Original Article

Comparison of the effect of Yoga, Zumba and Aerobics in controlling blood pressure in the Indian population

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Abstract

Aim: This study aims at comparing the effect of Yoga, Zumba dance, and Aerobic exercises in controlling blood pressure among the Indian population without using hypertensive drugs. **Objective:** This study is designed to analyze the effect of Yoga, Zumba, and Aerobics in controlling blood pressure among the Indian population and to determine which of the three is better to treat hypertension without using hypertensive drugs. **Background:** Hypertension is a disease which is nowadays most commonly seen among children and adolescents and has been found that regular exercise tends to reduce the levels of high blood pressure in a very effective way among which the effects of aerobics exercise on reducing high blood pressure in hypertensive patients had been more convincing that regular aerobics exercise reduces the blood pressure by >1.5 mmHg.

Keywords: Aerobics, blood pressure, cardiovascular diseases, exercise, hypertension, stress, Yoga, Zumba

Introduction

Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels. Blood pressure is expressed by two measurements, the systolic pressure and diastolic pressure, which are the maximum and minimum pressures, respectively. Normal blood pressure for adults is defined as a systolic pressure below 120 mmHg and a diastolic pressure below 80 mmHg. It is normal for blood pressures to change during sleep, activity, excitement, or nervousness. During activity, it is normal to expect an increase in the BP. Blood pressure normally increases with age and body weight. Infants often have very low blood pressure that are considered normal for babies, while older teens have similar range of BP to adults. However, once the activity stops, blood pressure returns to normal baseline range.[1]

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Received: 01-08-2019 **Revised:** 01-01-2020
Accepted: 10-01-2020 **Published:** 28-02-2020

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_607_19

Hypertension and prehypertension have been increasing among adolescents since the 1990s.[2,3] Hypertension affects approximately 1 billion worldwide.[4] Elevated blood pressure, also known as hypertension, is one of the most important modifiable risk factors for cardiovascular disease and is accounting for 10% of overall deaths in India.[5] Regular physical exercise reduces blood pressure and is broadly recommended by current American and European hypertension guidelines.[6,7] studies have concluded that the prevalence of hypertension is greater in the urban population when compared to the rural population. The reason could be the difference in heredity, smoking, body fat and lifestyle of city dwellers and villagers. Modern medicines can treat hypertension but in the long run they have side-effects.[8,9]

Aerobic exercises are advised for health promotion and prophylaxis for many cardiovascular diseases. Hypertensives are encouraged to "engage in aerobic exercise on a regular basis, such as walking, jogging or swimming for 30–45 minutes daily.[9] They refer to all exercises that involve major muscle groups and

How to cite this article: Packyanathan JS, Preetha S. Comparison of the effect of Yoga, Zumba and Aerobics in controlling blood pressure in the Indian population. J Family Med Prim Care 2020;9:547-51.

