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# Awareness and practice of aerobic exercise and yoga among hypertensive patients in Anand city

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## Abstract:

**BACKGROUND:** Aerobic exercise is helpful in reducing elevated blood pressure (BP). It was also found that yoga is useful in reducing BP. Thus, they both can be used in prevention and treatment of hypertension. Hence, the study aimed to observe both awareness and practice of aerobic exercise and yoga among hypertensive patients in Anand city.

**MATERIALS AND METHODS:** A cross-sectional descriptive study was conducted. A questionnaire was prepared containing 24 questions about awareness and practice of aerobic exercise and yoga among hypertensive patients. The questions were explained to all the patients, and 200 patients were recruited from Anand city through convenience sampling.

**RESULTS:** Two-hundred patients were included in this study, of which 100% were aware of hypertension. 67.68% were aware of the role of aerobic exercise in hypertension, of which 58.29% practiced them. 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.

**CONCLUSION:** There was a complete awareness of hypertension among hypertensive patients. A large number of patients were aware of the role of aerobic exercise in hypertension, but only few of the patients practiced them. However, there was less awareness of the role of yoga in hypertension and even lesser number practiced them.

## Keywords:

Aerobic exercise, asanas, awareness and practice, blood pressure, hypertension, yoga

## Introduction

Hypertension is one of the major chronic health problems globally. One-fourth of the world's adult population is suffering from hypertension, which is predicted to increase to 29% by 2025.<sup>[1]</sup> In 2010, hypertension was considered as the third most common risk factor for burden of disease in South Asia and was the third "killer" disease leading to one in every eight deaths globally.<sup>[2,3]</sup> The World Health Statistics 2012 report depicted that 23.10% of men and 22.6% of women

of more than 25 years of age suffer from hypertension.<sup>[4]</sup> Hypertension is defined arbitrarily at levels above generally accepted normal limits (Joint National Committee VII) [Table 1].<sup>[5]</sup>

The consequences that occur due to hypertension are shown in Figure 1.

Physical inactivity is an important risk factor for cardiovascular disease, and less active people have 30%–50% more risk of developing hypertension.<sup>[6]</sup> It is found that approximately 54% of stroke and 47% of ischemic heart disease worldwide occur due to hypertension. In 2010, uncontrolled hypertension led to about

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62% of cerebrovascular disease and 49% of ischemic heart disease in the United States.<sup>[7,8]</sup> According to the American College of Sports Medicine, even the reduction of 2 mmHg systolic and diastolic blood pressure (BP) reduces the risk of stroke by 14% and 17% and risk of coronary artery disease by 9% and 6%, respectively.<sup>[9]</sup> Both pharmacological and lifestyle modifications are necessary for the management of hypertension. Of several recommended modifications, physical activity or aerobic exercise is most prevalent.

Walking, cycling, jogging, swimming, etc., are aerobic exercises, which help in conditioning and also augmentation of the energy utilization for the muscles.<sup>[10]</sup> Lifestyle modification including aerobic exercise has been effective in treating and preventing hypertension. The meta-analysis of 54 trials concluded that previously sedentary adults could decrease systolic BP by 3.8 mmHg (95% confidence interval [CI], 2.7–5.0 mmHg) and diastolic BP by 2.6 mmHg (95% CI, 1.8–3.4 mmHg) with regular aerobic exercise.<sup>[6]</sup>

Another lifestyle modification which is helpful in reducing BP is yoga. The word yoga is derived from Sanskrit meaning union and target to bring

harmony between body, mind, and spirit.<sup>[11]</sup> There are eight limbs incorporated in yoga by Patanjali: yamas and niyamas (moral and ethical restraints), asanas (postures), pranayama (regulation of breathing), pratyahara (internalization of the senses), dharana (concentration), dhyana (meditation), and samadhi (self-realization).<sup>[12]</sup>

