

Evaluation of the Effects of Music Therapy Using Todi Raga of Hindustani Classical Music on Blood Pressure, Pulse Rate and Respiratory Rate of Healthy Elderly Men

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Abstract

Several studies have indicated that music therapy may affect cardiovascular health; in particular, it may bring positive changes in blood pressure levels and heart rate, thereby improving the overall quality of life. Hence, to regulate blood pressure, music therapy may be regarded as a significant complementary and alternative medicine (CAM). The respiratory rate, if maintained within the normal range, may promote good cardiac health. The aim of the present study was to evaluate the changes in blood pressure, pulse rate and respiratory rate in healthy and disease-free males (age 50-60 years), at the completion of 30 days of music therapy intervention. Eighty healthy males were divided randomly into the experimental and the control group. Subjects of the experimental group were exposed to music therapy (a twenty-minute instrumental session of Raga Todi of Hindustani Classical Music), whereas the control group was not exposed to the raga and were only kept quite at rest for the same period of time, during the period of intervention. Before and after the intervention, blood pressure, pulse rate, and respiratory rate of the subjects were measured. It was found that the values of blood pressure, pulse rate and respiratory rate showed significant ($p < 0.001$) decrement in healthy/ asymptomatic subjects exposed to music therapy. In the control group, the parameters under study did not vary significantly between the initial and afterward measurements ($p > 0.05$). Thus it may be concluded that raga Todi of Hindustani Classical Music has the potential to bring down the blood pressure levels and thereby may restrict the development of cardiovascular disorders.

Keywords: Blood Pressure, Heart Rate, Hindustani Classical Music, Raga Todi, Respiratory Rate

I. INTRODUCTION

Music may be regarded as the projection of ideas as well as emotions through significant sounds produced by an instrument, voices, or both by taking into consideration different elements of melody, rhythm, and harmony. Music plays an important role in everyone's life. Music has the power to make one experience harmony, emotional ecstasy, spiritual uplifting, positive behavioral changes, and absolute tranquility. The annoyance in life may increase in lack of melody and harmony. Music is known to have healing power. Music may be effective to combat pain (Cepeda et al., 2006), anxiety (Madhusudhan et al., 2018; Ghasemi et al., 2017; Jhon and Upendra, 2016), coronary artery disease (Hanser and Mandel, 2005), mental illness (Li et al., 2015), stress (Möckel et al., 1994), and several other forms of health ailments (Sarkar and Utpal, 2015). One of the major risk factors for cardiovascular diseases and cerebrovascular diseases is hypertension. These diseases increase the morbidity and mortality rates among adults. Increased blood pressure levels seen at childhood may extend into adult life as hypertension (McGill et al., 2001), which eventually leads to the damage of blood vessels of the body. Hypertension is externally asymptomatic and causes damage to certain internal organs of the body. Therefore, it has been referred to as a 'Silent Killer' by the World Health Organization (WHO, 1992). In India, the incidence of hypertension has been found to be more among urban adults in comparison to rural adults. The estimated number of hypertensive Indians will reach two hundred million

by 2025 (Bhalwar, 2009). Evidence gathered many studies suggest that music may bring positive changes in the blood pressure levels (do Amaral et al., 2016), and thus may lower the incidence of other diseases which are associated with hypertension. It should be noted that music may be of different types, viz., Western, Indian and others. There exists scope for exploring the impact of different Indian ragas of Hindustani Classical music on blood pressure, especially in healthy individuals, so that ragas can be used more efficiently in music intervention programs targeting the prevention of cardiovascular disease.

The American Society of Hypertension in their study have noted that the blood pressure measured at regular intervals, as the individual move around, carrying out his/ her normal daily routine, that is, the 24-hour ambulatory blood pressure (ABP), significantly reduced in mild hypertension patients listening Indian classical raga for half an hour per day, for four weeks (Sherry, 2008).

From time to time, continuously, the blood pressure targets have been redefined (Pradhan and Vishwakarma, 2017), to help in the early detection of subjects at risk of developing hypertension and to speed up the treatment strategies, which could be either drug-based for hypertensive patients, and non-pharmacological therapies and techniques for subjects who are not hypertensive but are at the risk of developing hypertension in future.