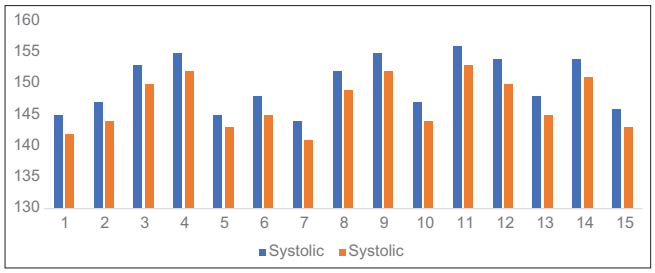

Figure 1: Variations in systolic pressure before and after aerobic exercises

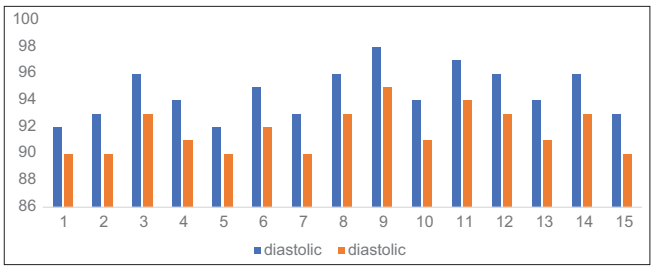

Figure 2: Variations in diastolic pressure before and after aerobic exercises

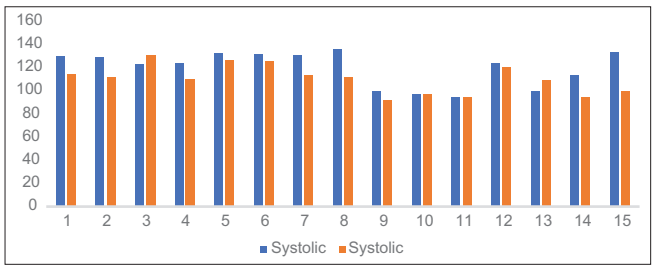

Figure 3: Variations in systolic pressure before and after practicing yoga

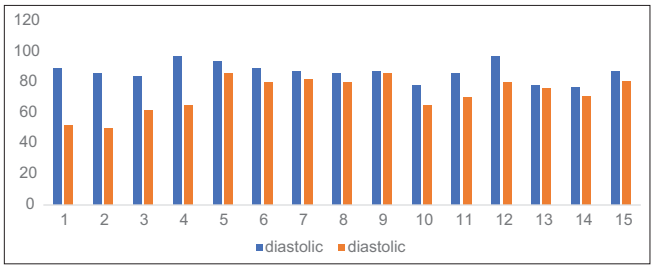

Figure 4: Variations in diastolic pressure before and after practicing yoga

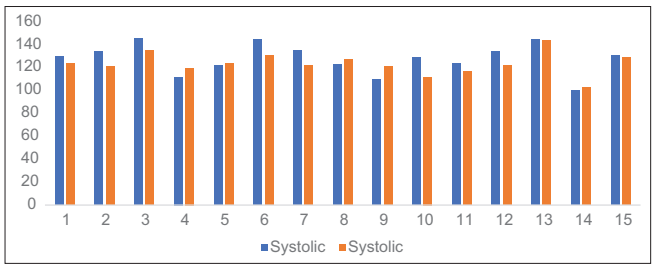

Figure 5: Variations in systolic pressure before and after zumba dance

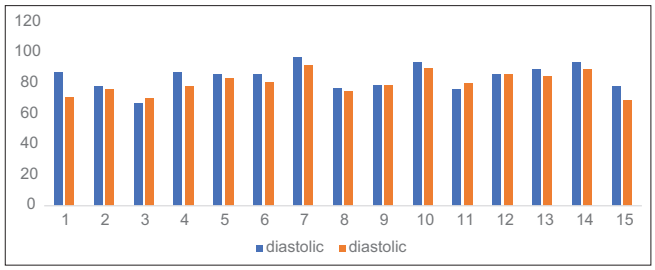

Figure 6: Variations in diastolic pressure before and after zumba dance

improve oxygen consumption by the body. Aerobic exercise includes walking, jogging, running, cycling, and others. Recent meta-analytical study from western world confirms that aerobic exercise would result in clinically significant reduction in blood pressure.[10] In normotensives, regular exercise reduces systolic blood pressure by 3 to 5 mmHg and diastolic blood pressure by 2 to 3 mmHg. In hypertensives, this effect is even more pronounced: a recent meta-analysis indicated a mean reduction of 7 mmHg systolic and 5 mmHg diastolic.[11] Aerobic exercise such as walking not only improves fitness but also improves overall quality of life and decreases all-cause mortality.[12,13] A recent study by Fernando *et al*.,[14] shows that aerobic exercise leads to a significant reduction of blood pressure in resistant hypertension. Hence, a low responsiveness to antihypertensive drug therapy does not inevitably go along with a low responsiveness to exercise.

Zumba is a dance fitness program created by Colombian dancer and choreographer Alberto "Beto" Perez during the 1990s. It is an extremely widespread Latin inspired dance exercise program that started in 2001 and has been gaining rapid popularity. The motto of Zumba dance is "Ditch the workout, Join the party".[15] LLC. Zumba involves dance and aerobic movements performed to energetic music. The goal of Zumba is for participants to improve strength, balance, coordination, and cardiovascular endurance.[16] The choreography incorporates hip-hop, soca, samba, salsa, merengue, and mambo. Squats and lunges are also included.[17] The exercises include music with fast and slow rhythms, as well as resistance training. Approximately 15 million people take weekly Zumba classes in over 200,000 locations across 180 countries.[18]

