

DEVOTIONAL MUSIC AND CARDIOVASCULAR SYSTEMNeera Goel¹, Varun Malhotra², Rinku Garg³, Yogesh Tripathi⁴, Usha Dhar⁵**HOW TO CITE THIS ARTICLE:**

Neera Goel, Varun Malhotra, Rinku Garg, Yogesh Tripathi, Usha Dhar. "Devotional Music and Cardiovascular System". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 33, August 07; Page: 8897-8902, DOI: 10.14260/jemds/2014/3140

ABSTRACT: A slight reduction of blood pressure and pulse rate can reduce the risk of developing cardio vascular disease. Indian and western music have been considered among preventing programmes for time in order to reduce risk associated with cardio vascular disease. Therefore the aim of study is to describe the effect of listening hanuman chalisa music on systolic, diastolic blood pressure and heart rate in asymptomatic individuals **MATERIAL AND METHODS:** Twenty healthy MBBS subjects, aged 18 to 22years were seated in a comfortable sitting posture with spine straight, body relaxed. The music of hanuman chalisa plays for 10 minutes. Systolic, diastolic blood pressure and pulse rate is monitored before and after the intervention. Result – Statistically significant reduction in SBP (10.62 mmHg), DBP (3.91mmHg) and pulse rate (5.77per minute) were observed after listening to hanuman chalisa music (p value< 0.001). Conclusion- hanuman chalisa music may have a potential benefit in reducing blood pressure and can be used in cardio vascular disease preventive programmes. It helps to improve the quality of life as well as increased life expectancy of the patient.

KEYWORDS: Hanuman chalisa, systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate (PR), cardio vascular disease (CVD).

INTRODUCTION: The relaxing effects of music have been culturally accepted for centuries. Despite this, music was not given much attention in formal medical settings, where patients experience heightened levels of anxiety. While anxiety does not cause chronic hypertension (HTN), it can lead to acute elevations in blood pressure (BP) as may be noted with patients in a variety of medical settings; thus, BP and heart rate (HR) may be a result of anxiety in these settings.

Cardiovascular disease (CVD) is the leading cause of death in the world. According to the WHO, in 2012 CVD killed 17.5 million people. 7.4 million people died of ischemic heart disease and 6.7 million from stroke.¹ It has been shown that a slight reduction of Blood pressure leads to a reduction in prevalence of morbidity and mortality associated with CVD.^{2, 3} In the general population a reduction of resting heart rate leads to a reduction in CVD risk as well as its consequences.⁴⁻⁷

Studies have shown the association of increase risk of coronary heart disease with heart rate more than 84 beats per minute at rest. Increase risk of mortality in general population as well as in post myocardial infarction patient have been identified with increasing heart rate.^{6,7} Since the clinical care of CVD is costly and prolonged, prevention of CVD is crucial. It helps to improve the quality of life as well as increased life expectancy of the patient.

To this aim we designed our study to use music therapy to help decrease blood pressure. Our studies have been conducted to assess the effect of listening hanuman chalisa music on systolic and diastolic blood pressure and pulse rate. The effect of relaxation music on physical health has been identified since ancient times; very few scientific studies have been conducted recently.

ORIGINAL ARTICLE

MATERIAL AND METHODS: Twenty normal asymptomatic male and female MBBS subjects were seated in a comfortable sitting posture with spine straight, body relaxed. The music of hanuman chalisa plays for 10 mins. Systolic, diastolic blood pressure and heart rate is monitored before and after the intervention. Blood pressure was taken by using sphygmomanometer and stethoscope (auscultatory method). Heart rate was measured by counting pulse rate. The subject is instructed to listen to music and enjoy it.

Examination of hearing was done, during screening by using simple hearing examination technique (whispered voice test).⁸ Sound of music kept low (audible). Inclusion criteria include healthy students with normal hearing and Hindu religion. Students who were deaf, complaints of tinnitus, hypertension, ear pain and students of a different religious faith who did not want to hear hanuman chalisa were excluded.

Statistical analysis of data: The data obtained was analyzed using SPSS software (version 13.0). All parameters including PR, SBP, and DBP were assessed. student's paired "t" test was used for analysis of comparison. Results are expressed as Mean+ S.D. P<0.05 was considered as significant.

