



TO EXPLORE THE RELATIONSHIP BETWEEN HEART RATES OF FEMALE YOGA PRACTITIONERS UPON YOGA INTERVENTION

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Abstract

Context: Yoga has asana, pranayama, and meditation as the three main techniques to attain functional harmony between the body and mind. Recent studies on long-term yogic practices have shown improvements in cardiovascular functions. Like lower heart rates for the otherwise healthy and improved heart conditions for the recuperating and patients with chronic heart conditions.

Aim: The present study was conducted to explore if there is any relationship between the age controlled heart rates (partial correlation) after short-term practice of yoga in healthy females.

Settings and Design: This interventional study was conducted in the yoga centers operating in south Delhi, India

Subjects and Methods: Fifty two healthy females of mean age 20.25 ± 2.90 years, fulfilling the inclusion and exclusion criteria underwent one hour of daily yoga session for 15 days conducted by an experienced yoga teacher. Pre, during and post yoga heart rate were assessed by recording heart rate variable.

Statistical analysis used: The parameters were analyzed by using Pearson correlation.

Results: There was significant relationship (zero order) found between the 3 heart rate measurements after practicing pranayama and meditation for 15 days. The response was similar after controlling for age (partial correlation).

Conclusion: This study showed beneficial effects vis a vis strong relationships between the heart rates measured over the 3 occasions of short term (15 days) regular pranayama and meditation practice on heart rate irrespective of age amongst normal healthy females.

Keywords: Heart Rate, Meditation, Short Term Yoga, Females

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Introduction:

It has been reported by the World Health Organization that the death rate in developing countries is higher due to chronic diseases [1] like hypertension, diabetes and various other metabolic disorders. Either/or High blood pressure (HBP) or increased body fat [2] are

the two main root causes for almost all the chronic diseases. Researchers have shown that globally, about 39% of people over 18 years are overweight[3] and 13% already in obese category (2016). Overweight/obesity are being reported amongst the top five risk factors which can lead to death if remains



uncontrolled, unmanaged or ill-managed. People don't die because of body fat but the subsequent heart diseases globally and females are more prone to heart related disorders as compared to males.

Yoga is an age old but tried and tested philosophical culture thought to have originated in India in around 5000 BC. Modern medicine has started accepting the art and science of this tradition since the past few decades because of the fact that a holistic approach is required to cure the increasing incidences of diseases of modern day lifestyles like obesity, hypertension, coronary artery diseases, and diabetes mellitus so on and so forth. Yoga aims to attain the uniformity and unity of mind, body and spirit through postures (asana), pranayama (breathing techniques), and meditation (dhyana)

Different types of yogic practices (pranayama for example) produce different heart rates responses amongst the otherwise healthy individuals. Research has shown that in the pranayama that involves inhalation and exhalation from the right nostril only, while closing the left one, the heart rate is found to be elevated [4]. In the pranayama that involves alternate nostril breathing (nadi shodhan pranayama), there was a decrease[5] or no change in heart rate.[6] Four weeks of Nadishodhan pranayama showed significant decrease in heart rate, diastolic blood pressure, systolic blood pressure besides significant increase in pulse pressure.[7] During 'OM recitation' meditation, amongst the treatment group, there was a significant reduction in heart rate as compared to the control group in which non-targeted thinking (dhyana, as per Ashtang Yoga) was encouraged.[8,9]. All these studies reported the effects of individual pranayama or meditation practice for minimum of 4 weeks to 6 months. Some studies also included the effects of asanas. The present study was carried out to know the physiological effects of short term (15 days) combined practice of pranayama and meditation in influencing cardiovascular status in healthy females 18 to 26 years.

Hypothesis:Null: There will not be significant correlation between heart rates measured over the period of time (thrice during the intervention)

The present study was conducted offline in the various south Delhi yoga centers after taking the consent of subjects through an online google form of consent.

Fifty two healthy female subjects of age group 18 to 26 years were selected randomly from a group of participants visiting the yoga center that had been practicing yoga for 2 to 3 years but were keen on learning. The same subjects were tested thrice for their heart rates-day-1, day-7 and day-15.

Subjects who were not trained in yoga before, subjects with history of joint related issues, respiratory, cardiovascular and renal diseases, and diabetes were excluded from the study. Subjects who smoke and consume alcohol or any drugs or those who were on medication were also excluded from the study. The subjects were selected after taking a detailed clinical history. An informed consent was obtained from all the members. A medical certificate as an essential pre-requisite was being sought from all the subjects.

