



EFFECT OF YOGA ON PULSE RATE AND BLOOD PRESSURE AMONG WOMEN OF TERTIARY CARE HOSPITAL OF MADHYA PRADESH

Physiology

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ABSTRACT

Chronic diseases are a common cause of increased mortality in developing countries. Nowadays many studies are showing that young females of the age group 30-45 years are at increased risk of morbidity and mortality due to chronic diseases like hypertension. Lifestyle and dietary modifications are the first steps for the prevention of the development of hypertension and diabetes. Yoga is an effective method to control our physiological variables like blood pressure and pulse rate. We aimed to study the effects of yoga on physiological variables. 40 females were enrolled in the study after informed consent and the various yoga practices were done for 6 weeks. There is a reduction in the post-yoga values though the results were not statistically significant. We recommend that a large population study should be conducted in the future as yoga therapy can be an effective method of primary prevention for chronic diseases like hypertension.

KEYWORDS

Yoga, Blood pressure, Pulse rate

INTRODUCTION

According to the World Health Organisation, chronic diseases including diabetes, hypertension, and other similar conditions cause a higher death rate in developing countries.[1] Either elevated blood pressure (BP) or increased weight is the primary root cause of all chronic illnesses. [2] Research reported that globally, in 2016, about 39% of people over 18 years are overweight, and 13% were already in the obese category.[3] Overweight/obese is the fifth risk factor which may also lead to death also. About 2.8 million people annually die because of obesity globally. So, being overweight or obese is a global epidemic.[4]

According to the National Family Health Survey (NFHS) data from 2005–2006, urban communities have a considerable rate of overweight or obesity. The study also showed that middle-aged women in particular have a higher prevalence of it. [5] Various researchers reported reasons for the high prevalence of overweight/obesity among middle-aged women. Research reported that the main cause of overweight/obesity was reduced basal metabolic rate due to decreased physical activity. [6,7] Another study reported that due to decreased production of growth hormones and estrogen leads to obesity.[8] Another study identified that overeating is a reason for being overweight and obese.[9] Lack of physical activity may lead to obesity or another associated comorbidity like hypertension. It is observed that body mass index (BMI) is comparatively high among pre hypertensive and hypertensive groups, which shows a significant correlation.[10,11]

Studies have found that obesity leads to arterial stiffness due to changes in the vascular structure.[12] Obesity reduces vascular elasticity due to changes in endothelial function which may lead to increased BP.[13] The reasons will be due to increased arterial intima layer thickness and, hence, it reduces arterial lumen diameter.[14] This arterial stiffness increases systolic blood pressure (SBP) and simultaneously decreases diastolic blood pressure (DBP).[15] This further increases pulse pressure, which increases the load on the left ventricle, resulting in an increased risk of myocardial infarction and other coronary heart diseases. So, obesity changes both physiological variables, i.e., BP and pulse rate.

Yoga is a mind and body technique that is a combination of physical exercises (Asanas) in synchronous with breathing techniques like pranayama and meditation. It offers us a number of positive outcomes. [16] Yoga also improves lipid profile, and heart rate variability and decreases BP. [17, 18] The aim of our study was to identify the effectiveness of yoga therapy on physiological variables among women.

Methods

The study was conducted at People's College of Medical Sciences and Research Center, Bhopal, Madhya Pradesh. Total 40 women of the age group range from 30 to 45 years were recruited for this study. A total of

50 women were screened; out of whom four declined to sign an informed consent form. The remaining 40 were registered for the trial and were randomly allocated to both groups.

Inclusion criteria for the study were: women of age group 30–45 years; normal BP; diagnosed with any chronic illness and taking any treatment; physical activity not contraindicated; no physical and cognitive impairment; able to perform yoga and willing to participate in the study. Exclusion criteria for the study were: prior experience with yoga, and hospitalization within 3 months.

A single-blind randomized control trial with 40 participants was divided in two groups (yoga versus control) using computer generated random software, i.e., a sealed envelope. [19] Opaque envelopes were used to do the random allocation of participants in each group. Each participant did a practice set of integrated yoga for 45 min, 5 days/week for 6 weeks with a postgraduate diploma in yoga with 10 years of experience. Participants of the control group did conventional therapy. Pre-yoga and post-yoga therapy assessments, i.e., BP and heart rate were done in both groups equally after 6 weeks of intervention. All participants refrain from participating in other types of yoga-related activity during this study period.

Intervention-Yoga sets of integrated modules were developed and validated by five experts in the field of yoga. It mainly consists of simple practices which work on physical, mental, and emotional health.

The data collection procedure-Pre and post-assessment of subjects after 6 weeks were done after relaxation for 20 min. BP was measured using a calibrated and validated Android sphygmomanometer device. Both SBP and DBP recordings were taken with back support, legs uncrossed, and upper arms bared from the left hand to maintain consistency in the sitting position. All clothing covering the cuff region was removed, cuff bladder was ensured to encircle 80% or more of the participant's arm circumference. Participants were instructed not to talk while taking measurements. Pulse rates were measured by sitting each participant comfortably and measured using a digital finger pulse oximeter. Participant's information sheets were completed by each participant. Participants' complete medical history and information sheet were collected before starting of study. Adherence and compliance were checked by attendance records maintained by the yoga instructor. Participants were instructed to continue yoga sessions for 6 weeks intervention period. At end of 6 weeks, a feedback form was used to assess happiness and the hurdle faced by participants of the study. Data analysis was done by using SPSS version 23.0. For participants, the information sheet frequency and percentage were calculated. The effectiveness of yoga therapy was analyzed by using an unpaired t-test and $P < 0.05$ was considered significant.

