



Role of Rag Ahir Bhairav As Complementary And Alternative Medicine (CAM) On Blood Pressure in Prehypertensive Adults

R.Sobana¹, K.Jaiganesh*², P.Barathi³

¹Assistant Professor, Department of Physiology, Mahatma Gandhi Medical College & Research Institute, Pondicherry, India

²Associate Professor, Department of Physiology, Mahatma Gandhi Medical College & Research Institute, Pondicherry.

³Professor & Coordinator, Department of Music Medicine, Mahatma Gandhi Medical College & Research Institute, Pondicherry, India

Abstract

Pre-hypertension is the preliminary stage of hypertension with high normal blood pressure, which is a major risk factor for cardio vascular, renal and neurological complications. Music therapy is considered as an important complementary and alternative medicine (CAM) to treat pre-hypertension. The aim of this study was to find out the efficacy of music on blood pressure in pre-hypertensive adults. Sixty male pre-hypertensive subjects, who are not on any antihypertensive therapy, were divided randomly into 2 groups (the experimental and the control groups). The experimental group received 40 days of music therapy, while the control group did not receive music therapy. The systolic and diastolic blood pressures of the subjects were recorded before and after 40 days in both the groups and statistically analyzed. There was a significant reduction in the blood pressure in the experimental group when compared to the control group. We conclude that music plays an effective role as complementary therapy for treating the patients with pre-hypertension.

Key words: Hypertension, Pre-hypertension, Music therapy, Complementary and alternative medicine (CAM)

*Corresponding Author: Dr.K.Jaiganesh, Associate Professor of Physiology, Mahatma Gandhi Medical College & Research Institute, Pondicherry, India. E.mail: drkjgmd2000@gmail.com

Received: February 26, 2013. Accepted: April 26, 2013. Published: May 20, 2013. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

Hypertension is a common disorder in which blood pressure remains abnormally elevated (a reading of 140/90 mm Hg or greater) and it is a major risk factor for cardio vascular, renal and neurological complications. Although hypertension affects up to 30% of the adult population in the majority of

countries, >50% of hypertensive individuals are unaware of their condition¹. Globally, it is estimated that high blood pressure causes 7.1 million deaths and about 13 percent of the fatality total. Studies conducted by WHO state that around 62 percent of cerebro-vascular accidents and 49 percent of myocardial infarctions are caused by elevated blood pressure. Around 5 million premature deaths are caused hypertension in a year worldwide². Studies indicate that 56 billion people worldwide will be hypertensive by the year 2025³.

Pre hypertension is the preliminary stage of hypertension with high normal systolic blood pressure between 120 -139 mm Hg and diastolic blood pressure between 80 – 89 mm Hg. Pre hypertension is often associated with multiple cardiovascular risk factors like diabetes mellitus, obesity, dyslipidemia, and myocardial infarction. This condition is considered as a starting point in the cardiovascular disease continuum⁴. If intervened at

this stage, we can decrease the rate of progression to hypertensive levels and reduce risk of cardiovascular disease⁵. For pre-hypertensive patients, the first line approach is lifestyle modification such as physical exercise, cessation of tobacco use and dietary modifications. In recent years more importance is given to complementary and alternative medicine (CAM) such as Yoga & Meditation as non pharmacological methods to reduce blood pressure in prehypertensives. Now another type of CAM approach, listening to music, has been considered to provide easy and non-pharmacological option to reduce BP particularly in individuals with borderline hypertension, which does not require the use of antihypertensive drugs⁶.

Many case studies have documented the evidences for the effect of music in reducing blood pressure. Vera Brandes et al have hypothesized that specially designed music programs for hypertensives might alter their parasympathetic tone⁷. A research team in China has developed a new MP3 player, which can detect the current BP value with a cuff less measurement method, and also select certain types of music for playing according to the current BP value in order to alleviate the hypertension of patient⁸.

The impact of music listening in reducing ambulatory blood pressure (ABP) was first recommended by the American Society of Hypertension which has documented that patients with mild hypertension who listened to just half an hour of classical Indian (raga) music a day for four weeks experienced significant reductions in 24-hour ABP⁹.

The purpose of our study was to evaluate the efficacy of listening to music, in lowering blood pressure in pre-hypertensive patients. From this study, if this CAM is shown to be effective for reducing blood pressure in pre-hypertensives, it would definitely serve as the foundation for a controlled trial.

