

Effectiveness of Music Therapy on Reducing Blood Pressure among Elderly People with Hypertension Residing in Selected Geriatric Homes at Dindigul District, Tamilnadu

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Abstract

Hypertension has long been recognised as a modifiable risk factor causing cardiovascular diseases and premature deaths worldwide. It is one of the most common lifestyle diseases and considered to be a silent killer. Among the geriatric population hypertension is a major problem, presenting the risk of multiple associated co-morbidities. One in every three senior citizen living in old age homes in urban area is diagnosed with hypertension due to many causes. Music therapy helps to reduce the blood pressure among elderly people. This study aimed to assess the effectiveness of music therapy on reducing blood pressure among elderly people. A quasi-experimental pre-test, post-test approach with non-equivalent control group design was adopted to assess the effectiveness of the music therapy among 60 patients (30 patients each in the experimental and control group) at old age home Vellodu, Mariya Anthonia old age home and St Joseph's home for aged, Kodairoad. The elderly patients who satisfied the inclusion criteria were selected as samples based on a non-probability purposive sampling technique. The study revealed that the calculated unpaired 't' value for the post-test systolic were, $t = 9.461$ and diastolic $t = -11.180$, respectively, which showed a very high statistical significance at $p < 0.001$ level. An older adult with hypertension can reduce blood pressure with music therapy, a non-invasive, non-pharmacological, and cost-effective intervention.

Key words: Hypertension, Music therapy, Geriatric homes

Hypertension is a considerable public health alarm and is one of the major causes of premature death worldwide. An estimated 1.13 billion people worldwide have hypertension. In 2015, a survey showed that 1 in 5 women and 1 in 4 men have hypertension. Fewer than 1 in 5 people have well-controlled hypertension (WHO, 2023) and more than 9 million deaths are associated with hypertension. Prevalence of hypertension has been hiking noticeably for the past two decades. Worldwide, 1 billion people have hypertension, and an estimation of 1.5 billion is predicable by 2025 (Kingue et al, 2015).

Blood pressure reading of a person measured on two different days shows the systolic blood pressure reading on both days as ≥ 140 mmHg and/or the diastolic blood pressure reading on both days as ≥ 90 mmHg then it is diagnosed as

hypertension. Hypertension is kept within normal limits and in control through diet, exercise; other lifestyle measures also help reduce the risk of complication such as heart failure, chronic kidney disease and stroke which also maintains the better quality of life (Lamelas et al, 2019).

Six percent of India's population was of the age 65 and above. According to first Longitudinal Ageing Study in India (LASI) released by the Union Ministry of Health & Family Welfare 2020, two in every three senior citizens in India suffer from some chronic disease.

Chronic hypertension is top second (Fig 1) accounting for about 18 percent of those between 45-49 years of age suffering from hypertension and the level increased to 28 percent among those aged 60-64 and 35 percent among those aged 70-74.

Need for the study

Misbehaviour of sons and daughters-in-law (29.8%) was found to be most common reason for elderly residing in old age home in India (Akbar

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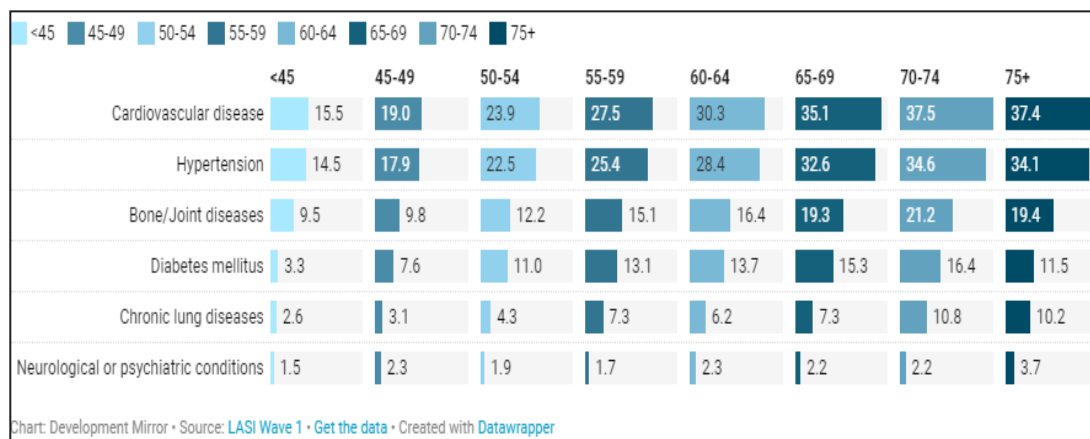


