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A hospital-based cross-sectional study on yoga and meditation in patients of hypertension in Western India

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ABSTRACT

Background: Yoga and meditation hold promise as a non-pharmacological management of hypertension as they have shown to lower blood pressure. This study aimed at (1) assessing the awareness about benefits of yoga and meditation in hypertension among patients and finding its socio-demographic correlates, (2) estimating the practice of yoga and meditation in hypertensives, its pattern and impact on blood pressure control.

Methods: This cross-sectional study was conducted on 400 hypertensive patients. Statistical association was tested with chi square and independent t tests.

Results: It was observed that only 9% respondents were aware of the benefits of yoga and meditation in hypertension while 12.8% practised the same. On probing it was found that these 3.8% practised yoga and meditation only because their physician had advised them to do so without even knowing their benefits. This points out the importance of physician advice which can be even more effective if pros and cons are properly explained. People who were aware of the benefits were 51.9 times more likely to practise them (p<0.001). Highly significant association was observed between awareness regarding lifestyle modifications like yoga and meditation and gender, socioeconomic status, education and locality (urban non-slum/urban slum/rural).

Conclusions: The complementary use of non-pharmacological treatment or lifestyle modifications like yoga and meditation can go a long way to lower blood pressure and such options need to be provided by the health care providers and the gap in awareness elicited in our study needs to be addressed.

Keywords: Cardiovascular disease, Stress, blood pressure, Pranayama, Lifestyle modification

INTRODUCTION

Cardiovascular diseases (CVD) pose a threat to health scenario in India as it is estimated to be the largest cause of death and disability in India by 2020 and nearly half of this mortality will be in young and middle-aged individuals. Hypertension (HTN) is the most common CVD and the most important modifiable risk factor for

coronary heart disease (CHD), stroke, congestive heart failure (CHF), end-stage renal disease (ESRD) and peripheral vascular disease (PVD). One of the important causes of HTN is stress. Stress and HTN forms a vicious cycle each aggravating the other. This association is a cause of concern; as rapid urbanization and modernization, industrialization, migration, occupational and educational challenges in the competitive world has

led to increase in stress level in individuals which, if prolonged, can lead to hypertension. Again, better quality of life and healthcare has led to increased lifespan which makes a way for development of chronic diseases related to senility such as HTN and the awareness of one's hypertensive state can give birth to stress which in turn can make management of HTN difficult.³

Lifestyle modification is a cornerstone of HTN treatment, yet most recommendations often neglect stress reduction strategies. Yoga is an ancient Indian practice that can reduce stress and ameliorate HTN. Yoga involves vogic asanas (exercises) and pranayama (voluntary alteration of the breathing pattern). Yoga has shown to have immediate psychological effects: it decreases anxiety and increases feelings of emotional, social, and spiritual wellbeing. 4-6 It has positive effects on CVDs. 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.⁸ Various studies have shown yoga to decrease anxiety, stress, and levels of salivary cortisol as well as plasma rennin levels, and 24-hour urine norepinephrine and epinephrine levels. 9-11 Like yoga, meditation also has shown to be effective in reducing BP. 12,13 Both yoga and meditation seem to be promising adjuvants in prevention and treatment of HTN, as they are easy, economical, no side effects have been reported yet if properly done and can be carried along with pharmacological treatment. However, very few studies have been done to find out their awareness and practice in hypertensive patients. The present study has been designed to fill this gap so that management of HTN with such nonpharmacological treatment can be done. This study aimed at (1) assessing the awareness about benefits of yoga and meditation in hypertension among patients and finding its socio-demographic correlates, (2) estimating the practice of yoga and meditation in hypertensives, its pattern and impact on blood pressure (BP) control.

METHODS

The present study is a quantitative, hospital-based, cross-sectional study conducted in the district of Jamnagar, a coastal region in the western-most part of India in the state of Gujarat for a period of one year, from July 2013 to June 2014.

Sample size calculation and sampling technique

Sample size (N) was calculated using the formula 4 pq/L². Where p is anticipated population, q is 100-p and L is relative precision. At 95% confidence interval, taking prevalence (p) as 50% and L as 10% of p, a sample size of 400 was calculated. ^{14,15} Out of the total sample size, half of the study subjects were selected from the tertiary care hospital of the study district and remaining 200 were selected from community health centres (CHCs) of study district. There were 11 CHCs in study district, of which

50% were chosen through simple random sampling technique. Thus five CHCs were taken up and 40 patients from each of CHCs were taken for the study. Hypertensive patients attending NCD clinics at the Guru Govind Singh Government hospital (GGH) and at the selected CHC of Jamnagar district formed the study population. Data was collected from patients only on their first visit after the onset of the study. If a patient had been already included in the study, then next patient was taken up for the study to avoid repetition.