RESULTS

Out of 40 participants, the mean age of participants was 39.2 years.

Both groups mostly belong to the age groups of 41–45 years, doing moderate work, are vegetarian, literate, and have no any family history of obesity.

Most of the women were have BMI higher than 24.6kg/m² in both groups.

Table 1: Yoga Training Schedule

Yoga training	Schedule for 0-2weeks						Schedule for 2-6weeks					
	Duration	Repetition	Sets	Rest between practices	Rest between sets	Frequency/ week	Duration	Repetition	Sets	Rest between practices	Rest between sets	Frequency/ week
Sitilikarana vyayama	5min	2	2	5-10secs	5-6mins	5days/week	4min	3	2	5-8secs	3-5mins	5days/week
Suryanamaskar	6min	2	2	10-15secs			6min	3	2	5-10secs		
Padmasana	3min	2	2	5-10secs			3min	3	2	5-10secs		
Bhujasana	3min	2	2	5-10secs			3min	3	3	5-10secs		
Padahastasana	3min	2	2	5-10sec			3min	3	3	5-10sec		
Bhramari	3min	1	1	5-10secs			4min	3	1	-		

Table 2: Participants Information Sheet Of Experimental And Control Arm.

Variables	Options	Experimental group		Control group	
		f	%	f	%
Age	30-40 years	06	30	07	35
	41-45 years	14	70	13	65
Occupation	Sedentary work	04	20	06	30
	Moderate work	09	45	07	35
	Heavy work	07	35	07	35
Food pattern	Vegetarian	16	80	12	60
	Non-vegetarian	4	20	8	40
Education	Literate	18	90	16	80
	Illiterate	2	10	4	20
Family history of obesity	Hereditary	4	20	6	30
	Non-hereditary	16	80	14	70
Body mass index	<24.9kg/m ²	2	10	2	10
	>24.9kg/m ²	18	90	18	90

Table 3: Comparison Of Pulse Rate And Blood Pressure Of Experimental And Control Group.

Physiological variable	Group	Pre-test value	Post-test value	SD	t-value	p-value
1. Pulse rate	Experimental	80.40	76.80	2.58	34.70	0.07
	Control	82.45	81.20	2.78		
2. Systolic BP	Experimental	142.28	140.80	4.23	12.89	0.06
	Control	140.38	141.18	4.89		
3. Diastolic BP	Experimental	82.60	81.70	3.28	23.79	0.03
	Control	81.20	80.56	4.28		

DISCUSSION

In our study, the participant's mean age was 39.2 years. Another randomized control trial recruited participants from an age group of more than 65 years indicating that in our study most of the participants were of a young age.[20] The majority did a modest amount of work, were vegetarians, were literate, and had no history of obesity in their families. However, no study had provided this type of participant information sheet, which would have been useful in gaining further insight into participants. The current study found that 6 weeks of yoga training reduces the pulse rate of the experimental group more than the control group. The review article also concludes that yoga training has an effect on heart rate and control variability.[21] Yoga training for 6 weeks among the experimental and control group shows a significant difference in the mean of SBP as well as DBP after doing and maintaining BP. Hence, it proves yoga therapy is an effective method to control BP among hypertensive patients or chronic diseases. A meta analysis also reported that yoga can be recommended for reducing BP as an effective intervention.[22] Another longitudinal study was conducted to assess the effects of yoga therapy on quality of life and obesity levels among women. The study was conducted for 3 months and showed a significant decrease in all physiological variables like SBP (0.06), DBP (0.03), and pulse rate (0.07), all of which were found statistically insignificant.[23] The practice of yoga therapy with meditation calms our mind, which further promotes our mental alertness, leading to a normal healthy life. When a person practices yoga and meditation, their appetite is also reduced, and their craving for food is reduced. Yoga therapy helps women achieve inner balance and reduces stress levels.

The novelty of this study is that yoga can be integrated with these yoga techniques along with regular treatment for hypertensive patients. Yoga must be a way of living for every human being. The novel aspects of our study were randomized control design, structured yoga training

After 6 weeks of yoga training, the pulse rate of the experimental group was significantly reduced, which is again also statistically significant.

Statistically, there was no significant difference in values of the mean of SBP as well as DBP after doing yoga training for 6 weeks among experimental and control groups as the sample size is small.

session, good compliance, control group, and women population.

CONCLUSION

For overweight women, yoga therapy should be the preferred treatment option because it is one that they can simply adopt. Due to the limited sample size and short follow-up period used in this study. As researchers, we advocate for studies with high sample sizes and long-term follow-ups to finally demonstrate the effectiveness of yoga therapy. As childhood obesity is a serious issue in developing nations, yoga treatment can be efficiently and simply included in the curricula of schools and colleges. Yoga therapy should be an integral part of hypertension patient's treatment that helps us to treat a human holistically including their physical, mental, social, and spiritual health. Yoga therapy has preventive nature, while it could be used for curative and restorative purposes in some chronic diseases. So significant changes were observed in physiological variables in our study that suggested that yoga therapy is beneficial therapy and improves the quality of life of women by reducing stress levels and decreasing weight also.

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