The resting heart rate in beats per minute was recorded in the right radial artery by palpatory method for whole one minute, on two days after the session and before the session on the first day. All the parameters were recorded between 6 am to 7.30 am

All the subjects were under uniform vegetarian dietary habits and received same yoga training for a period of 15 days for one hour daily between 6 am to 7.30 am. The subjects were instructed not to change their lifestyle or perform any other physical exercises during yoga training for 15 days.

The yoga practice schedule consisted of:

Prayer - 15 mins.

Pranayama - 15 mins.

Tips on nutrition, stress management, meditation and yogic attitude in daily life - 15 mins.

NADA Yoga Meditation - 15 mins.

Following pranayams.

Kumbhaka Pranayama (air retention)

Nadishodhan Pranayama (Alternate nostril breathing)
 Bhramari Pranayama (buzzing bee)

Results were presented as Mean SD. Pearson correlation was used to find the significance correlations of study parameters by using SPSS 23.0 version. P value less than 0.05 was considered statistically significant.

Results and findings:

Table-1: Descriptive Statistics of 52 female subjects

	N	Mean	Std. Deviation
Age	52	20.25	2.90
HR-day-1	52	68.92	5.46
HR day-7	52	66.4	4.75
HR day-15	52	63.01	5.44
Valid N (listwise)	52		

Chart-1: Descriptive statistics of both dependant and independent variable

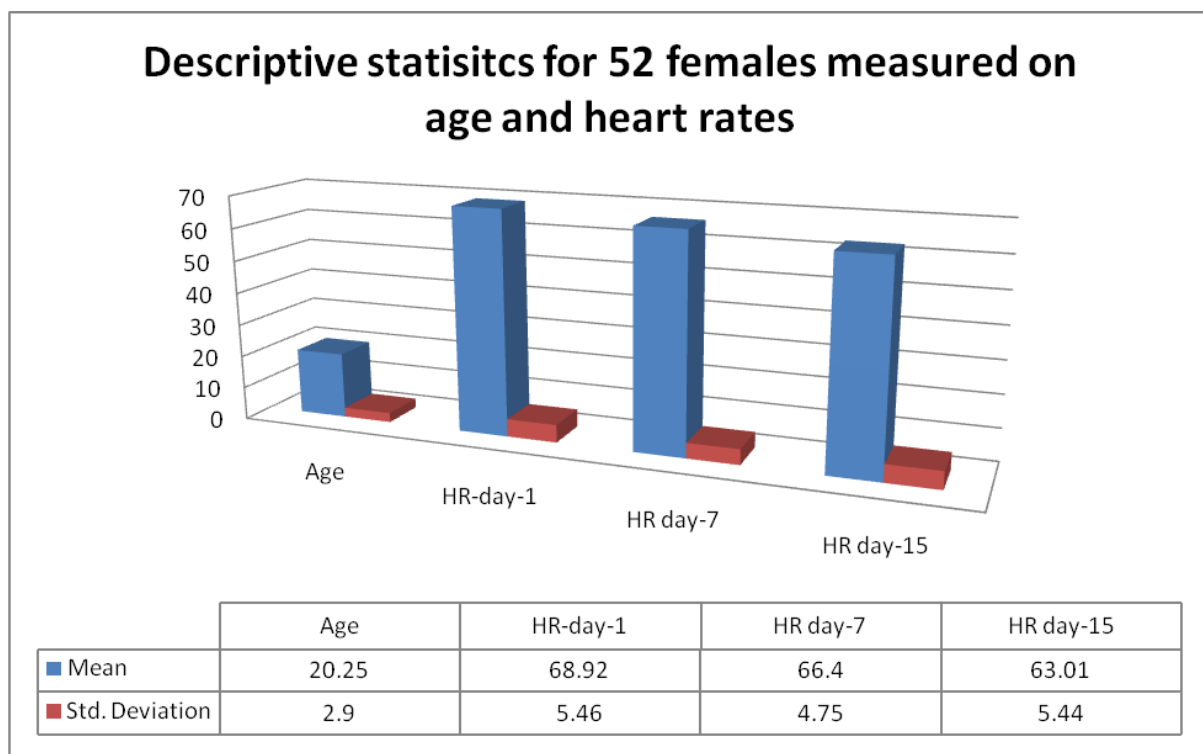


Chart-2: Trend line showing mean heart rates declining steadily from day-1 to day-15