Fig 1: Prevalence of diagnosed major chronic health condition among older adults by age India, 2017 -18.
Source LASI Wave1: <https://www.iipsindia.ac.in/content/lasi-publications>

et al, 2014). Elderly people tend to be at risk of stress, financials problem and emotional instability (Rao et al, 2014). The life of elders in the present age is quite stressful, both for themselves and for the children. The fortunate few depart with satisfaction and peace of mind, while others leave with an unhappy state of mind. So, many elderly are affected by cardiac diseases especially hypertension. To control and manage hypertension several complementary and alternative medicine therapies can be considered as part of an evidence-based approach to the treatment of hypertension (Nahas, 2008). To address these issues, and to provide an alternative or at least offer a complimentary therapeutic approach that is comparatively inexpensive, devoid of side effects, not prone to overdose, the present study sought to explore the effect of Ahir bhairav raga of flute music on reduction of blood pressure in elderly people.

Table 1: Joint National Committee (JNC) blood pressure

BP Classification	SBP* MMHG	DBP* MMHG
Normal	<120	and <80
Pre-hypertension	120-139	Or 80-89
Stage-1 hypertension	140-159	Or 90-99
Stage-2 hypertension	≥160	Or ≥100

Table 2: JNC classification of blood pressure score

JNC classification	Score
Normal	1
Pre-hypertension	2
Stage-1 Hypertension	3
Stage-2 Hypertension	4

Review of Literature

Bekiroglu et al (2013) carried out a study to investigate whether Turkish classical music has positive effects on blood pressures and anxiety levels in elderly patients. Randomised controlled trial was performed on 60 hypertensive patients living in a local elderly home in Adana, Turkey. The mean reduction in

HAMA-A was 1.63 in the music therapy group and 0.77 in the control group. The study demonstrated that both Turkish classical music and resting alone have positive effects on blood pressure in patients with hypertension. Lakshmi et al (2015) conducted a quasi experimental design pre-test, post-test study. The effect of music therapy was assessed on elderly suffering from hypertension, who were residing in selected geriatric homes. The results revealed that there is a significant relationship between the effect of music therapy and decreasing blood pressure of the elderly.

Lorber et al (2022) conducted a randomised controlled trial to evaluate the effect of music therapy on blood pressure, heart rate, and anxiety levels in older adults with hypertension living in a nursing home. Sixty older adults were randomly divided into experimental and control groups (30 in each). Significant reductions in systolic blood pressure, heart rate, and anxiety levels were found in older adults with hypertension receiving music therapy compared with the control group.

Winarto et al (2021) aimed to assess music therapy's effectiveness to provide beneficial effects for the elderly with hypertension. Twelve articles included randomised control trials (RCTs), quasi experiment, and case reports were reviewed using PRISMA protocol and methodological quality and result. Seven of the ten articles showed music therapy's effectiveness for lowering blood pressure in elderly with hypertension. This review suggests that music therapy could be done as a part of complementary therapy to lower blood pressure.

Objectives

The study was set out with following objectives.

1. To assess the pre-test and post-test level of blood pressure among elderly people (60-75 years) in experimental and control group.