Yoga is a science practiced in India over thousands of years. It produces consistent physiological changes and has sound scientific basis.[19] All over the world scientists have extensively studied Yoga and claimed that it increases longevity, it has therapeutic[20-22] and rehabilitative effects[23-25]. Several previous investigators have also observed that Yoga lowers systolic pressure.[26] Aging is inevitable and no system is spared of its changes. As the age advances cardiovascular regulatory mechanisms (baroreceptor reflex activity) reduces their efficiency.[27] Yoga might modify the states of anxiety I,[28] thus reducing hypertension. Numerous longitudinal studies on effect of short term yoga on cardiovascular system in various age groups showed similar results.[29,30] Yoga in long duration affects hypothalamus and brings about decrease in the systolic

and diastolic BP through its influence on vasomotor centre, which leads to reduction in sympathetic tone and peripheral resistance.[20]

Even though it is confirmed from western world that exercises are helpful, there is little available evidence from India. The present study however was undertaken to ascertain whether Yoga, Zumba, and aerobic exercises in the long term has any effect on slowing the onset effects of aging, stress, lifestyle on blood pressure, and considering the possibility of advocating this simple and easy technique for reducing the morbidity and mortality from cardiovascular diseases.

Materials and Methods

The ethics committee has approved the study on 25th April 2017. The study was conducted among 15 randomly selected hypertensive patients in an aerobics gym centre in Chennai, Tamil Nadu. The participants were aged between 30 and 60 years and were engaged in aerobic exercises on a regular basis for 45 mins every day. The study group also included 15 hypertensive patients between the age groups of 30 and 60, randomly selected from Chennai, Tamilnadu, performing "Yoga" i.e. "Asanas" (postural exercises), "Pranayamas" (breathing techniques), and "Savasana" (meditation), under proper guidance of the instructor. Another study group consisting of 15 hypertensive patients in a Zumba training center was included in the study. The participants were aged between 30 and 60 years. Participation of the respondents was voluntary. The study was conducted for a period of 3 months. The total participants in the study were 45 ($n = 45$).

The inclusive factors were all subjects should be non-alcoholic, non-smokers, not under any medications for hypertension, the participants must be undertaking a regular diet and were having similar dietary habits and must do regular exercise. They were subjected to clinical examination and found healthy. The participants not falling under inclusive factors were excluded. The participants were explained about the study and the volunteers were included.

The blood pressure of the participants was estimated twice, first time during their visit to the aerobics center before starting their exercise and second time after 3 months of regular aerobics exercise. In the same way, the data was collected from participants doing yoga and Zumba dance. During both visit the blood pressure of the patients were checked after five minutes of rest before beginning of the workout using an automatic blood pressure monitor, the systolic and diastolic pressure were noted in mm/Hg separately and the values were entered and evaluated using SPSS software and the results were analyzed.

Results

The data collected was computed using SPSS software. On analysis of data, it is observed that the mean reduction in systolic and diastolic pressure after aerobic exercises was 3.0 mmHg [Figure 1] and 2.87 mmHg [Figure 2], respectively, the mean reduction in systolic and diastolic pressure in people performing yoga was 9.73 mmHg [Figure 3] and 14.4 mmHg [Figure 4] respectively and the mean reduction in systolic and diastolic pressure after Zumba dance was 4.53 mmHg [Figure 5] and 3.80 mmHg [Figure 6] respectively. The "*P* value" of the study of the present study was not significant. Table 1 shows that Yoga intervention was more effective as compared to drugs therapy in controlling systolic blood pressure but not diastolic blood pressure.

Table 1: Mean Systolic and diastolic pressure recorded before and after Yoga, Aerobics and Zumba

	Group	*n*	Mean	Std. Deviation
Systolic before	Aerobic	15	149.9333	4.30061
	Yoga	15	120.1333	14.87504
	Zumba	15	128.0000	13.30413
Systolic after	Aerobic	15	146.9333	4.16562
	Yoga	15	110.4000	12.52882
	Zumba	15	123.4667	9.54588
Diastolic before	Aerobic	15	94.6000	1.84391
	Yoga	15	86.8000	6.15514
	Zumba	15	84.0667	8.11935
Diastolic after	Aerobic	15	91.7333	1.66762
	Yoga	15	72.4000	11.54371
	Zumba	15	80.2667	7.28469