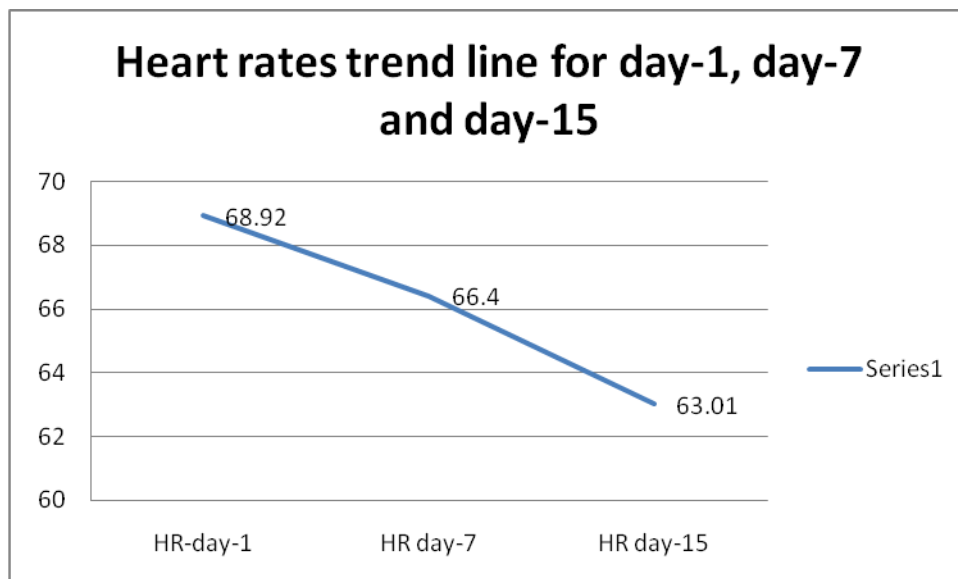


Table-2: Correlations between heart rates on all 3 days

Control Variables			HR1	HR2	HR3	Age
-none ^a	HR1	Correlation	1.000	.889	.588	-.058
		Significance (2-tailed)	.	.000	.000	.682
		df	0	50	50	50
	HR2	Correlation	.889	1.000	.696	.041
		Significance (2-tailed)	.000	.	.000	.774
		df	50	0	50	50
	HR3	Correlation	.588	.696	1.000	.214
		Significance (2-tailed)	.000	.000	.	.127
		df	50	50	0	50
Age	Correlation	-.058	.041	.214	1.000	
	Significance (2-tailed)	.682	.774	.127	.	
	df	50	50	50	0	
Age	HR1	Correlation	1.000	.893	.616	
		Significance (2-tailed)	.	.000	.000	
		df	0	49	49	
	HR2	Correlation	.893	1.000	.704	
		Significance (2-tailed)	.000	.	.000	
		df	49	0	49	
	HR3	Correlation	.616	.704	1.000	
		Significance (2-tailed)	.000	.000	.	
		df	49	49	0	

a. Cells contain zero-order (Pearson) correlations.

A partial correlation was run to determine the relationship between an individual's heart rates measured 3 times before, during and

after the intervention whilst controlling for age. There was a strong, positive partial correlation between heart rate day 1 (68.92 ±



2.90 beats per minute) and heart rate day 2 (66.48 ± 4.75 beats per minute) whilst controlling for age (20.25 ± 2.90 years), which was statistically significant, $r(49) = +0.893$, $N = 52$, $p = .000.$, indicating that age had strong influence in controlling for the relationship between heart rate for day 1 and heart rate for day 7.

Similarly there was a strong, positive partial correlation between heart rate day 7 (66.48 ± 4.75 beats per minute) and heart rate day 15 (63.01 ± 5.44 beats per minute) whilst controlling for age (20.25 ± 2.90 years), which was statistically significant, $r(49) = +0.704$, $N = 52$, $p = .000.$, indicating that age had strong influence in controlling for the relationship between heart rate for day 7 and heart rate for day 15.

Similarly there was a strong, positive partial correlation between heart rate day 1 (68.92 ± 2.90 beats per minute) and heart rate day 15 (63.01 ± 5.44 beats per minute) whilst controlling for age (20.25 ± 2.90 years), which was statistically significant, $r(49) = +0.616$, $N = 52$, $p = .000.$, indicating that age had strong influence in controlling for the relationship between heart rate for day 1 and heart rate for day 15.

Zero order correlation (i.e. without controlling for age) also indicated a strong positive correlation between the heart rates measured thrice over the period of intervention. There was not much difference with regard to the level of significance from zero order to controlling for age variable on the relationship between the heart rates measured over the three occasions, i.e. the relationships were still highly significant even after controlling for the age variable. Upon thorough literature search, it was found that there is a dearth of such similar studies being carried out to assess the relationship between same group heart rates progressively.

Conclusion:

The null hypothesis is therefore rejected, because the partial correlation is found to be significantly positive and high between the heart rates on all the 3 days of measurement.

This was true also for the zero order correlation as shown in the table-2.

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