse effect upon the products of conception, especially on the sensitive organism.[14]

A leading cause of maternal and neonatal death worldwide, preeclampsia is a syndrome that arises in pregnancy affecting 5% to 8% of all pregnancies.[6]

Hypertension is one of the common conditions met with in pregnancy. It may be preexisting or appears for the first time. The identification of this clinical entity and effective management plays a significant role in the outcome of pregnancy, both for the mother and the baby.[15]

Hines and Brown in 1932[8] devised a method to study the response of the body to the cold stress. Later on Randall et al[9] used the technique of Hines and Brown in pregnancy and concluded that by means of this test it might be possible to pick out, during early pregnancy, a group of women, some of whom might later develop hypertensive toxemia.

Since the patho-physiological mechanisms underlying the preeclampsia are not completely understood, various theories are put forward.[2-4] Airaksinen et al[16] suggest that impairment of the autonomic functions may be the cause. Recent data indicate that an increased vascular reactivity due to an over activity of the sympathetic nervous system is present in women with preeclampsia.[5] If this vascular reactivity can be detected prior to the clinical manifestation by the use of a physiological stimulus then pregnancy induced hypertension and the related maternal and fetal mortality can be decreased by the use of adjunctive measures like Yoga together with the use of drugs.

It is with this objective that present study was undertaken. In our study 50 pregnant women were subjected to the cold pressor test devised by Hines and Brown. 28 out of 50 (56%) turned out to be hyper reactors to this provocative test. These 28 hyper reactive women underwent Bhramari Pramayama for two months and it was observed that the hyper reactivity of 21 subjects was converted back to hypo reactivity while 7 subjects did not show any change. There was also statistically significant reduction in basal BP, response to cold stress and basal pulse rate after two months of this Yogic practice.

Yogic exercises have been reported to be beneficial in stress-related disorders by producing calming effect on nervous system. In yoga, pranayama is known to modulate autonomic output. The pranayama also helps in achieving and maintaining autonomic balance between the components (sympathetic and parasympathetic) of autonomic nervous system.[10]

Jerath et al[17] has explained the mechanism of how pranayamic breathing interacts with the nervous system affecting metabolism and autonomic function. According to them,

voluntary slow deep breathing functionally resets the autonomic nervous system through stretch induced inhibitory signals and hyperpolarization currents propagated through both neural and non-neural tissue which synchronizes neural elements in the heart, lungs, limbic system and cortex.

During inspiration stretching of lung tissue produces inhibitory signals by actions of slowly adapting stretch receptors (SARs) and hyper polarization current by action of fibroblast. Both inhibitory impulses and hyperpolarizing current are known to synchronize neural elements leading to the modulation of the nervous system and decreased metabolic activity indicative of the parasympathetic state.

Brahmari pranayama done regularly for five minutes daily has a definite role in the successful maintenance of pregnancy and in preventing the complications of pregnancy, especially abortion, pre-term delivery, antepartum haemorrhage, hypertension, eclampsia, anxiety and insomnia.[18]

Thus, it is possible that Bhramari Pramayam employed early in pregnancy may prevent the pregnancy induced hypertension and may be useful in averting the maternal and fetal mortality associated with it.

CONCLUSION

The hyper- reactivity to cold stress may be an early indication of the developing pre eclampsia. Conversion of this response to hypo-reactivity may be used as a tool for prevention of pregnancy induced hyper tension.

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