However, there has been only limited research into non-pharmacological treatment options for pre hypertension. So, we have attempted to find out the effect of listening to music on blood pressure reduction in pre hypertensive population.

Materials and methods

60 adult male pre hypertensives in the age group of 35 to 45 years with keen interest to music were recruited for this study, from a private nursing home near Pondicherry. Written informed consent was obtained from them. Known smokers, alcoholics, subjects on antihypertensive medication, Diabetics, subjects with coronary artery disease, subjects with acute illness and on steroid therapy were excluded. All the subjects were on normal mixed diet and with moderate physical activity. Participants were counseled to maintain their usual diet and physical activity during the course of study. A digital calibrated sphygmomanometer (OMRON Hem-401) was used to record blood pressure. After a period of 10 minutes rest, 2 blood pressure readings were taken in intervals of 5 minutes in upper arm in a sitting posture. Mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) was used for statistical analysis to reduce the effect of variability of blood pressure.

| BP Classification | SB-P mmHg* | | DBP mm Hg LSM | Drug Therapy** | |
|-----------------------------|------------|-----|---------------|----------------|--------------|
| Normal | <120 | And | < 80 | Encourage | No |
| Pre hypertension | 120-139 | Or | 80 – 89 | Yes | No |
| Stage 1 Hypertension | 140-159 | Or | 90–99 | Yes | Single agent |
| Stage 2 Hypertension | > 160 | Or | >100 | Yes | Combo |

Blood Pressure Classification JNC-7-2003⁴

The subjects were divided into two groups based on their receptivity and interest to music as experimental group and control group with 30

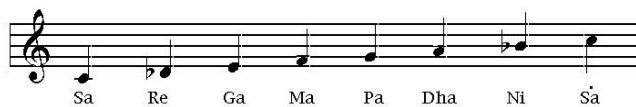
subjects in each group. The mean age of the experimental group was 38± 4. Age matched subjects were selected for the control group. Subjects in

experimental group were administered Rag Ahir Bhairav through head phones for 20 minutes in a session, for a period of 40 days. The subjects in control group were not given music therapy. The systolic and diastolic blood pressures before and after 40 days of music listening were recorded and statistically analyzed using “paired t-test”.

Bernardi et al observed that crescendo and decrescendo of sound volume in musical performances led to specific modulations in cardiovascular activity, which increases with crescendo and decreases with decrescendo type of music². We used this observation to compose the music with Rag Ahir Bhairav. When rendered in cascading manner, just like water fall coming down, with the higher Sa (higher octave C in western) coming down rapidly down the seven notes, ending with the lower Sa(lower octave C in western). This cascading effect through mind body connection relieves blood pressure markedly. Ahir Bhairav is a Hindustani classical raga. It is a mixture of Bhairav and the ancient but now rare raga Ahiri or Abhiri. Ahir Bhairav is a Sampoorna - Sampoorna raga as it allows seven notes in ascent and seven in descent. The carnatic music equivalent to this raga is Chakravakam.

Aaroha or Ascent : S R1 G2 M1 P D2 N1 S’

AROHANA



Avaroha or Descent: S’ N1 D2 P M1G2 R1 S
AVAROHANA



Results

The mean blood pressures before and after music sessions in the experimental group are shown in **Table-1**, and illustrated in **Figure.1**. The mean blood pressures of the control group initially and after 40 days are shown in **Table-2** and illustrated in **Figure.2**. By analyzing the findings of our study, we can arrive at the following results.

- A Significant reduction in mean systolic blood pressure ($p < 0.0011$) among the experimental group after music session.
- Reduction in diastolic blood pressure ($p < 0.0104$) but not as marked as the systolic blood pressure in the experimental group after music session.
- There was no significant reduction in the systolic ($p < 0.1643$) and diastolic blood pressures ($p < 0.7734$) in the control group as both blood pressures remained the same initially and after 40 days.
- We can infer that listening to specific music pattern reduces both systolic and diastolic blood pressures of which systolic blood pressure shows marked reduction.

Table.1: Mean Blood Pressure of Subjects before & after Music Listening.

| BP | First day | 40 th day | p-value |
|-----|---------------|----------------------|---------|
| SBP | 127.60 ± 4.67 | 125.73 ± 4.27 | 0.0011 |
| DBP | 85.20 ± 1.66 | 83.73 ± 2.12 | 0.0104 |

SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure. Both Systolic & Diastolic blood pressures are significantly decreased ($p < 0.0011$, $p < 0.0104$, respectively).

