

Heart Rate Variability during meditation in Pranik Healers

Jaisri G, Dayananda G, Saraswathi Hegde, Sundaram C

Department of Physiology, M S Ramaiah Medical College, Bangalore, Karnataka, India.

Abstracts: Background: Heart rate variability (HRV) can be measured non-invasively in humans to study the physiological responses to various stimuli. The sympathetic branch increases heart rate and the parasympathetic branch decreases heart rate. HRV is an indicator of the dynamic interaction and balance between these two divisions of the Autonomic Nervous System. The pranik healers practice meditation which utilizes unification of body and mind. A reduced HRV is associated with increased risk of cardiac and overall mortality. Studies suggest a number of non-pharmacological techniques for the improvement of HRV. These techniques are believed to stabilize the ANS by modulating the parasympathetic nervous system and in turn improve HRV. The impact of these techniques on HRV and their effectiveness as therapeutic tools in patients with reduced HRV is to be determined. Methods: This study included 15 professional pranik healers as subjects in the age group 18-40 years. ECG was recorded during the phases, Series 1 (before meditation) and Series 3 (during meditation). HRV parameters were computed with the aid of suitable software and were analyzed. Results: The HRV parameters (Mean, Low frequency / LF, High frequency / HF, Total power, pNN50%) were compared. Power spectrum analysis showed distinctive change in frequency components. Low frequency component (LF; 0.04Hz to 0.15Hz), high frequency component (HF; 0.15Hz to 0.40Hz) and total power were significantly higher during the meditation phase ($p = 0.05$). pNN50% showed a trend towards decrease (though not significant) during the meditation phase ($p = 0.066$). Conclusions: The variance of the heart rate during meditation was significantly higher during meditation than before meditation for all subjects. These techniques are believed to stabilize the ANS by modulating the parasympathetic nervous system and in turn improve HRV. [Dayananda G et al NJIRM 2011; 2(4) : 113-116]

Key Words: Autonomic Nervous System, Heart Rate Variability, meditation, pranik healer

Author for correspondence: Dr. Dayananda G, Department of Physiology, M S Ramaiah Medical College, Bangalore - 560054, Karnataka, India. E-mail: dr.daya@rediffmail.com

Introduction: Heart rate variability (HRV) can be measured non-invasively in humans to study the physiological responses to various stimuli^{1,2}. HRV is the change in the time interval between heartbeats, from beat to beat. Autonomic nervous system (ANS) controls HRV and many other vital functions within the body. ANS comprises of two divisions, the sympathetic and the parasympathetic. Normally, the sympathetic branch increases heart rate and the parasympathetic branch decreases heart rate. Thus, HRV is an indicator of the dynamic interaction and balance between these two divisions of the ANS.

HRV data is usually analyzed in terms of its power spectral density (PSD). The PSD reveals the relative strengths of the frequency components of the signal. Frequencies in the range 0.0033 to 0.04 Hz (VLF) are associated with parasympathetic activity; frequencies from 0.15 to 0.4 Hz (HF) are associated with sympathetic activity. The intervening band (LF) is a mixture of the two influences¹.

The meditation technique followed by the pranik healers is similar to the traditional meditation which utilizes unification of body and mind. Pranik healing having originated in India and China has spread into the western world today. It involves realizing and healing by deep, relaxed meditation.

Electrophysiological studies including electroencephalogram (EEG) during meditation has been studied in the past³. A reduced HRV is associated with increased risk of cardiac and overall mortality. Studies suggest a number of non-pharmacological techniques like thought field therapy, aerobic training, biofeedback, yoga, abdominal breathing, qigong breathing and meditation^{4, 5, 6, 7, 8, 9} for the improvement of HRV. These techniques are believed to stabilize the ANS by modulating the parasympathetic nervous system and in turn improve HRV. There is a paucity of evidence and consistency regarding HRV during meditation. The impact of these techniques on HRV

and their effectiveness as therapeutic tools in patients with reduced HRV is to be determined.

The present study is to learn about the information contained in the fluctuation response of electrocardiogram heart rate to meditation. Here, HRV data was collected before and during the meditation in pranic healers. This shall focus a better understanding of the mechanisms underlying the control of hemodynamic events through reciprocal autonomic activation elicited by meditational manipulation of body, respiration and mind. This hypothesis gains insight into the autonomic response induced by the meditative state¹⁰.

Material and Methods: This study included 15 professional pranic healers as subjects. Subjects included both males and females in the age group 18-40 years. The study was conducted at Department of Physiology, M S Ramaiah Medical College and Hospital, Bangalore, Karnataka, India. The pranic healers were trained and professional healers who practiced meditation routinely. All subjects were examined for general physical health and clinical history details were taken through a standard proforma and questionnaire. Informed, written, witnessed consent was taken from all the subjects prior to the study. Subjects with obvious disease (i.e., Diabetes Mellitus, hypertension and endocrinopathies) were excluded from the study. Also were excluded those on drugs like antidiabetic / antihypertensive / glucocorticoids and other drugs which might have an effect on the study. The study was approved by the Institutional Ethical Committee.