Inclusion criteria

- Minimum age of patients enrolled should be 30 years.
- Patients who are already diagnosed as having hypertension.

Exclusion criteria

- Patients not willing to participate.
- Patients who are critically or mentally ill.
- Pregnant patients.

Data collection

Data was collected by personal interview which was carried out using a pre-tested, semi-structured type of proforma comprising questions about socio-demographic factors, past history, family history, any other co-morbid condition, his/her knowledge and attitude about hypertension and their practices to control the disease including yoga (asanas and pranayama) and meditation. Practice of yoga or meditation for 30-45 minutes per day for at least five days a week was taken as necessary in the present study. Socio-economic status (SES) was estimated on the basis of Modified Prasad's classification (1961) according to AICPI (All India Consumer Price Index) of the year 2013. Anthropometric measurements and clinical examination were done.

Statistical analysis

The data entry was done using Microsoft Office Excel 2007. To summarize the data, descriptive statistics of frequency, percentages, mean and standard deviation (SD) were used. Relationship between various sociodemographic factors and awareness regarding benefits of yoga and meditation was tested with chi square and independent t tests using MedCalc version 10.4.8.0. Alpha level was set at to 0.05 (5%).

Ethical consideration

The study protocol was reviewed and approved by The Institutional Ethical Committee. An informed consent was taken from all participants of the study after fully explaining the purpose of the study and assuring them of full confidentiality. The interviews were conducted in Gujarati and Hindi

RESULTS

Table 1 shows the patient socio-demographic characteristics. The male:female ratio was 1:1.3. A higher proportion (67%) of the patients belonged to \geq 50 years age group. Majority (80.8%) were Hindus. Most of the patients who were enrolled were married (86.5%) and belonged to nuclear family (61%). Around one-fourth (26%) of the respondents were illiterate and majority (48.7%) were educated only up to primary school. In the present study, majority of the patients were housewives (45.3%) followed by labourers (15.8%) and retired persons (10.5%). Highest proportion of the patients 64.5% and 76.1% belonged to the lower socio-economic

class (SES) and urban areas respectively, of which majority belonged to non-slum areas.

Table 2 shows that only 9% (36) respondents were aware of the benefits of yoga and meditation in HTN and 12.8% (51) practised the same. We observed that people who were aware of the benefits were 51.9 times more likely to practise them and this was statistically highly significant. Table 4 shows highly significant association (p<0.001) was observed between awareness regarding lifestyle modifications like yoga and meditation and gender, socioeconomic status, education and locality (urban non-slum/ urban slum/rural).

Table 1: Socio-demographic profile of the patients.

Demographic factors	Frequency (n)	(%)	
Sex			
Male	172	43.0	
Female	228	57.0	
Age (years)			
<50	132	33.0	
≥50	268	67.0	
Religion			
Hindu	323	80.8	
Muslim	75	18.7	
Others	2	0.5	
Marital Status			
Married	346	86.5	
Never married	5	1.2	
Widow/ widower	49	12.3	
Type of family			
Nuclear	244	61	
Joint	86	21.5	
Three generation	70	17.5	
Education			
Illiterate	104	26	
Up to primary	195	48.7	
Secondary and above	101	25.3	
Occupation			
Labourer	63	15.8	
Businessman	34	8.4	
Housewife	181	45.3	
Retired	42	10.5	
Others	80	20	
Socioeconomic class			
Higher class (I, II)	142	35.5	
Lower class (III, IV, V)	258	64.5	
Locality			
Urban non-slum	215	53.8	
Urban slum	89	22.3	
Rural	96	24	

Table 2: Awareness and practice of yoga and meditation (n=400).

	Benefit of yoga and meditation			
Practice yoga or meditation	Aware	Not aware	OR (C.I)	P value
	n (%)	n (%)		
Yes (n=51)	28 (77.8)	23	51.9	
	20 (77.0)	(6.3)	(21.3-	<.0001*
No (n=349)	8 (22.2)	341 (97.7)	126.6)	

*p<0.001(highly statistically significant).

Table 3: Duration and frequency of practicing yoga and meditation (n=51).

Variables	No.	%		
Duration of practice (minutes)				
<30	32	62.8		
≥30	19	37.2		
Frequency of practice (days/week)				
≥5	21	41.2		
2-5	21	41.2		
Sometimes, not fixed	9	17.6		

Table 4: Association of awareness of benefits of yoga and meditation with various socio-demographic factors (n=400).