The conventional non-pharmacological strategies to lower blood pressure include lifestyle modifications such as reduction of body weight, dietary changes, restriction in the intake of salts, lowering of stress levels, and participation in exercises / physical activity. In recent times, the use of complementary and alternative medicine (CAM) to reduce blood pressure has gained importance. The CAMs include meditation, yoga, and music therapy (Mcelroy et al., 2012).

A. Musicological Analysis of Indian Music Therapy

In Sama Veda and other ancient music therapy-related Indian music literature, it has been mentioned that ragas such as Todi, Bhupali, Ahir Bhairava, Puriya, Hindol, Bhimpalās, and Kausi Kanada are effective in lowering blood pressure (Kunikullaya et al., 2016).

In Indian context, a subject may be said to be exposed to music therapy when sound (nada), note (Swara), melody (raga), music interval (Shruti), beat (tala), rhythm (laya) are rightfully and systematically intoned, clinging to the aesthetic emotion/ mood (rasa) and format / mode (Thaat) (Sharma, 2007). It may be mentioned that there are seven notes Sa, Re, Ga, Ma, Pa, Dha, and Ni of Swara. The individual notes may be of decreased pitch or higher pitch. If the note is in decreased pitch, it is known as a flat note (Komal), whereas if the note is in a higher pitch, it is known as the sharp note (Teevra). The natural/ Suddha/ pure Swaras are the Shadja (Sa) and Panchama (Pa) with no

displacement or distortion (immovable: Achalit Swaras), and the notes Rishabha (ri), Gandhara (ga), Madhyama (ma), Dhairvata (dha), and Nishada (ni) may be either Suddha (movable : Vikrut/ Chalit), Komal or Teevra. Altogether, there are 12 notes (Chaitanya, 1973). That is the format of a sequence of selected Swaras with variation in Suddha, Komal and Teevra Swaras (Sobhana, 1989).

Raga is an array of Swaras that inputs suitable rasa / aesthetic emotion/ mood in a song/ music. A raga has the ability to induce or magnify the feeling of excitement, joy / rejoice, peace, love, compassion, peace, courage, sorrow, and mental / emotional calmness (Karuna et al., 2013). This makes raga appropriate for music therapy. A particular raga has a definite number of Komal or Teevra Swaras, based on which the Thaat can be easily recognized (Sobhana, 1989). Positive physical / physiological / psychological changes have been found to be induced by positive emotions (Tugade et al., 2004), which can be elicited by raga therapy.

B. Present Concept of Hypertension in Adults

Conventionally, systolic blood pressure (SBP) ≥ 140 and diastolic blood pressure (DBP) ≥ 90 mm Hg is widely accepted as hypertension (Sadiq et al., 2017). In the year 2018, guidelines framed by the European Society of Cardiology (ESC) / European Society of Hypertension (ESH), defined hypertension using the same values of SBP and DBP (Williams et al., 2018). Subjects having systemic arterial blood pressure more than it is generally exposed to the treatment.

Treated blood pressure must be about 130/ 80 mm Hg if the patient is able to tolerate drug treatment. In the guidelines (2017) provided by the American College of Cardiology (ACC) and American Heart Association (AHA), SBP ≥ 130 and DBP ≥ 80 mm Hg was known as hypertension. Generally, health care professionals recommended that all subjects should maintain their blood pressure below 140/ 90 mm Hg. However, the European, as well as American guidelines, suggest that blood pressure should be maintained at $< 130/ 80$ mm Hg.

Subjects of any age may become hypertensives. However, with age, the prevalence of hypertension has been seen to rise. Hypertension is mainly of two types- Primary hypertension (essential hypertension) and Secondary hypertension. Primary hypertension is most common and is found in the majority (90 - 95 %) of hypertensive patients. It has no single identifiable causes; its causes are unknown and are multifactorial in nature. Genetics, sedentary lifestyle, high intake of salts, alcohol intake, smoking, stress, insulin resistance, aging, and obesity have a role in its development. Secondary hypertension is a less prevalent type, affecting 5-10 % of hypertensives. It may occur due to different underlying medical conditions such as diseases of kidneys, heart, endocrine system, and even by drugs (Mohamed et al., 2013).

C. Brief Literature Survey

In a study conducted on primary educators (age >30 years) with hypertension at Puducherry, it was found that raga Ahir Bhairav was effective in reducing the blood pressure. In the study, raga Ahir Bhairav was administered to the study subjects by using CD for 20-30 minutes (Angeline, 2018).