Procedures: 15 experienced Pranic healers who were practicing relaxed meditation since many years (minimum 5 years) were studied. HRV was recorded using the Galileo NT Neuropack. The procedure was done in supine posture on the bed in a semi-darkened room. Electrodes were placed over the right and left arms to record the Electrocardiogram (ECG), with a ground electrode over the right leg. The study was done under 3 series stepwise. To start with, the subjects were instructed to lie-down calm to attain physical and mental rest (Series 1) for 15 minutes. This was followed by a phase of pranic breathing, a specific

calm and deep respiratory exercise for about 8-10 cycles (Series 2). These involved deep inhalation for 6 seconds, breath-holding for 3 seconds and then slow exhaling over 6 seconds followed by a breath-holding for 3 seconds. Subjects were instructed to breathe through the nose. Following the pranic breathing, the healers were subjected to listening and mentally following the Master Choa Kok Sui instructions for pranic self healing in the deep relaxed state over ear phones (Series 3). This is a means of deep relaxed meditation in which different overtones of "Om" are superimposed with the instructions. Subjects were strictly instructed not to vocalize the listening as this can excite neuronal discharges. The pranic healers were well versed in these series as they practice it daily for many years. ECG recorded during the phases, Series 1 (before meditation) and Series 3 (during meditation) were analyzed and the HRV parameters were computed with the aid of inbuilt software of Galileo NT Neuropack instrument. The HRV parameters of the 2 series were compared.

Statistical Analysis:^{11, 12} The data pertaining to the HRV parameters thus acquired was analysed using SPSS 13.0 and Systat 8.0 softwares. Two tailed independent student t test has been used to find the significance of HRV parameters observed in the 2 series. MS offices' excel and word was used to generate the tables.

Result: This study included 15 professional pranic healers as subjects. Subjects included both males and females in the age group 18-40 years. ECG recorded before and during the relaxed meditation phases, Series 1 and Series 3 were analysed and the HRV parameters (Mean, Low frequency / LF, High frequency / HF, Total power, pNN50%) were computed. The HRV parameters of the 2 series were compared. Power spectrum analysis showed distinctive change in frequency components.

Low frequency component (LF; 0.04Hz to 0.15Hz), high frequency component (HF; 0.15Hz to 0.40Hz) and total power were significantly higher during the meditation phase ($p = 0.05$). pNN50% showed a trend towards decrease (though not significant) during the meditation phase ($p = 0.066$). (Table-1)

Table – 1 : Comparison of Age, BMI and WC between the FH⁻ group and the FH⁺ group

	Before meditation	During meditation	p value
Mean	717.88 ± 131.21	728.78 ± 128.9	0.443
LF norm	0.45 ± 0.08	0.54 ± 0.09	0.055
HF norm	0.47 ± 0.14	0.66 ± 0.11	0.013
Total power	215.28 ± 77.26	145.35 ± 55	0.05
pNN50%	2.8 ± 2.16	1.12 ± 1.26	0.066

Discussion: Pranic energy healing is a art of understanding the inner science and it involves deep relaxed meditation. Expertise of such deep meditational states of pranic healing can be accomplished by training and practice over several years. This study was designed to understand the heart rate response to relaxed meditation in trained, professional pranic healers. The study could not find any difference in mean HRV before and during the meditation in these pranic healers. It was observed that the frequency components of the heart rate power spectrum were significantly different before and during the meditation.

In this frequency domain, the LF and the HF components were significantly higher ($p < 0.05$) during meditation than in the series recorded before meditation. The total power component was significantly higher ($p < 0.05$) before meditation than in the series recorded during meditation. The pNN50% component was increased though not significantly before meditation than in the series recorded during meditation. These frequency domain variations appear to indicate that the balance between the two branches of the ANS and is probably changed by the act of meditating. HF component is around the frequency of respiration, because it corresponds to respiratory sinus arrhythmia. Parasympathetic nervous system can transfer and modulate higher frequency, thereby transferring the respiratory sinus arrhythmia as observed in the pranic healers. This is in accordance with the understanding that the HF component is modulated by parasympathetic nervous system, but not by sympathetic nervous system^{13, 14}. Heart rate through the arterial baroreflex mechanism generates LF component of HRV^{15, 16}. Recent studies suggest that this LF component also has a

central origin¹⁷. The LF component is within the transferable frequency of sympathetic nervous system. Hence this component is modulated by both sympathetic and parasympathetic nervous system. An increase in the LF component and high frequency component was observed during meditation in the pranic healers. This increase in HF component can be attributed to the response of parasympathetic neural enhancement¹⁸. The increase in LF component is attributed to the response of both parasympathetic and sympathetic arousal mechanism during the deep relaxed meditation.

Conclusions: Pranic healing is a non-pharmacological technique for improvement of HRV similar to yogic breathing and meditation. The variance of the heart rate during meditation was significantly higher during meditation than before meditation for all subjects. These techniques are believed to stabilise the ANS by modulating the parasympathetic nervous system and in turn improve HRV.

Limitation: The present study seems to indicate that the balance between the two branches of the ANS is changed by the act of meditating. However, this is a non-harmonic component of the heart rate modulation mechanism and is not well understood². Clear interpretation of the observed changes can be attributed by series involving meditations for longer durations. This shall give a better understanding of the physiological effects of meditation and the mind-body connection.

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