Demographic factors	Benefits of yoga and meditation			
	Aware (n= 36) No. (%)	Unaware (n=364) No. (%)	Test statistic	
Sex				
Male	26 (72.2)	146 (40.1)	χ^2 value=12.504 p=0.0004 [†]	
Female	10 (27.8)	218 (59.9)	p=0.0004	
Age (years)				
< 50	16 (44.4)	116 (31.9)	$\chi^2 \text{ value}=2.343$ p=0.1258*	
≥50	20 (55.6)	248 (68.1)	p=0.1238	
Locality				
Urban non-slum	31 (86.1)	184 (50.6)	χ^2 value= 17.21	
Urban slum	4 (11.1)	91 (25)	$p=0.0002^{\dagger}$	
Rural	1 (2.8)	89 (24.4)		
Education				
Illiterate	1 (2.8)	103 (28.3)	χ^{2} value= 70.924	
Primary	5 (13.9)	190 (52.2)	$p < 0.0001^{\dagger}$	
Secondary and above	30 (83.3)	71 (19.5)		
Socio-economic status				
I	16 (44.4)	21(5.8)		
II	10 (27.8)	95(26.1)	χ^{2} value= 61.355	
III	4 (11.1)	86 (23.6)	p<0.0001 [†]	
IV	5 (13.9)	140 (38.5)		
V	1 (2.8)	22 (6.0)		

 *p value >0.05 (not statistically significant); $^\dagger p$ <0.001 (highly statistically significant).

Table 5: Impact of yoga and meditation in control of BP among patients (n=400).

Yoga and Meditation	Mean SBP±SD (in mmHg)	p value	Mean DBP±SD (in mmHg)	p value
Practicing (n=51)	135.6±13.9	0.0072^{*}	86.8±6.4	0.2811^{\dagger}
Non-practising (n=349)	140.4±19.1		87.2±7.3	

*p value <0.05 (statistically significant); †p value >0.05 (not statistically significant).

DISCUSSION

In terms of patient socio-demographic characteristics, more than half (57%) of the patients were females, 67% of the cases were in their fifties or above. Most of the patients who were enrolled were married (86.5%) and housewives (45.3%). Similar to our study, Jesus ES *et al.* in their study conducted in Sau Paulo observed higher numbers of female patients, majority of their patients were in fifties and also, most were married and were housewives.¹⁸

In the present study, 9/10th of the total respondents were unaware about the benefits of yoga and meditation in HTN. Only 9% thought that these practices were beneficial in disease control and 12.8% practised the same. On probing it was found that these 3.8% practised yoga and meditation only because their physician had advised them to do so without even knowing their benefits. This points out the importance of physician advice which can be even more effective if pros and cons are properly explained. The awareness regarding yoga and meditation was lower than in Pandor's study where 38.3% respondents were aware about the benefits of yoga. ¹⁹ However, the practice of asanas and pranayama was comparable to the study on CHD patients (13.3%) carried out by Bhanushali. ²⁰

It was observed in the present study that out of 51 individuals who practised yoga or meditation or both, only 37.3% practised for at least 30 minutes and 41.2% practised these at least 5 days a week. This was falling short of the recommendations from various studies which range from at least 30 minutes to 1 hour for 5 days a week. 14,21 We observed highly significant association between awareness regarding lifestyle modification involving yoga and meditation with gender, education, socioeconomic status and with locality (urban non-slum/ urban slum/rural). Similar to our study, Noor et al found highly significant statistical association of the awareness with educational status and significant association with gender.²¹ Pandor, in her study done in Gujarat, found similar results in association of knowledge regarding yoga and higher educational level (graduate and postgraduate). 19

In the present study, we observed that the SBP in the patients practising yoga and/or meditation was lesser than the non-practising patients by 4.8 mmHg and it was statistically significant. Similarly, DBP was lesser by 0.4 mmHg in the practising patients though the difference was not statistically significant. The difference observed was higher for SBP and lower for DBP than that elicited by Saptharishi et al. in their randomized controlled trial (2 mmHg in SBP, 2.9 mmHg in DBP) with only yoga as an intervention. Singh et al. reported a much higher reduction in BP (12 mmHg in SBP; 11.2 mmHg in DBP) with a 40-day yoga regimen among Type 2 diabetics. The study by Anderson et al suggested that regular practice of transcendental meditation may have the

potential to reduce SBP and DBP by approximately 4.7 and 3.2 mmHg, respectively.²⁴

CONCLUSION

Hypertension is a widespread epidemic and the prevention and management of the disease has been challenging in spite of use of pharmacological treatments. The complementary use of non-pharmacological treatment or lifestyle modifications like exercise, voga and meditation can go a long way in not only to lower BP but also for general well-being of a patient. However, our study elicits the lack of awareness of these indigenous and ancient practices of the country in disease management. Since, like various other studies, our study too shows a lower BP in the patients practising yoga and meditation, an integrated approach of advising these lifestyle modifications along with the prescribed medications by health care professionals can help fill up the lacunae in awareness of benefits of yoga and meditation that our study unfolds and possibly a better control of blood pressure.