RESULT:

	Parameter	Before Mean± SD	After Mean± SD	p-value
1	pulse rate	82.3 ± 8.32	76.53 ± 7.97	P <0.0008
2	systolic blood pressure	126.3 ± 13.25	115.68 ± 12.81	P <0.0001
3	diastolic blood pressure	75.7 ± 9.61	71.79 ± 9.70	P <0.0032

Table 1: cardiovascular parameters of the subjects before and after listening of music

SD= standard deviation p value <0.05 significant.

Statistically significant reduction in SBP (10.62 mmHg), DBP (3.91mmHg) and pulse rate (5.77per minute) were observed after listening to hanuman chalisa music (p value< 0.001)

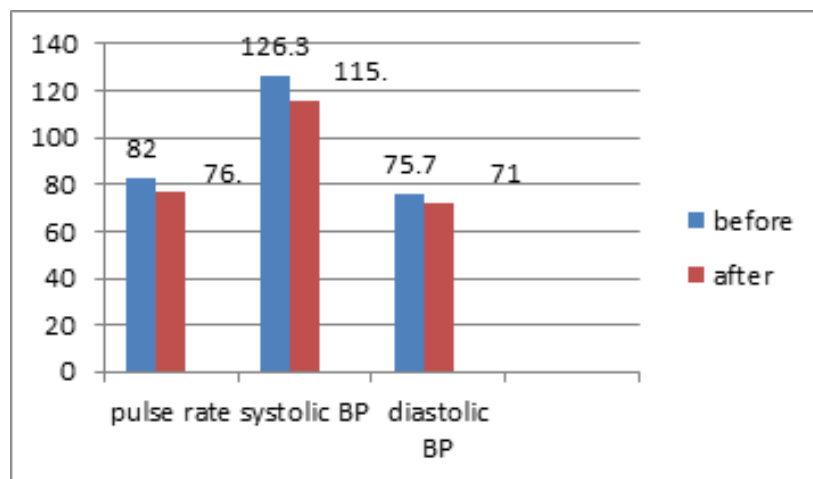


Chart 1

ORIGINAL ARTICLE

DISCUSSION: In the present study we found that listening to hanuman chalisa leads to a significant reduction of systolic blood pressure, diastolic blood pressure and pulse rate. Hanuman chalisa is a devotional music.

The observed effect may be due to the effect of music on the central and autonomic nervous system as well as on the endocrine system that is reduction in the sympathetic activity with simultaneous activation of parasympathetic drive along with the reduction of stress hormone level. Though the effect of relaxation music on physical health has been identified since ancient times, very few scientific studies have been conducted recently.^{9,10}

Listening to music affects arousal, mood and listeners' enjoyment, which in turn influence performance on a variety of cognitive tasks. Music may help facilitate a relaxation response in part because of the integrated ways that it is processed by the brain and body.⁹ In 1918, Hyde and Scalapino reported that minor tones increase pulse rate and lower blood pressure, where as "stirring" music increased both pulse rate and blood pressure.¹¹

Dr. Bermandi found that reciting the rosary prayer or a yoga, mantra enhanced heart rate variability and baroreflex sensitivity by slowing the breathing rate down to 6 breaths per minute.¹² In their extended study it has been shown that breathing at this slow rate reduced blood pressure and enhanced baroreflex sensitivity in hypertensive patients.¹³

Dr. Bernardi L. et al were able to demonstrate a significant effect of different types of music on heart rate and the blood pressure in musicians and non-musicians. According to them, slower or more meditative music, such as raga music have significant effect on reducing the heart rate, while faster music and more complex rhythm such as rap, techno, and fast classical had significant effect on increasing the respiratory rate, heart rate and blood pressure.¹⁴

Dr. E. J. Wendy showed the effect of relaxing music on participants. The stress induced increases of cortisol were prevented by exposure to music and this effect was independent to gender. Music also enhanced baseline salivary IgA levels. These finding supports that music is an effective anxiolytic treatment and helps to boost immunity.¹⁵

The effect of listening to different types of music on perceived and physiological indicators of relaxation, were evaluated in 56 students by Burns et al. They were randomly assigned to listen to classical, hard rock, self-selected relaxing music, or no music at all. Participant's relaxation levels, skin temperature, muscle tension, and heart rate were evaluated before and after exposure to a music condition. Skin temperature was decreased for all conditions and the classical, self-selected relaxing music and no music groups reported significant increases in feelings of relaxation.¹⁶