An Indian study among male and female subjects found that listening to Indian classical music for an hour, along with the intake of regular anti-hypertensive medications, causes a significant lowering of blood pressure at the completion of four months from the start of music therapy (Kulkarni and Chittapur, 2017).

Similarly, another study at Nellor, India, found music therapy effective in the regulation of blood pressure, heart rate, and respiratory rate, after neurosurgery, in patients of traumatic brain injury (Reddy et al., 2017).

Raga Bhupali, an evening raga, has been found to be useful for lowering heart rate and modulating other cardiac regulation factors by lowering the sympathetic activity and raising the vagal tone. Moreover, it may reduce anxiety levels and induce positivity in perceived feelings (Nagarjan et al., 2015).

In a sample of elderly adults (above 60 years of age) of Chennai, Tamil Nadu, administration of music therapy using raga Malkauns for a time period of 22 minutes, in the evening for 30 days was found to be significantly effective in lowering blood pressure (Lakshmi and Bhushan, 2015).

In another study, among prehypertensives or stage I hypertensives, lifestyle modification, along with the listening of raga Bhimpalas for three months, obtained promising results in terms of decrement in blood pressure (Kunikullaya et al., 2016).

A study carried out at Jawaharlal Nehru Medical College, Belgaum, showed that raga Todi was effective in lowering the blood pressure in adults (age > 40 years) of both sexes having essential hypertension, when administered for 20 minutes daily in the morning, for 30 days along with their regular medication (Kamat-Nadkarni, 2013).

In another study conducted among pre-hypertensive male (aged 35-40) adults, near Pondicherry, music therapy intervention (listening Ahir Bhairav using earphones for 20 minutes per day) for 40 days significantly reduced the blood pressure (Sobna et al., 2013).

A Sri Lankan study on 45 and 65 years aged male and female subjects, found that listening Hindustani Classical Music for certain duration in healthy individuals effectively improved cardiovascular and respiratory health, evaluated in terms of SBP, DBP, Pulse rate and Breathing rate (Siritunga et al., 2013).

Studies have reported that listening to Indian classical instrumental music while gastroscopy may reduce blood pressure, heart rate, and breathing rate (De Oliveira et al., 2009).

In a study conducted on elderly adults of India, living in old age homes, it was seen that music therapy intervention

employing raga Anandabhairavi of Carnatic music was successful in decreasing the blood pressure (Mathew, 2008).

In a foreign study on adolescents, it was found that the relaxing nature of the music may cause a lowering of heart rate. Such findings may be of relevance for the maintenance of good cardiovascular health (Escher and Evéquo, 1999).

Thus by analyzing the available studies, it is seen that minimal studies have been conducted to investigate the therapeutic efficacy of Indian ragas in controlling blood pressure in healthy/asymptomatic subjects. Hence, the objective of this present study was to investigate the impact of Raga Todi of Hindustani Classical Music (Instrumental) on systemic arterial blood pressure, pulse rate, and respiratory / breathing rate in such a group of individuals.

II. MATERIALS AND METHODS

Participants : After receiving the approval from the Institutional ethics committee and informed consent from the participants of the study, 80 male subjects satisfying the inclusion and exclusion criteria mentioned below was randomly selected for the study. The study was carried out in a private health care unit at Burdwan, West Bengal.

1) Inclusion Criteria

Subjects fulfilling all of the below criteria were included in the study.

- Individuals between 50-60 years of age.
 - Males who had systemic arterial pressure less than 140/90 mm Hg.
 - Subjects with no sign of Bradycardia (resting heart rate of lower than 60 beats per minute), Tachycardia (resting heart rate greater than 100 beats per minute), and those having no additional heart sounds.
 - Subjects who were not under treatment / medications for any kind of disease or health-related condition.
- The assessment of the above selection criteria was done by a certified health professional.

2) Exclusion criteria

- Males who were lower or above 50-60 years .
- Males with hypertension, that is, having systemic arterial pressure \geq 140/90 mm Hg.
- Males taking medications or those under long term treatment for any illness were excluded.
- Smokers and alcoholics.
- Individuals who were under lifestyle or dietary modifications for treatment of health-related conditions. were excluded.