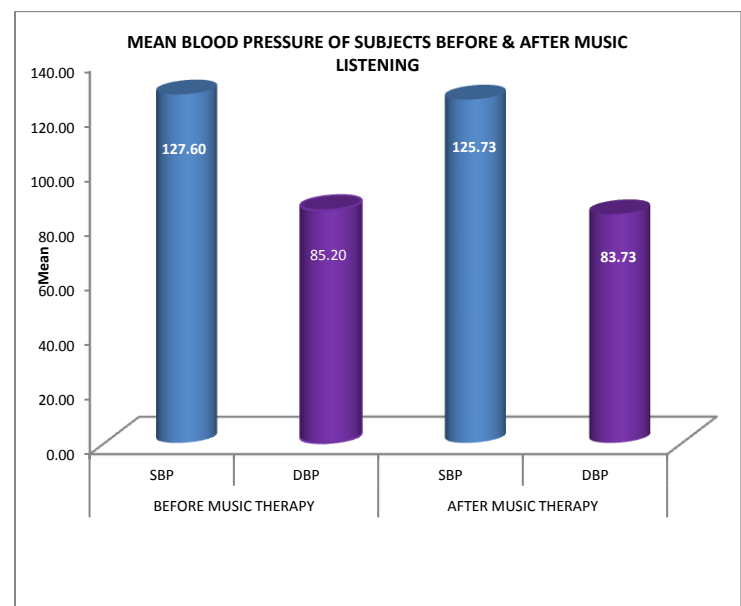


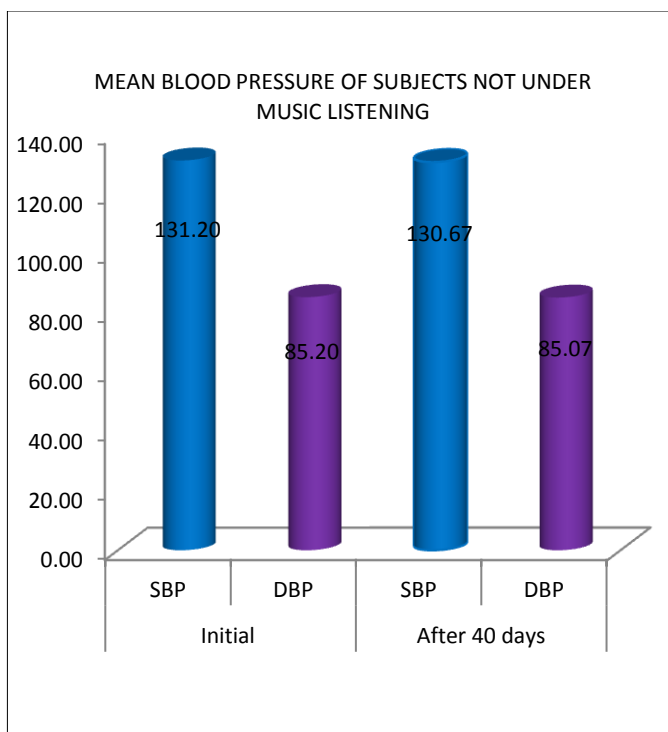
Figure.1

Table.2: Mean Systolic & Diastolic Blood Pressure of Subjects Not Under Music Listening.

| BP | First day | 40 th day | p-value |
|-----|---------------|----------------------|---------|
| SBP | 131.20 ± 3.36 | 130.67 ± 2.79 | 0.1643 |
| DBP | 85.20 ± 1.47 | 85.07 ± 1.28 | 0.7744 |

SBP: Systolic Blood Pressure, DBP: Diastolic Blood Pressure. Both Systolic & Diastolic blood pressures are not significantly decreased ($p < 0.1643$, $p < 0.7744$, respectively).

Figure.2



Discussion

The results of our study show significant reduction in systolic blood pressure ($p < 0.0011$) and diastolic blood pressure ($p < 0.0104$) in the experimental group after exposure to specific music (Rag Ahirbhairavi) for 20 minutes twice day for 40 days. There was no such reduction in the blood pressure in the control group.