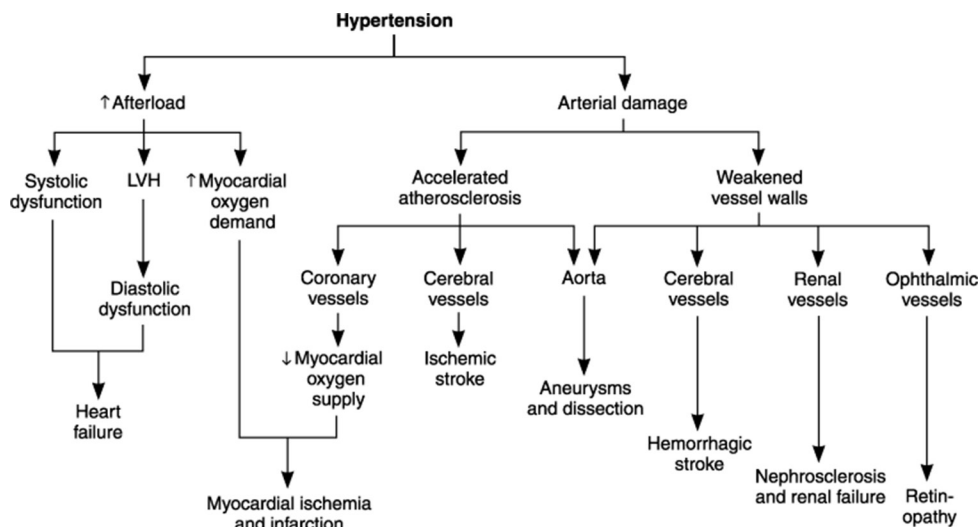
Yoga is helpful in reducing raised BP by combined effect of meditation, controlled breathing, and gentle physical activity. Yoga is beneficial, especially for older patients with musculoskeletal problems who cannot participate in vigorous aerobic physical activity.<sup>[12]</sup> Chronic stress plays a significant contribution in starting and maintaining hypertension, and stress management is one of the recommended interventions for the management of hypertension. Yoga, also known as mind–body technique, is a great method for stress control and relaxation.<sup>[1]</sup> The main elements of yoga include breathing exercises (pranayamas), meditation, and physical exercises (asanas), which are used to promote physical, mental, and social well-being.<sup>[12]</sup>

Several studies have shown the effect of yoga in reducing raised BP.<sup>[1,12,13]</sup> The meta-analysis of 17 studies depicted that yoga is helpful in significantly reducing systolic BP (4.17 mmHg) and diastolic BP (3.26 mmHg). The reduction in BP with the help of yoga is similar to other lifestyle modifications such as reduced alcohol and salt intake and physical activity.<sup>[8]</sup>

The prevalence of hypertension is high, and many literatures are available for the effect of aerobic exercise and yoga in the prevention and treatment

**Table 1: Classification of hypertension**

Classification	Systolic blood pressure (mmHg)	And/Or	Diastolic blood pressure (mmHg)
Normal	<120	And	<80
Prehypertension	120-139	Or	80-89
Stage 1 hypertension	140-159	Or	90-99
Stage 2 hypertension	≥ 160	Or	≥ 100



Source: McPhee SJ, Ganong WF: *Pathophysiology of Disease: An Introduction to Clinical Medicine*, 5th Edition: <http://www.accessmedicine.com>  
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**Figure 1: Consequences of hypertension**

of hypertension. However, the literature on both the awareness and practice of aerobic exercise and yoga in hypertensive patients is scarce. Hence, our study aimed to find out the awareness of the role of aerobic exercise and yoga in hypertensive patients and to determine whether they practice aerobic exercise and yoga in Anand city.

## Materials and Methods

### Study design and participants

It is a cross-sectional descriptive study design, in which convenience sampling was used. The approval was obtained from the "Human Research Ethical Committee" of H. M. Patel Centre for Medical Care and Education, Karamsad, Anand, Gujarat, India, before initiating the study. This study was conducted in January 2017–April 2017.

The study population included individuals with hypertension in Anand city.

The inclusion criteria included the diagnosed case of hypertension and taking medications of adult age of both genders. Unstable hypertension, mentally unstable, or uncooperative patients were excluded from the study.

### Methodology

- A questionnaire was prepared (English and Gujarati), which included questions on awareness of hypertension, BP, salt intake, regular visit, medications, comorbidities, aerobic exercise, and yoga and its practice. The questionnaire was validated in the community by a pilot study and those patients who had participated in pilot study were excluded from the final data collection
- Prior explanation and written consent were taken. The patients were given a participant information sheet which included the purpose of the study. Participants satisfying inclusion and exclusion criteria were interviewed
- Participants were explained about the questionnaire which consists of 24 questions. They were given the choice to fill in the questionnaire. Those who cannot read/write were interviewed by the investigator on one-to-one basis. The answers given by the participants were noted by the investigator in the questionnaire. The collected data were recorded and analyzed.