Study protocol : A control group (n = 40) and an experimental group (n = 40) were formed with the male participants. The control group was simply exposed to a resting period for 20 minutes. The subjects of the experimental group, on the other hand, was exposed to a 20-minute session of Raga

Todi of Hindustani Classical Music (Instrumental), employing headphones in a sitting posture.

All the subjects of the study were asked to remain at rest for 5 minutes in sitting posture, before the start of the study so that various physiological parameters of the body remain at a steady level. The intervention of maintenance of resting state in case of the control group and exposure to music in the case of the experimental group was continued daily (once a day) in the morning hours for a time period of 30 days.

The study employed Pre-test and Post-test design to evaluate the changes in blood pressure (SBP and DBP), pulse rate, and respiratory rate, before and after music therapy intervention. On the first day (Pre-test- Before Intervention), and on the 30th day (Post-test- After Intervention), the determination of blood pressure, pulse rate, and respiratory rate in the control group subjects and the experimental group subjects were carried out.

The blood pressure was measured in the sitting position by using a digital blood pressure apparatus (OMRON HEM-7130). The average of two consecutive measurements, at an interval of 5 minutes in the upper arm of the subject, was taken to be the final blood pressure of an individual. The same instrument also measured the heart rate or pulse.

The determination of respiratory rate was done by counting the respiratory movements of the chest for one minute from a distance (Kumar and Clerk, 2001; Michel, 1995).

It is necessary to mention that initially, a pilot study was conducted for pretesting the study design and for feasibility. Then necessary alterations were made before the final study. All the measurements of the Pre-test and Post-test were done at a similar timing of the day to restrict circadian effects and promote the reliability of the collected data.

Raga Todi (morning raga) used on the experimental group is a Sampurna raga and permits seven notes in ascent and seven in descent. This deep raga is known to create an atmosphere full of Karun and Bhakti ras.

Statistical Analysis: All the data obtained were expressed as mean ± SD (standard deviation). A comparison of the parameters under study was made by using the t-test. A p-value of ≤ 0.05 or lower was considered significant.

III. RESULTS

The complete characteristics of the study participants have been presented in Table 1. From the table, it was seen that the majority of the participants were graduates, married, and were private-sector employees. The mean age of the participants was 57 ± 6.

The blood pressure before and after music therapy in the experimental group, and the blood pressures of the control group initially and after the intervention (rest) have been presented in Table-2 and illustrated in Figures 1A and 1B. It was found that after music therapy intervention in the experimental group, the

systolic blood pressure was reduced to 130.2 (mm Hg) from 136.3 (mm Hg), and the diastolic blood pressure was reduced to 80.5 (mm Hg) from 86.2 (mm Hg). The observed drop in blood pressure was significant (p < 0.001).

Table 1: Distributions of Participants by Characteristics

No.	Category	Frequency	Percentage (%)
Education			
1	10 + 2	7	8.75
2	Graduate	44	55
3	Post Graduate	23	28.75
4	Higher Degrees	6	7.5
Total		80	100
Marital Status			
1	Married	75	93.75
2	Unmarried	5	6.25
Total		80	100
Employment			
1	Government employees	22	27.5
2	Private employees	28	35
3	Business	25	31.25
4	Others	5	6.25
Total		80	100
Mean Age		57 ± 6	

Table 2: Analysis of blood pressure in the Control Group (initially and after resting period), and Experimental Group (before and after exposure to music)

Control Group (Mean ± SD)			
Variable	Pre test- Initial level before resting period of 20 minutes, in no music condition	Post test- After resting period of 20 minutes, in no music condition	p-value
SBP (mm Hg)	137 ± 1.26	136.5 ± 1.53	> 0.05
DBP (mm Hg)	87.1 ± 1.62	86.5 ± 1.72	> 0.05
Experimental Group (Mean ± SD)			
Variable	Pre test- Before Music Therapy Intervention	Post test- After Music Therapy Intervention	p-value
SBP (mm Hg)	136.3 ± 2.42	130.2 ± 4.21	< 0.001
DBP (mm Hg)	86.2 ± 1.93	80.5 ± 2.51	< 0.001

The pulse rate and respiratory rate before and after music therapy in the experimental group, and the same in the control

group initially and after the intervention (rest) is presented in Table-3, and illustrated in Figure 2 and 3. It was seen that the pulse rate was lowered to 79.8 (bpm) from 85.2 (bpm), and the respiratory rate dropped to 13.6 (per minute) from 15.7 (per minute), after music therapy in the experimental group. These variations were significant ($p < 0.001$).