JNC Blood Pressure Classification

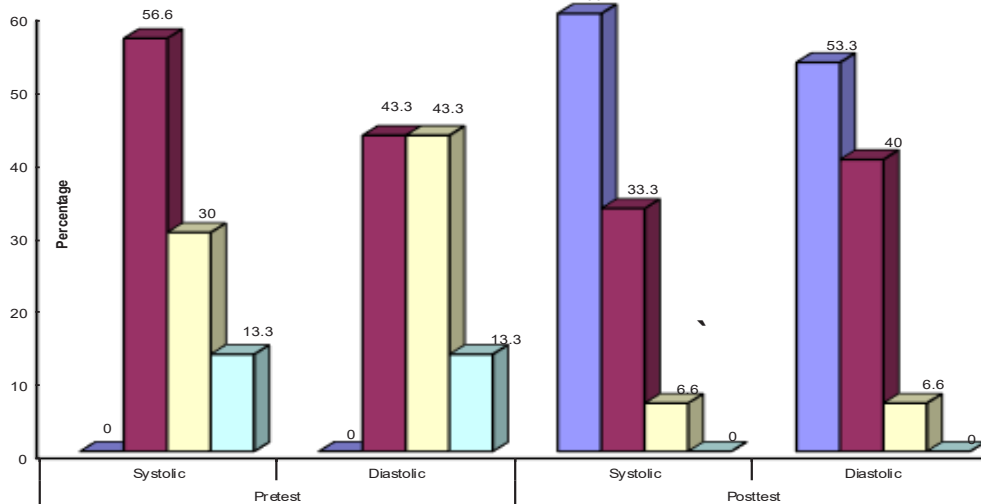


Figure 1: Percentage distribution of level of blood pressure in elderly people (60-75 years) among pre-and post-test in experimental group.

2. To evaluate the effectiveness of music therapy on reducing blood pressure among elderly people (60-75 years) in experimental group.
3. To find out the association between post-test level of blood pressure among elderly people (60-75 years) with their selected demographic variables in experimental group and control group.

Research Hypotheses

- RH1: There is a significant difference in the level of blood pressure between pre-and post-test among elderly in experimental group and control group.
- RH2: There is a significant difference in the

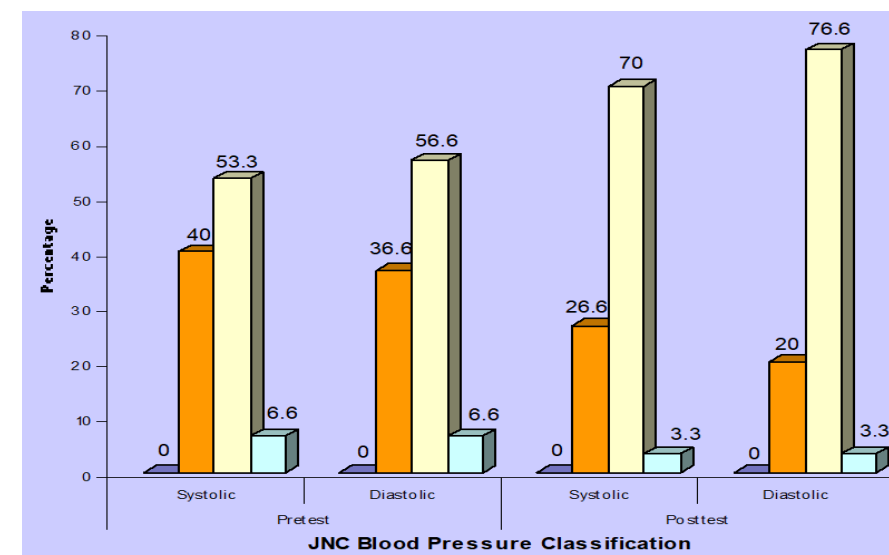


Figure 2: Percentage distribution on level of blood pressure in elderly people (60-75 years) among pre-and post-test in control group.

level of blood pressure among elderly between experimental group and control group.

- RH3: There will be a significant association between the post-test level of blood pressure with their selected demographic variables among elderly in experimental group and control group.

Assumptions

- Elderly persons like to hear the music as it reduces high in reducing blood pressure.
- Music has soothing effect and maintains optimum blood pressure in the elderly people.
- Music therapy is used to aid in physical discomfort by lowering blood pressure.
- Music therapy relieves emotional stress and brings wellbeing among elderly people with hypertension.