## Results

Figure 2 shows that there was 100% awareness of hypertension among hypertensive patients. Figure 3 reveals age-related hypertension, with a higher number of patients having hypertension in the age group of 50–70 years. Figure 4 depicts that regular 96% of

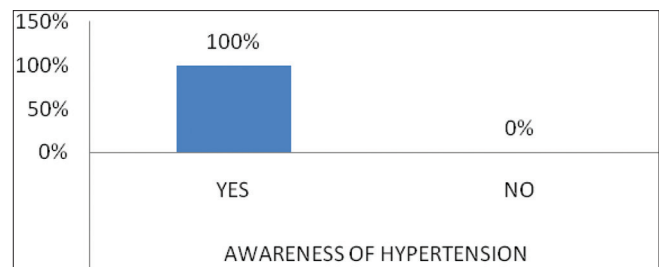


Figure 2: Awareness of hypertension

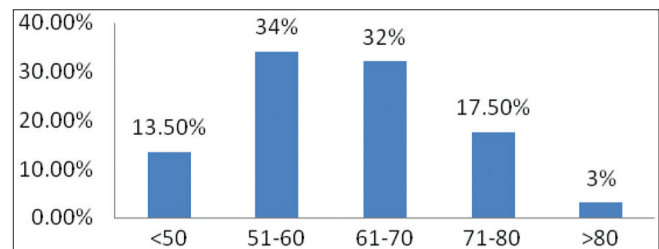


Figure 3: Age-wise percentage of hypertension

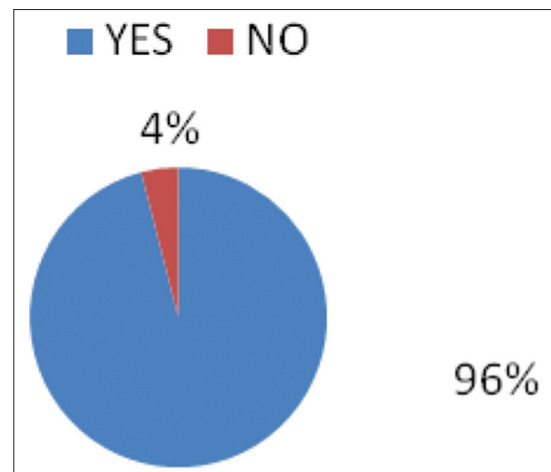


Figure 4: Percentage of hypertensive patients taking regular medications

hypertensive patients were taking regular medications and only 4% were not taking them. Figure 5 shows that 91% of the patients were regularly taking visit to the doctor and only 9% did not take regular visit. Figure 6 depicts that 79% of patients were having control on their diet such as reduced salt intake and 21% did not restrict salt intake. Figure 7 shows comorbidities associated with hypertension, with majority linked with diabetes (69.62%), followed by thyroid (20.25%), asthma (7.59%), and heart disease (2.53%). Table 2 shows that there was no major difference in the occurrence of hypertension as per the gender, with females having hypertension slightly higher than males.

Table 3 depicts that majority of the patients fell in prehypertension as per the systolic BP and both prehypertension and Stage 1 hypertension for diastolic BP. Figure 8 depicts that the awareness of the role of

aerobic exercise in hypertension was 67.68%, of which 58.29% practiced them. Figure 9 shows that most of the patients were aware of aerobic exercise and practiced walking (51.5%) and 4.5% practiced cycling. Figure 10 depicts that 33.67% of hypertensive patients were aware of the role of yoga in hypertension, of which 13.07% practiced pranayamas and 9.5% practiced

asanas. Figure 11 shows that maximum number of patients practiced savasana (8.50%), followed by setu bandha sarvangasana (bridge pose; 7.50%), paschimottanasana (seated forward bend; 6.50%), balasana (child's resting pose; 5.50%), and adho mukha svanasana (downward-facing dog pose; 3%). Figure 12 depicts that hypertensive patients were aware of the role of aerobic exercise and yoga by a doctor (65.22%), followed by self (26.09%) and social media (8.7%).