Fernell evaluated the effects of music on anxiety in the preoperative period. Patients in the music group were given stereo headphones, a cassette player and a choice of 22 types of music (including soft hits, classical guitar, chamber music and folk music). Patients in the music group have lower heart rate and blood pressure levels than patients in the no music group in the preoperative period, during surgery and after surgery. Further more patients in the music group reported lower level of perceived stress and higher levels of ability to cope after surgery than the no music group.¹⁷

Dr. S. Chaffin et all data suggest that listening to classical music may serve to improve cardio vascular recovery from stress and significantly lower the systolic blood pressure.¹⁸ Dr R. S. Loomba et all stated that music therapy had a significantly greater decrease in SBP ($p < 0.001$), DBP ($p < 0.001$), HR ($p < 0.001$).¹⁹ Bekiroqlu T. shows the effect of Turkish classical music on blood pressure in elderly. His study shows the mean reduction in SBP was 13mm hg in the music therapy group and 6.50mmhg in the control group.²⁰

ORIGINAL ARTICLE

Music Therapy in Cardio-Respiratory Physiology: There are many preventive programs operating to minimize the development of CVD mainly based on life style modification. Approaches aimed at reducing stress and anxiety such as music therapy, muscle relaxation therapy, meditation, bio-feed back etc. are now seriously considered.²¹

Music therapy includes listening to music that alternates a quick tempo with slower passages or pauses could help induce relaxation as an alternative to meditation and it could have a potential use in managing patient with cardiovascular disease.²² Music therapy is easy to practice; prior preparations are not needed and it can be practiced at any given time; thus it is more acceptable to the general population and is an extremely inexpensive intervention technique.²³

While western and eastern classical music system have a positive effect on the physiology and the psychology of the human body, rock, pop, zazz, rap, disco and other varieties of fast and high beat music which have become quite popular in modern times are found to have detrimental effect on health in general.^{9,14,24}

Lacunae and Future Studies: Measuring the cortisol levels and endorphins would help explain the effect of music on neuroendocrine system. It would also play an important role in understanding the underline physiology of the relaxation music.

CONCLUSION: Significant reduction in SBP, DBP, PR were observed immediately after listening to hanuman chalisa music for about 10mins, in students aged between 18-22 years. Listening to relaxing music would be more acceptable to general population as an intervention method of reducing CVD risk. It would lead to an improvement in the quality of life of the people. Furthermore, as it is a very cost effective intervention method, it may help to minimize the CVD related economic burden in future.

REFERENCES:

1. World Health Organization. Top ten causes of death. 2012 updated May 2014; Fact sheet N*310: 3 <http://www.who.in/medicentre/factsheets/fs310/en/idx2.html>.
2. Eastern stroke and coronary heart disease collaborative research group. Blood pressure, Cholesterol and strokes in eastern Asia. *Lancet*.1998; 352, 1801-1807. Doi 10.1016/50140-6736(98)03454-0.
3. Mac Mohan, S. Blood pressure and the risk of cardiovascular disease. *The New England Journal of Medicine*.2000; 342; 49-52. Doi; 10.1056/NEJM2000/063420109.
4. Borer J S. Heart rate: From risk marker to risk factor. *European Heart Journal*. 2008; 10, F2-F6. Doi. 10. 1093/ eur heart j/ sun 019.
5. Palatini P et al. Heart rate as a predictor of development of sustained Hypertension in subjects screened for stage 1 Hypertension. The HARVEST study. *Journal of Hypertension*.2006; 24 (9): 1873-1880 doi: 10. 1097/01.hjh. 0000242413.96277.5b.
6. Hjalmarson A K. Heart rate an independent risk factor in cardiovascular disease. *European Heart Journal* 2007supplements; 9: F3-F7. Doi 10.1093/ eur heart j/sum 030.
7. Reil J C et al. Heart rate reduction in cardiovascular disease and therapy. *Clinical Research in Cardiology*. 2011; 100: 11-19. doi. 10. 1007/ 500392- 010-0207-x.
8. Michel S. Hutchinson's clinical methods. 1995; 20th edition. Saunders Company London.