Material and Methods

This quasi experimental study was conducted to assess the effectiveness of music therapy on reducing blood pressure among elderly peoples (60-75 years) with hypertension. Ethical permission was obtained from institutes ethical committee. Participants were informed about the purpose of research and ensured about anonymity and confidentiality of the information. Oral and written informed voluntary participation consent was taken from each study participant. Total 60 hypertensive elderly were recruited in the study using purposive sampling technique. The elderly were included in this study according to the following criteria: aged between 60-75 years willing to participate, who were diagnosed with hypertension and known to write and read Tamil language. Excluded were: the elderly people having hearing impairment, other associated disease like renal disorder or diabetes mellitus and not present during the study.

Data were collected through a 15-20 min face-to-face interview with each elderly patient using

Table 3: Paired 't' test of pre-and post-test level of blood pressure among elderly people (60-75 years) within experimental and control group

S. No.	Observation	Experimental group			Control group		
		Mean	SD	Paired 't' value 'p' value	Mean	SD	Paired 't' value 'p' value
1	Pre-test: systolic (120-139 mm of Hg)	139.26	2.98	5.269 p=0.000 SS	144.4	2.50	t = 0.880 p=0.388 NS
2	Post-test: systolic (120-139 mm of Hg)	122.53	6.67		144.5	1.01	
3	Pre-test: diastolic (80-89 mm of Hg)	91.13	7.26	6.114 p=0.000 SS	91.3	1.64	1.429 p=0.166 NS
4	Post-test: diastolic (80-89 mm of Hg)	82.3	3.14		90.3	1.10	

NS-Not significant, *** highly significant at p≤0.001.

Table 4: Student independent 't' test of pre-and post-test level of blood pressure among elderly people (60-75 years) between the experimental and control group

S. No.	Observation	Experimental group (post-test)		Control group (post-test)		't' value 'p' value
		Mean	SD	Mean	SD	
1	Post-test: systolic (mm of Hg)	122.53	6.67	144.5	1.01	t = 9.461*** p = 0.000 SS
2	Post-test: diastolic (mm of Hg)	82.3	3.14	90.3	1.10	t = -11.180*** p = 0.000 SS

NS-Not significant, *** highly significant at p≤0.001.

standardised and semi structured questionnaire in 2 parts: Part-I: 10 items related to socio-demographic characteristics and clinical profile of participants (age, sex, marital status, education status, religion, habit of smoking, exercise daily, family history of hypertension, duration of disease and treatment of hypertension). Part-II consisted of standardised Joint National Committee (JNC) Blood pressure classification.

Assessment of Blood Pressure

It consisted of assessment of blood pressure (mm Hg) by using stethoscope and digital sphygmomanometer and classification of blood pressure made as below.

Score Interpretation

The numerical values were assigned for the structured instrument part 1, 2, 3 and 4. The numerical values were assigned for the part 4 as mentioned below.

Method of reliability used for part I & II was

Test-Retest method -0.86 and 0.87. The investigator got formal permission and oral written informed consent from concern authorities. First investigator established the good rapport and introduced the study topics to the elderly people. The investigator conducted questionnaire on demographic variables, the blood pressure was checked by digital sphygmomanometer, joint national committee (JNC) blood pressure classification was used to assess the blood pressure in both experimental and control group. The intervention was started from the day one using "The Best Relaxing Piano and Flute Music Ever with Ahir Bhairav raga". During a period of two weeks, 14 sessions (morning and evening) of 30 minutes each were administered using mobile phone with speaker for selected experimental group every day at old age home Vello-du, Mariya Anthonia. For control group, using digital sphygmomanometer blood pressure was checked on day 1, without giving intervention continued with St Joseph's home for aged, Kodai-road routines, post-test day 15 was conducted for both experimental and control group.