**Table 2: The frequency and percentage of hypertensive patients according to gender**

Gender	Frequency (%)
Male	97 (48.50)
Female	103 (51.50)

**Table 3: The frequency and percentage of blood pressure according to the Joint National Committee VII classification**

Blood pressure Classification	Blood Pressure	Frequency (%)
Systolic		
Prehypertension	120-139	109 (63.74)
Stage 1 hypertension	140-159	44 (25.73)
Stage 2 hypertension	≥ 160	18 (10.53)
Diastolic		
Prehypertension	80-89	65 (38.01)
Stage 1 hypertension	90-99	70 (40.94)
Stage 2 hypertension	≥ 100	36 (21.05)

Table 4 shows that 119 patients were doing aerobic exercise for the mean duration of 32 min (standard deviation [SD] – 15 min) and 19 patients were practicing yoga asanas for the mean duration of 13 min (SD – 12.88 min). Furthermore, the mean duration of practice of each of five asanas with SD is shown in Table. Table 5 shows that awareness of aerobic exercise was highest in the age group of 51–60 years (33.84%) and 61–70 years (32.32%), and awareness of yoga was highest in the age group of 51–60 years (35.82%) and 61–70 years (38.81%).

### Discussion

The present study recruited 200 patients with hypertension. All the patients were aware of hypertension [Figure 2]. The increased awareness of hypertension could be due to promotion of health services, free health checkup, increase input of social media such as Internet, television, and newspaper.

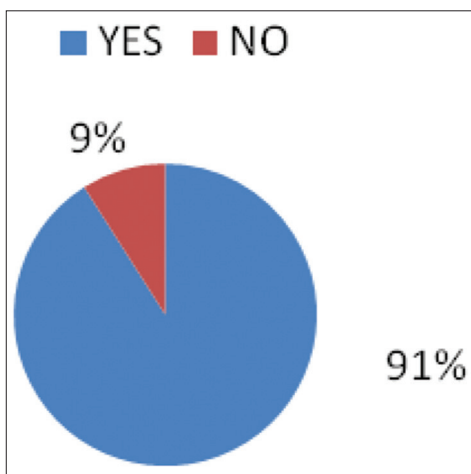


Figure 5: Percentage of hypertensive patients taking regular visit to doctor

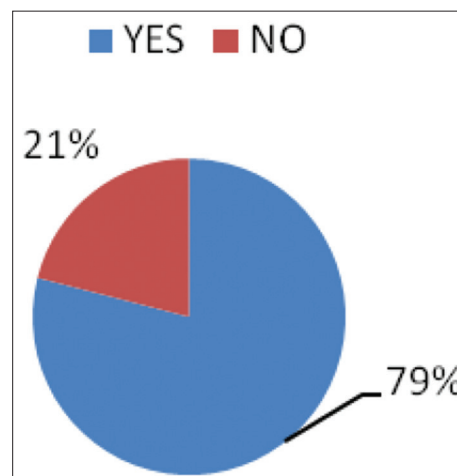


Figure 6: Percentage of hypertensive patients having control on salt intake

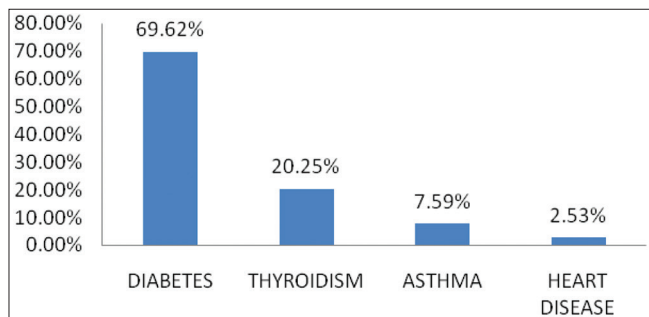


Figure 7: Comorbidities associated with hypertension

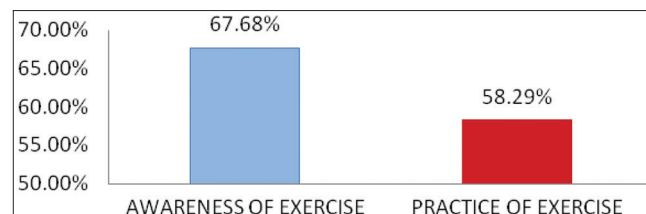


Figure 8: Awareness and practice of aerobic exercise in hypertension

Of 200 patients, majority of the patients having hypertension were in the total age group of 51–70 years, with 34% in the age group of 51–60 years and 32% in the age group of 61–70 years, with the mean age of 62 years [Figure 3]. The increased prevalence of hypertension in the age group of 50–70 years may be associated with age-related changes. Increasing age is one of the important risk factors linked with hypertension due to atherosclerotic changes in the blood vessels, especially during stress.<sup>[14]</sup> Yoga postures may