We can explore the psycho physiological basis by which music reduces blood pressure. Musical rhythms induce physiological adaptations in bodily rhythms¹⁰. It influences neuronal, immunological and endocrine systems. Bartlett states that musical tempo as measured in beats per minute,

alter the cardio vascular dynamics¹¹. This principal was used in our selection of the specific music pattern in Rag Ahir Bhairavi. By playing recordings of this relaxing music morning and evening, the elevated blood pressure of pre hypertensives is reduced. The cascading effect produces an immense alteration via mind body connection and normalizes the blood pressure¹². This result is supported by the statement of “American society of Hypertension” research meet which stated that “classical, Celtic or raga music every day might reduce high blood pressure⁹.”

From the above discussion, we infer that music is yet another powerful mode of CAM to treat pre hypertension. CAM are the first line of management of pre hypertension as they are non invasive, non pharmacological and universally acceptable¹³. Many other forms of CAM such as, meditation are widely being recommended in managing pre hypertension¹⁴.

Since we have the evidence for the role of music in reducing blood pressure, more preference can be given to this type of intervention. It is high time we create awareness on the beneficial effects of music as it delays the onset of full blown hypertension and prevents its complications¹⁵.

Conclusion

From our study we can conclude that listening to specific music pattern restores normal BP in pre hypertensive subjects. As pre-hypertension, is a preliminary stage of hypertension, it is mandatory to intervene and restore normal blood pressure at this stage itself. This will delay the onset of full blown hypertension and its complications. As music listening is non pharmacological and universally acceptable mode, it can be adopted as one form of CAM for managing pre hypertensive subjects. As more importance is given to other forms of CAM such as Yoga, Meditation, the role of music has to be further explored. The role of music in reducing blood pressure in pre hypertensives has been established from our study. We recommend further studies to explore the efficacy of music in the treatment of full blown hypertension.

References

1. Nakasone Y, Nakamura Y, Yamamoto T, Yamaguchi H. Effect of a traditional Japanese garlic preparation on blood pressure in pre hypertensive and mildly hypertensive adults.

Sobana R, Jaiganesh K, Barathi P. (May 2013) Role of Rag Ahir Bhairav as complementary and alternative medicine (CAM) on blood pressure in prehypertensive adults. *Jour of Med Sc & Tech*; 2(2); Page No: 66- 70.

- Experimental and therapeutic medicine. 2013 February; 5(2): 399–405.
2. WHO World Health Report, 2002.
 3. Cardiovascular Diseases " Prevention and Control, WHO, 2001-2002
 4. A. Muruganathan, Tirupur. *Medicine Update* 2012; Vol. 22: page 105-110.
 5. Ankur Gupta, Deepak Tomar, J.C.Mohan, Pritam Gupta. *Medicine Update-2011*. Page 61-64
 6. Mcelroy, Misra, Vasile, Hosokawa. *Annals of Behavioral Science and Medical Education* 2012, Vol. 18, No. 2, 15 – 18
 7. Vera Brandes, Julian F. Thayer, Columbus, OH, & Joachim E. Fischer. Effect of receptive music therapy on heart rate variability in hypertensive patients. *Mannheimer Institute for Public Health*
 8. Yu JY, Huang DF, Li Y, Zhang YT. *Conf Proc IEEE Eng Med Biol Soc*. 2009; 2009:6444-7.
 9. Music Therapy Shows Promise in Treating High Blood Pressure. Saturday, June 21, 2008 by: Sherry Baker, Health Sciences Editor.
 10. Mac Donald,R., Hargreaves,D.J and Miel,D. Musical Identities. In S.Hallam, I Cross, and M.Thayer (eds) *Oxford Hand Booh of Musical Psychology*, 2009,pp.462-70. Oxford;Oxford University Press.
 11. Bartlett, D.L. Physiological responses to music and sound stimuli. In: D.A.Hodges(ed). *Hand book of Music Psychology*.1996; Second edition, pp.343-85. San Antonio TX: IMR Press.
 12. Ferrer, AJ., The Florida State University, Tallahassee Memorial Health Care, USA. 44(3):242-55.
 13. Cohen JJ. Reckoning with alternative medicine. *Acad Med* 2000; 75:571.
 14. Mourya M, Mahajan AS, Singh NP, Jain AK. Effect of slow- and fast breathing exercises on autonomic functions in patients with essential hypertension. *J Altern Complement Med* 2009; 15:711-7
 15. Bruscia, K.E. *Defining Music Therapy*. Second edition ed. Lower Village: Barcelona Publishers. 1998.