Statistical Analysis

Collected data were analysed by descriptive and inferential statistics. The data related to demographic variables were analysed by using descriptive measures (frequency and percentage distribution). Inferential statistics of paired t-test and unpaired t-test was used to evaluate the effectiveness of music therapy on reducing blood pressure. To find the association of blood pressure and selected demographic variables chi-square test was used for analysis.

Results

Data on the description of the demographic variables of elderly peoples (60-75) years in experimental and control group

The demographic variables of the experimental & control groups showed that in both the groups, most of the elderly people were aged between 66-70 years, were females, Hindu, married, had no habit of smoking not doing exercise daily, having family history of hypertension, and had irregular treat-

ment. Most of the elderly people had completed their primary school education, and having duration of hypertension between 1 to 2 years whereas in the control group most were illiterate and duration of hypertension was less than one year.

Assessment of pre-and post-test level of blood pressure among elderly people (60-75 years) in experimental and control group

Fig 1 and 2 show that the pre-test level of systolic 56.6 percent, and diastolic 43.3 percent of samples had pre-hypertension whereas the post-test level of systolic (60%) and diastolic (53.3%) of samples had reduced to normal blood pressure in experimental group while the control group pre-test and post-test diastolic (53.3% & 70%) systolic (56.6% & 76.6%) blood pressure of samples had stage I hypertension there were no much changes found between pre-and post-test.

Effectiveness of music therapy on reducing blood pressure among elderly people (60-75 years) in experimental and control group

Table 3 Indicates that the pre-test mean score of systolic and diastolic was 139.26 and 91.13, which decreased to 122.53 and 82.3 in the post-test. The calculated 't' was = 5.269, $t=6.114$, which showed statistical significance at a value of $p=0.001$. In the control group, the pre-test mean core showed a very slight change.

Table 4 describes the comparison of blood pressure on post-test systolic and diastolic blood pressure between the experimental and control group (statistically significant at $p < 0.001$).

Discussion

This study was conducted to evaluate music therapy performed in the elderly with hypertension. Music therapy was found to be beneficial to the elderly. Music therapy can significantly reduce SBP and DBP in old age people. Hypertensive individuals are more likely to have a family history of hypertension in this study; 17 (56.6%) of 30 participants showed family history of hypertension. An analysis by Rampal et al (2011) found a significant correlation between family history and pre-hypertension and hypertension. Findings suggest that young adults with a family history of hypertension are more likely to develop prehypertension.

Studies such as randomised controlled trials and systematic reviews have shown that relaxation music can significantly lower SBP of elderly patients in Stage 2 hypertension when used for six weeks to six months (Sumathy et al, (2015); Loomba et al, 2012). During the 4 weeks music therapy, the SBP decreased from 148.68 to 129.45 mmHg, with a significant reduction ($p < 0.001$)

in the experimental group, indicating that music therapy might be an effective means of reducing blood pressure in older people.

Reduction of 10.43 mmHg in DBP was observed in our study after 4 weeks of music therapy for older people; however, this reduction was statistically significant. Teng et al (2007) and Pal et al (2014) reported that relaxation music therapy significantly reduced DBP in young adults and elderly individuals, respectively. Both studies used relaxation music therapy for a longer period of time, 6 months compared to 4 weeks in the present study.

Limitations

This study, conducted with small sample size and only 4 weeks of duration of music therapy was introduced for older people residing at old age people. Additionally, the confusing factors such as life style of the elderly, stress and sleeping pattern may have also affected the result of this study. The study findings imply that music therapy dramatically lowered SBP and DBP in older peoples. Therefore, music therapy can offer a favourable alternative intervention to reduce BP to prevent further complications.

Conclusion

Music therapy slows down the activity of the brain, which in turn alters the limbic system. Variations in psychological factors like anxiety, stress, and mood may also be reason for changing body's physiological reactions, such as BP and heart rate. In this study, the decrease in SBP was statistically more significant than the decrease in DBP. According to Ramesh et al (2015), who support the findings of this study, SBP is more influenced by stress experience and sympathetic nervous system stimulation, whereas the factors that affect DBP are multifactorial (Kunikullaya et al, 2015).

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