**Table 4: Mean and standard deviation of duration for aerobic exercise and yoga**

Duration	Observation number	Mean (min)	SD
Aerobic exercise	119	32.1	15.02
Yoga	19	13.21	12.88
Setu bandha sarvangasana	15	8.93	4.38
Paschimottanasana	13	10	4.56
Balāsana	10	10.5	4.38
Adho mukha savasana	5	10	0
Savasana	18	8.16	4.96

SD=Standard deviation

**Table 5: Awareness and practice of aerobic exercise and yoga according to the age group**

Age group	Percentage				
	<50	51-60	61-70	71-80	>80
Awareness of aerobic exercise	13.64	33.84	32.32	17.17	3.03
Practice of aerobic exercise	13.57	34.17	32.16	17.09	3.02
Walking	12.62	33.98	34.95	17.48	0.97
Nothing	15.91	34.09	28.41	15.91	5.68
Cycling	0	33.33	33.33	33.33	0
Awareness of yoga	13.43	35.82	38.81	11.94	0
Practice of pranayama	11.54	34.62	34.62	19.23	0

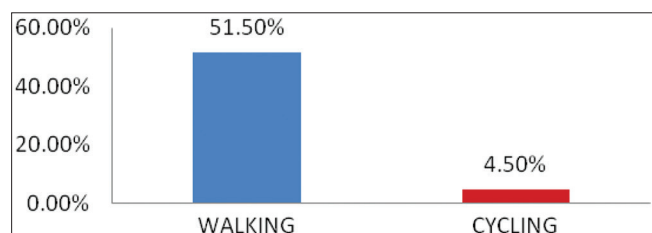


Figure 9: Awareness and practice of aerobic exercise

be helpful to reduce the BP by resetting baroreceptor reflex mechanisms that regulate BP.<sup>[15]</sup>

Further, it was found that of 200 patients, 96% were taking regular medications, 91% were taking regular visit, and 79% had control on salt intake [Figures 4-6]. One such study showed that of 101 patients, 53.5% restricted salt intake in their diet.<sup>[16]</sup> This increased awareness can be linked with the higher levels of consciousness about health and improved social awareness. Another study reported that of 110 patients, 61.8% had regularly visited and measured their BP and 85.5% were taking regular antihypertensive medication. Hypertension is a major public health issue globally. Hence, changes in lifestyle are needed, which can lead to a decrease in the use of pharmacological and invasive cardiovascular treatment approaches.<sup>[16,17]</sup>

The study also depicted that among comorbidities, there was a strong association between hypertension and diabetes (69.62%), followed by thyroid (20.25%), asthma (7.59%), and heart disease (2.53%) [Figure 7]. Diabetes share common pathways such as obesity, oxidative stress, inflammation, mental stress, sympathetic nervous system, renin–angiotensin–aldosterone system, and insulin resistance. These pathways relate and affect each other and can cause a vicious cycle.<sup>[18]</sup>

Furthermore, the results depicted that there was almost equal occurrence of hypertension in both genders, i.e., male (48.5%) and female (51.5%), with females being slightly higher [Table 2]. A similar study in 2005, the analysis of global data to observe the burden of hypertension worldwide, depicted that 20.6% of