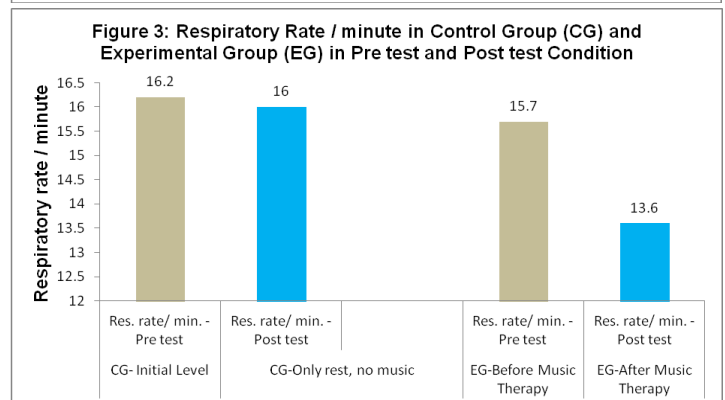
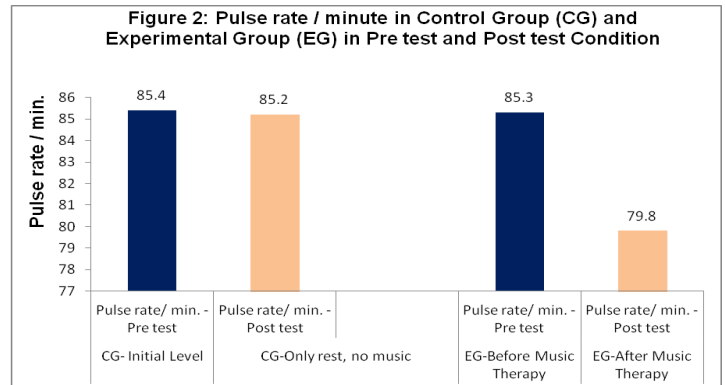
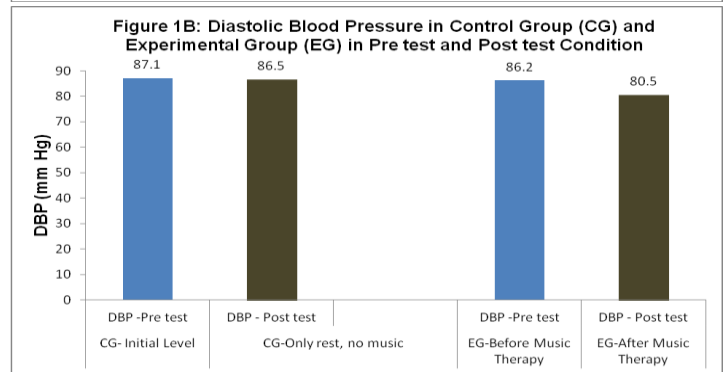
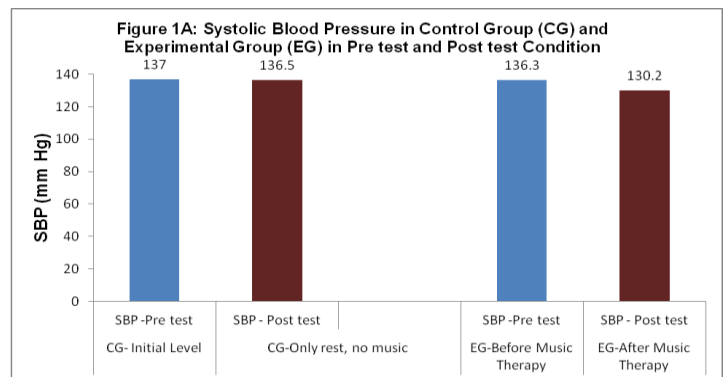
The variations of SBP, DBP, pulse rate and respiratory rate observed in the control group after exposure to the resting period was very less and were not significant ($p > 0.05$) (Table 2 and 3).