Discussion

High blood pressure (BP) is ranked as the third most important risk factor for attributable burden of disease in south Asia (2010).[31] Hypertension (HTN) exerts a substantial public health burden on cardiovascular health status and healthcare systems in India.[32,33] In an analysis of worldwide data for the global burden of HTN, 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005.[34] The rates for HTN in percentage are projected to go up to 22.9 and 23.6 for Indian men and women, respectively by 2025.[35] However, only about 25.6% of treated patients had their BP under control, in a multicenter study from India on awareness, treatment, and adequacy of control of HTN.[34]

High blood pressure is a major risk factor for stroke, coronary heart disease, congestive heart failure, and end stage renal disease.[36-38] Environmental conditions and variety of behavioral factors such as stress, anxiety, affective, and attitudinal dispositions of the individual influence the cardiovascular responses.[38] However, only' mild and moderate cases of hypertension may be controlled easily without drugs. Severe case may need pharmacological intervention. The available drugs include beta-blockers, sympatholytics calcium channel blockers, and ACE inhibitors.[39]

According to a study by Jitesh *et al.*, the systolic and diastolic pressure were found to be decreased in remarkable rate after the

practice of Zumba dance. Astonishingly the study showed that there is a reduction in blood pressure by 3.33 mmHg in systolic and 3.2 mmHg in diastolic. Thus it shows that Zumba dance have significantly reduced the blood pressure without any intake of blood pressure reducing pills.[40] Cornelissen[11] in their study among 5223 participants after high endurance training the mean reduction in systolic blood pressure was found to be 3.5 mmHg and the mean reduction in diastolic blood pressure was found to be 2.5 mmHg.

The result revealed that both Yoga intervention and drugs treatment helped hypertensives, but yoga intervention was the most effective. The awareness of the role of yoga in hypertension was noted in 33.67% of patients, of which only 13.07% practiced pranayama and 9.50% practiced asanas.[41] Several previous investigators have also observed that Yoga lowers systolic pressure (7,8,9,). In our study, it was found to reduce not only systolic but also diastolic pressure by an average difference of 9.73 mmHg and 14.4 mmHg, respectively. In the case of stress related hypertension, Numerous longitudinal studies on effect of short term yoga on cardiovascular system in various age groups showed similar results.[42,43] Yogic exercise involves physical, mental and spiritual task in a comprehensive manner. It brings about the behavioral changes. Yoga in long duration affects hypothalamus and brings about decrease in the systolic and diastolic BP through its influence on vasomotor center, which leads to reduction in sympathetic tone and peripheral resistance.[30] According to another study, it was reported that although the systolic and diastolic blood pressure decreased in males and females both, it was not significant in males.[44] when yoga (breathing techniques and meditation/mental relaxation) was practiced among individuals with hypertension, BP reductions of 11/6 mmHg compared with those that did not practice yoga was reported (i.e. 6/3 mmHg).[45]

Thus, cardiovascular parameters alter with age but these alterations are slower in persons aging with yoga. In comparison with other exercises, yoga had the best effect followed by Zumba dance which had an average reduction in systolic and diastolic pressures of 4.53 mmHg and 3.80 mmHg, respectively. Aerobic exercises had a small difference of an average of 3.0 mmHg and 2.87 mmHg for systolic and diastolic pressures, respectively. Because many individuals see their healthcare providers before starting exercise programs, providers could better counsel their patients on no pharmacological measures like Zumba dance, yoga, and aerobic exercises.

Conclusion

From the current study, it can be concluded that, hypertension can be controlled without drug intervention. Exercises like Aerobics, Zumba dance and yoga are other interventions that can bring about a fall in hypertension. They help reduce the morbidity and mortality from cardiovascular diseases which are now toping the lists. Comparing the three activities, it is found that the drop in the blood pressure was greatest among participants who practiced yoga, followed by participants who performed Zumba dance and finally among participants of aerobics. However, it should be noted that all the three activities produce no side effects which is evident while using drug interventions for prolonged periods. Thus, they are better strategy to manage states of stress and anxiety. Thus, it becomes an integral part of primary care in prevention of hypertension and its associated diseases by health promotion. As it can be practiced on a regular basis, it is an alternative to pharmacological approaches and helps individuals to conquer hypertension at the early stages promoting primary care.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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