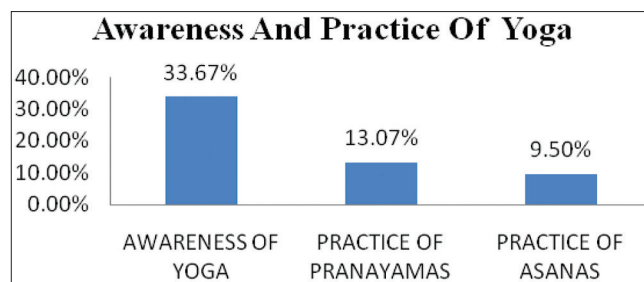


Figure 10: Awareness and practice of yoga

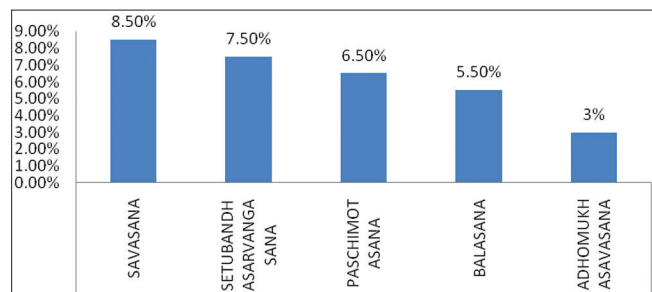


Figure 11: Practice of asanas

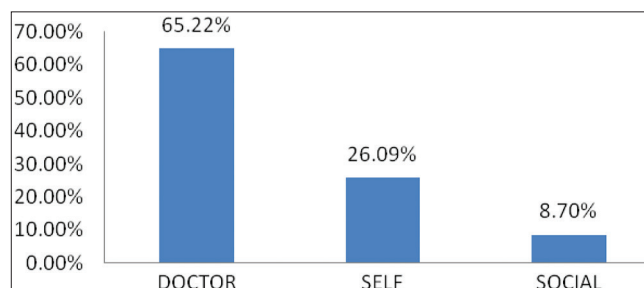


Figure 12: Mode of awareness by which medium

Indian men and 20.9% of Indian women suffered from hypertension. The incidence of hypertension is thought to increase by 22.9% for men and 23.6% for women by 2025.<sup>[2]</sup> The almost equal prevalence in both the genders with females being slightly higher could be due to age-related changes, postmenopausal hormonal deficiency, stress, and obesity.<sup>[16]</sup>

Furthermore, the study portrays that large numbers of patients (63.74%) fell into prehypertensive category with systolic BP (120–139 mmHg). With regard to diastolic BP, majority of the patients were in the prehypertensive (80–89 mmHg – 38.01%) and stage 1 hypertensive (90–99 mmHg – 40.94%) category [Table 3]. The present study showed that 67.68% of the patients were aware of the role of aerobic exercise in hypertension, of which 58.29% practiced aerobic exercise [Figure 8]. The awareness of aerobic exercise was high, which may be due to an increased recommendation by a doctor and increased awareness through social media. However, patients failed to put aerobic exercise into practice despite the awareness which due to laziness or lack of time and lack of concern about one's health. Out of aerobic exercise, there was maximum awareness and practice of walking (51.50%) followed by cycling (4.5%) [Figure 9]. The reason for maximum awareness and practice of walking could be due to cost-effectiveness and commonly advised by doctors and relatives. The nutritional and behavioral measures recommended in the management of high BP improved the patients' general health status, as they also have a beneficial effect on other cardiac risk factors frequently associated with hypertension.<sup>[17]</sup>

The study revealed that awareness of the role of yoga in hypertension was 33.67%, of which 13.07% practiced pranayama and 9.50% practiced asana [Figure 10]. Similar study depicted that there was awareness and practice of walking (90%) and yoga was only 11.9%. Awareness of yoga was comparatively low with respect to aerobic exercise because of less awareness through doctors, and majority of the patients were not aware of which asanas and pranayama are helpful in hypertension. Impaired baroreflex sensitivity has been increasingly postulated to be one of the major causative factors of essential hypertension. A short period (3 months) of regular yogic practice for 1 h/day is effective in controlling BP in such individuals.<sup>[17]</sup>

Of asanas, majority of patients practiced savasana (8.50%), followed by setu bandha sarvangasana (7.50%), paschimottanasana (6.50%), balasana (5.50%), and adho mukha svanasana (3%) [Figure 11]. Majority of the patients are practicing savasana, which may be due to the reason that savasana is the easiest of all asanas. The maximum awareness of aerobic exercise and yoga comes through doctors (65.22%), followed

by self (26.09%) and social (8.70%) [Figure 12]. The maximum mode of awareness of aerobic exercise and yoga through doctors could be due to regular visit and improved consciousness about health. In addition, it was found that the mean duration for practice of aerobic exercise was 32.1 min (SD – 15.02) and for yoga was 13.21 min (SD – 12.88) [Table 4]. Another study showed that aerobic exercise for 20–30 min/day helps in reducing BP in hypertensive patients.<sup>[9]</sup> A study depicted that minimum 10 min of yoga helps improve cardiorespiratory fitness.<sup>[19]</sup> Furthermore, the awareness and practice of aerobic exercise and yoga was highest in the age group of 51–70 years [Table 5]. The limitation of the study was that data collection relied entirely on information given by patients; hence, it was totally subjective as well as participants limited to Anand city.