Table 3: Analysis of pulse rate and respiratory rate in the Control group (initially and after resting period) and Experimental Group (before and after exposure to music)

Control Group (Mean \pm SD)			
Variable	Pre test- Initial level before resting period of 20 minutes, in no music condition	Post test- After resting period of 20 minutes, in no music condition	p-value
Pulse Rate Per Minute	85.4 \pm 1.87	85.2 \pm 1.82	> 0.05
Respiratory Rate/ min.	16.2 \pm 0.53	16.0 \pm 0.62	> 0.05
Experimental Group (Mean \pm SD)			
Variable	Pre test- Before Music Therapy Intervention	Post test- After Music Therapy Intervention	p-value
Pulse Rate Per Minute	85.3 \pm 1.85	79.8 \pm 2.39	< 0.001
Respiratory Rate/ min.	15.7 \pm 0.82	13.6 \pm 1.06	< 0.001

IV. DISCUSSION

The present study evaluated the effects of raga Todi of Hindustani Classical Music (instrumental) on vital physiological variables (blood pressure, pulse rate, and respiratory rate) concerned with cardiovascular and respiratory health. The comparison between Pre-test and Post-test results of the present study revealed that healthy / asymptomatic elderly males experienced a significant decrement in systolic blood pressure, diastolic blood pressure, pulse rate and breathing/ respiratory rate on exposure to music therapy intervention (listening to raga Todi) for a time period of 30 days, in the morning hours of the day. An earlier study found a significant lowering of blood pressure on exposure to long term raga therapy in chronic hypertensive patients (Kulkarni and Chittapur, 2017). This earlier study to prevent monotony among the subjects exposed them to six different ragas such as Asavari, Ahir Bhairavi, Hansadhvani, Bhimpalās, Darbari and Todi. However, each of the ragas was allowed to be listened for 1 week alternatively for 1 hour a day for a time period of 6 months.



In contrast, since the present study was only of 30 days duration, no such measures were taken to prevent monotony. A lowering in systolic blood pressure by 6.1 mmHg and diastolic blood pressure by 5.7 after listening to raga Todi was observed in the present study. Raga Todi has also been found to be effective in lowering blood pressure in essential hypertension patients of \geq forty years of age by an earlier study (Kamat-Nadkarni, 2013). The data obtained in the present study

,possibly for the first time, showed similar blood pressure-lowering effect of Raga Todi in a sample of healthy elderly males of 50-60 years. Thus it may be said that Raga Todi appears to have the ability of beneficially controlling the blood pressure levels not only in hypertensive patients but also in asymptomatic individuals.

In traumatic brain injury (TBI) patients, after neurosurgery, Raga Todi, Hindola and Kalyani have been seen to cause an improvement of respiratory rate, heart rate, and SBP, in a study conducted at Tertiary Hospital of Nellore, India (Reddy et al., 2017). A meta-analysis study, which evaluated several other studies, indicated that listening to music may result in improvement in the systolic blood pressure levels, and music should be given due importance during the treatment of hypertension (do Amaral et al., 2016). Based on several earlier studies (Angeline, 2018; Kulkarni and Chittapur, 2017; Kunikullaya et al., 2016; Nagarjan et al., 2015; Sobna et al., 2013; De Oliveira et al., 2009; Mathew, 2008), it may be said that music may be used as a supplement to the main treatment of hypertension. Turkish classical music has also been found to have positive effects on blood pressure in Turkish elderly patients with hypertension (Bekiroglu et al., 2013).

Much similar to the present study, a study was conducted in Sri Lanka but with a different raga. In the study at Sri Lanka, a test group formed of asymptomatic male and females of age 45 and 46 years were made to listen to Rag Darbari Kanada of Indian classical music for twenty-two minutes whereas the control group were not exposed to music and were simply maintained at silent state for the same duration of time. Before and after-test comparison was made. A significant decrease in the blood pressure, pulse rate, and respiratory rate were observed in the test group after listening to the music (Siritunga et al., 2013).

Lowering of the blood pressure (by two - six mm Hg) and heart rate may reduce the risk of developing cardiovascular diseases such as coronary artery disease (CAD), hypertension, stroke (MacMahon, 2000).