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Institutional Ethics Committee

REFERENCES

- 1. Global Burden of Disease: 2004 Update. Geneva: WHO. Available at: http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf. Accessed 30 June 2013.
- 2. Davison C, Davey SG, Frankel SJ. Lay epidemiology and the prevention paradox: the implications of the coronary candidate for health promotion. Sociol Health Illness. 1991;13:1–19.
- 3. Rostrup M, Kjeldsen SE, Eide IK. Awareness of hypertension increases blood pressure and sympathetic responses to cold pressor test. Am J Hypertens. 1990;3:912-7.
- Michalsen A, Grossman P, Acil A, Langhorst J, Ludtke R, Esch T, et al. Rapid stress reduction and anxiolysis among distressed women as a consequence of a three month intensive yoga program. Med Sci Monit. 2005;11:555–61.
- 5. West J, Otte C, Geher K, Johnson J, Mohr DC. Effects of Hatha yoga and African dance on perceived stress, affect, and salivary cortisol. Ann Behav Med. 2004;28:114–8.
- Moadel AB, Shaw C, Wylie-Rossett J, Harris MS, Patel SR, Hall CB, et al. Randomized controlled trial of yoga among a multiethnic sample of breast cancer patients: Effects on quality of life. J ClinOncol. 2007;25:1–9.
- 7. Raub JA. Psychophysiologic effects of hatha yoga on musculoskeletal and cardiopulmonary function: A literature review. J Altern Complement Med. 2002;8:797–812.

- 8. Khanam AA, Sachdeva V, Gulera R, Deepak KK. Study of pulmonary and autonomic functions of Asthma patients after Yoga training. Indian J Physiol Pharmacol. 1996;40(1):318–21.
- 9. Michalsen A, Grossman P, Acil A, Langhorst J, Ludtke R, Esch T, et al. Rapid stress reduction and anxiolysis among distressed women as a consequence of a three month intensive yoga program. Med Sci Monit. 2005;11:555-61.
- West J, Otte C, Geher K, Johnson J, Mohr DC. Effects of Hatha yoga and African dance on perceived stress, affect, and salivary cortisol. Ann Behav Med. 2004;28:114-8.
- 11. Selvamurthy W, Sridharan K, Ray US, Tiwary RS, Hedge KS, Radhakrishnan U, et al. A new physiological approach to control essential hypertension. Indian J Physiol Pharmacol. 1998;42:205-13.
- 12. Goldstein CM, Josephson R, Xie S, Hughes JW. Current Perspectives on the Use of Meditation to Reduce Blood Pressure. Int J Hypertension. 2012;2012:578397.
- 13. Anderson JW, Liu C, Kryscio RJ. Blood pressure response to transcendental meditation: a meta-analysis. Am J Hypertens. 2008;21(3):310-6.
- 14. Lwanga SK, Lemeshow S. Sample size determination in health studies. A practical manual, World Health Organization, Geneva; 1991.
- Sarkar A, Makwana N, Pithadia P, Parmar D. Compliance to Antihypertensive Therapy and its Predictors: A Cross-sectional Study in Western Coastal Region of India. J Clin Diagnos Res. 2018;12(3):26-30.
- 16. Anand MP. Non-pharmacological management of essential hypertension. J Indian Medical Assoc. 1999:97:220-5.
- 17. All India Consumer Price Index (General) for Industrial Workers. Available at:

- http://cyberjournalist.org.in/manisana/aicpinew.htm. Accessed on 20 November 2017.
- 18. Jesus ES, Augusto MAO, Gusmão J, MionJúnior D, Ortega K, Pierin AMG. Profile of hypertensive patients: biosocial characteristics, knowledge, and treatment compliance. Acta Paul Enferm. 2008;21(1):59-65.
- 19. Pandor J. A study on hypertension and its risk factors in Jamnagar city. Dissertation submitted to Saurashtra University. 2006.
- 20. Bhanushali V. Study on risk factor modification through lifestyle intervention in coronary artery disease patients. Dissertation submitted to Saurashtra University, (unpublished data). 2002.
- 21. Noor S, Prasad KVS, Krishnababu G. Yoga-Its Awareness and Benefits on Health. J Evolution Med Dental Sci. 2015;4(36):6248-56.
- 22. Saptharishi L, Soudarssanane M, Thiruselvakumar D, Navasakthi D, Mathanraj S, Karthigeyan M, et al. Community-based randomized controlled trial of non-pharmacological interventions in prevention and control of hypertension among young adults. Indian J Community Med. 2009;34:329-34.
- 23. Singh S, Malhotra V, Singh KP, Madhu SV, Tandon OP. Role of yoga in modifying certain cardiovascular functions in type 2 diabetic patients. J Assoc Physicians India. 2004;48:461-5.
- 24. Anderson JW, Liu C, Kryscio RJ. Blood pressure response to transcendental meditation: a meta-analysis. Am J Hypertens. 2008;21(3):310-6.

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