ORIGINAL ARTICLE

9. Watkin G R. Music therapy: Proposed physiological mechanisms and clinica implications. *Clin Nurse Spec* 1997; 11: 43-50.
10. Chiu P, Kumar A. Music therapy; Loud noise or soothing notes. *International Pediatrics*, 2003; 18: 204-208.
11. Hyde IM, Scalapino W. The influence of music upon electrocardiograms and blood pressure. *Am J Physiol.*1918; 46: 35-38.
12. Bernardi L, Sleight P, Bandinelli G, Cencetti S, Fattorini L, Wdowezyc-Szulc J, et al. Effect of rosary prayer and yoga mantras on autonomic cardiovascular rhythms: comparative study. *BMJ.* 2001; 323: 1446-1449.
13. Joseph CN, Potra C, Casucci G, Casiraghi N, Maffeis M, Rossi M et al. Slow breathing improves arterial baroreflex sensitivity and decreases blood pressure in essential hypertension. *Hypertension.*2005; 46: 714-718.
14. Bernardi P, Porta C, Sleight P. Cardiovascular, cerebrovascular and respiratory changes induced by different type of music in musicians and non – musicians: the importance of silence. *Heart Journal.* 2006; 92: 445-452 doi 10. 1136/hrt.2005.064600.
15. Wendy E, J Knight, Nikki S. Richard PhD. Relaxing music prevents stress induced increases in subjective anxiety, systolic blood pressure and heart rate in healthy males and females. *Oxford Journals. Journal of Music Therapy.*2001; 38 (Issue 4): 254-272. doi:10.1093/jmt/38.4.254.
16. Burns J, Labbe E, Williams K et al. Perceived and physiological indicators of relaxation; as different as Mozart and Alice in chains. *Appl Psychophysiol Biofeedback.*1999; 24: 197-202.
17. Fernell J. Listening to music during ambulatory ophthalmic surgery reduced blood pressure, heart rate, and perceived stress. *Evid Based Nurs.*2002; 5: 16.
18. S Chaffin, M Roy, W Gerin. Music can facilitate blood pressure recovery from stress. *British Journal of Health and Psychology.* 2004; 9 (3): 393-403.
19. Loomba RS, Arora R, Shah, Chandrasekar S, Molnar J. Effect of music on systolic blood pressure, diastolic blood pressure and heart rate; a meta-analysis. *Indian Heart Journal.* 2012; 64 (3): 309-313.
20. Bekiroqlu T, Ovayolu N, Erqun Y, Ekerbicertic. Effect of Turkish classical music on blood pressure: a randomized controlled trial in hypertensive elderly patients. *Complement Ther Med* 2013; 21 (3); 147-54].
21. White J. Effects of relaxing music on cardiac autonomic balance and anxiety after acute myocardial infarction. *American Journal of Critical Care*, 1999; 8: 220-230
22. Bernardi L. Music and the heart. *Journal of American Heart Association. Circulation: European Perspective in Cardiology.* 2007; 11: 139-140.
23. Iriate Roteta A. Music therapy effectiveness to decrease anxiety in mechanically ventilated patients. *Enfermeria Intensiva*, 2003; 14, 43-48. Doi: 10.1016/ S1130-2399 (03) 78103-6.
24. Mockel M et al. Immediate physiological responses of healthy volunteers to different types of music, cardiovascular, hormonal and mental changes. *European Journal of Applied Physiology and Occupational Physiology.*1994; 68: 451-459. Doi.10.1007/BF00599512.

AUTHORS:

1. Neera Goel
2. Varun Malhotra
3. Rinku Garg
4. Yogesh Tripathi
5. Usha Dhar

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Physiology, Santosh Medical College, Ghazibad, U. P.
2. Professor, Department of Physiology, Santosh Medical College, Ghazibad, U. P.
3. Assistant Professor, Department of Physiology, Santosh Medical College, Ghazibad, U. P.
4. Professor, Department of Physiology, Santosh Medical College, Ghazibad, U. P.

5. Dean, Professor and HOD, Department of Physiology, Santosh Medical College, Ghazibad, U. P.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Neera Goel,
H. No. 31,
Sector – 6,
Charanjeev Vihar,
Ghazibad, U. P.
Email: neera.goel15@gmail.com

Date of Submission: 19/07/2014.

Date of Peer Review: 21/07/2014.

Date of Acceptance: 30/07/2014.

Date of Publishing: 05/08/2014.