Heart rate or pulse is the number of times the heart beats per minute. Although the normal resting heart rate is 60-100 bpm, individuals having a resting pulse greater than 84 bpm have been found to have increased risk of developing cardiovascular diseases by earlier studies (Reil et al., 2011; Singh, 2003). In the present study, the pulse was a little higher than this limit. In the Pre-test phase, the mean values of the pulse were 85.4 bpm and 85.3 bpm, in the control group and experimental group, respectively. The Post-test measurement of pulse in the present study clearly showed that raga Todi significantly helped to bring down the pulse below 84 bpm. Thus listening to raga Todi may ensure better cardiac health and promote efficient working of the heart muscles.

At rest, the normal respiratory rate range is about 8 - 20 breaths per minute. But nowadays, in adults, the lower end of the

respiratory range has been raised to 15 breaths per minute from 8 breaths per minute. In the Pre-test phase of the present study, the mean values of the respiratory rate were 16.2 per minute and 15.7 per minute, in the control group and experimental group, respectively. It may be mentioned that heart disease patients are often seen to have a respiratory rate of up to about 15 breaths per minute. Hence, all individuals should strive to maintain their respiratory rate below 15 breaths per minute to reduce their risk for cardiovascular diseases and associated medical conditions (Siritunga et al., 2013; Rakhimov, 2011). The results of the present study showed that listening to raga Todi may be effective in maintaining a respiratory rate below 15 breaths per minute in healthy males. Raga Todi to some extent may thus reduce the risk of developing cardiovascular diseases.

The reduction in blood pressure, heart rate, and respiratory rate due to the application of music intervention may be attributed to the influence of music on the central nervous system, autonomic nervous system, and endocrine system. More specifically, music may lower sympathetic drive and enhance vagal control / parasympathetic drive. Simultaneously, music by lowering stress hormone levels such as serum cortisol and adrenaline may reduce stress (Mockel et al., 1994) and promote relaxation. Slow tempo music with soothing notes may be responsible for parasympathetic activation (Nagarajan et al., 2015). Rhythms of music bring beneficial adaptations in the physiology of bodily rhythms (Mac Donald et al., 2009). It has been known that the tempo of the music may modulate the dynamics of the cardiovascular system, promoting cardiovascular health (Bartlett, 1996). The cardiac vagal tone may have a role in the sustenance of attentiveness and modulation of emotional aspects of behavior (Porges et al., 1994). This may lead to positive changes in the mind, lowering stress and thus benefitting cardiovascular health. Sedative music may lower tension. Physiological parameters such as heart rate, respiration and blood pressure may be lowed by calm music (Bernardi et al., 2006). Furthermore, the calm mood promoted by such music may relax the body and brain. The calm brain will lead to the stimulation of the body to liberate Nitric oxide (NO), which in turn acts on the blood vessels and lowers the blood vessel tone, dilating the blood vessel, and hence reducing the blood pressure. Additively, music causes the release of endorphins, a hormone responsible for imparting pleasure and lowering of stress / tension. This may allow achieving a better steady-state of the cardiovascular and respiratory system. Even religious music therapy intervention has been found to lower the systolic and diastolic blood pressure in hypertensive patients (Bustami, 2018).

Positive changes in the respiratory system may influence the prime brain centers concerned with emotion, thought, and related behavior (Adhana et al., 2013; Matayan et al., 2009). Lower respiratory / breathing rates may lower blood pressure by enhancing the sensitivity of baroreceptor reflex in patients of

hypertension. Thus lower breathing rate achieved by music in the present study is a significant finding in relation to the management of high blood pressure. Moreover, the stimulation of the parasympathetic drive and reduction in the sympathetic drive by slow breathing may reduce both the resting heart rate as well as blood pressure (Abd El-Kader Mohamed, 2013; Oneda et al., 2010).

CONCLUSION

Thus it may be concluded that music may have a positive impact on the neuroendocrine system (Sirtunga et al. 2013), especially on the autonomic nervous system. It may be expected that special and systematically designed music therapy intervention, by altering the vagal tone may beneficially affect cardiovascular and respiratory regulation (Brandes et al., 2008), thereby promoting healthy living. The findings of the present study may be considered significant since it indicated that listening to raga Todi of Hindustani Classical Music may act as a preventive measure to restrain the rise of blood pressure in asymptomatic subjects. This may lower the chance of developing cardiovascular diseases. Future studies with large sample size, involving both males and females may be helpful to deeply understand the impact of music therapy on vital physiological parameters such as SBP, DBP, heart rate, and respiratory rate.

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