## Conclusion

There was complete awareness of hypertension, but a lesser amount of awareness of the role of aerobic exercise and yoga in hypertension. In comparison to yoga, huge numbers of patients were aware of the role of aerobic exercise in hypertension, but only few practiced them. However, there was less awareness of the role of yoga in hypertension and even lesser number of patients practiced them. This concern can be prevailed over by education and awareness program, seminars, or community visit, which will impart the knowledge of the role of exercises and yoga with their benefits for hypertension or health to individual.

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## Conflicts of interest

There are no conflicts of interest.

## References

1. Manchanda SC, Madan K. Yoga and hypertension. *J Prev Cardiol* 2013;2:361-4.
2. Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, *et al.* Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *J Hypertens* 2014;32:1170-7.
3. Meshram II, Arlappa N, Balkrishna N, Rao KM, Laxmaiah A, Brahmam GN, *et al.* Prevalence of hypertension, its correlates and awareness among adult tribal population of Kerala state, India. *J Postgrad Med* 2012;58:255-61.
4. All You Need to Know about Hypertension. *Times of India*; 10 May, 2016. Available from: <http://www.m.timesofindia.com/life-style/health-fitness/>

- health-news/All-You-need-to-know-about-hypertension/articleshow/35617449.cms. [Last accessed on: 2018 Jan 16].
5. Alvarez D. Hypertension and the JNC 8 guidelines. Kansas Cardiology Consultants Wichita, KS67218; 2014. Available from: <http://www.kansasdo.org/download/springconf2014/presentation/Alvarez-hypertension.pdf>. [Last accessed on 2018 Feb 23].
  6. Whelton SP, Chin A, Xin X, He J. Effect of aerobic exercise on blood pressure: A meta-analysis of randomized, controlled trials. *Ann Intern Med* 2002;136:493-503.
  7. Kishore J, Gupta N, Kohli C, Kumar N. Prevalence of hypertension and determination of its risk factors in rural Delhi. *Int J Hypertens* 2016;2016:7962595.
  8. Hagins M, States R, Selte T, Innes K. Effectiveness of yoga for hypertension: Systematic review and meta-analysis. *Evid Based Complement Alternat Med* 2013;2013:649836.
  9. Baster T, Baster-Brooks C. Exercise and hypertension. *Aust Fam Physician* 2005;34:419-24.
  10. Kisner C, Colby LA. Therapeutic exercise: Foundations and techniques. 6<sup>th</sup> ed. Philadelphia: PA, F.A. Davis Company; 1996.
  11. Sunder S. Text Book of Rehabilitation. 3<sup>rd</sup> ed. Jaypee Brothers Medical Publishers Pvt. Ltd.; 2008. p. 444.
  12. Cohen D, Townsend RR. Yoga and hypertension. *J Clin Hypertens (Greenwich)* 2007;9:800-1.
  13. Murugesan R, Govindarajulu N, Bera TK. Effect of selected yogic practices on the management of hypertension. *Indian J Physiol Pharmacol* 2000;44:207-10.
  14. Bharatia R, Chitale M, Saxena GN, Kumar RG, Chikkalingaiah TA, Dalvi K, Talele S. A, *et al.* Management practices in Indian patients with uncontrolled hypertension. *J Assoc Physicians India*. 2016 Jul; 63:14-21.
  15. Bhavanani YD. Normalization of the blood pressure with Yoga. In: Proceedings of the International Interdisciplinary Scientific Conference "Yoga in Science-Future and Perspectives". Belgrade: Yoga Federation of Serbia; 2010. p. 23-4.
  16. El-Hay SA, Seel M. Knowledge and perceptions related to hypertension, lifestyle behaviour modifications and challenges that facing hypertensive patients. *IOSR J Nur Health Sci Vers I* 2015;4:15-26
  17. Sahoo D, Gosai H, Sahoo U, Harsoda JM. Awareness and practices of non-pharmacological approaches for management of hypertension in a geriatric population. *Int J Med Stud* 2014;2:53-5.
  18. Cheung BM, Li C. Diabetes and hypertension: Is there a common metabolic pathway? *Curr Atheroscler Rep* 2012;14:160-6.
  19. Macgill M. Yoga Blood Pressure, and Health; 29 June, 2016. Available from: <http://www.medicalnewstoday.com/articles/260699>. [Last accessed on 2018 Feb 02].