

# Measurement of blood pressure and pulse rate in three different types of music

Sree Lakshmi<sup>1</sup>, R. Gayatri Devi<sup>2\*</sup>, A. Jyothipriya<sup>2</sup>

## ABSTRACT

**Introduction:** Music is the best described as the drug for the spirit as well as to the physique. The heartbeat and blood pressure (BP) recorded while listening to fast music was approximately 120–130 beats/min and 140/90. Moreover, in case of slow music, it was approximately 55–65 beats/min and 90/60, respectively. **Materials and Methods:** The sample size of this study is about 30 healthy individuals. Three different types of music are used for this study include melody, exciting, and arbitrary type. Participants were asked to listen each music separately and measure BP and heart rate. For a music interval, 10 min relaxation has been given and follows the other type of music and measurements will be noted. **Results:** The mean values of pulse rate, systole, and diastole were not significantly reduced from resting state when compared between before and after listening to slow and arbitrary music. However, the fast beat showed the increased mean ( $\pm$ standard deviation) values of pulse rate, systole, and diastole which have a significant effect on individual. **Conclusions:** Listening to slow beat music can benefit the health of an individual by modulating the cardiovascular rhythms, whereas fast beat music is ineffective and often dangerous. Thus, listening to slow music not only makes as happy but also have a significant result on our body.

**KEY WORDS:** Blood pressure, Fast beat, Heart rate, Music, Parasympathetic, Slow beat, Sympathetic

## INTRODUCTION

India is well known for “Unity in Diversity” where music plays an important role in everyone’s life. The reason for what they are listening and to what type of music there listen varies from person to person<sup>[1]</sup> whether it may be classical, folk, filmy, rock, and pop. It has become the way for expressing our feelings and emotion. In the current era, music has earned an hour able name called “Treatment without medicine.” It not only serves as a tool of entertainment but also as a tool for the corrective measures.<sup>[2]</sup> Music is the best described as the drug for the spirit as well as to the physique.<sup>[3]</sup> Music plays an important role in brain, which enhances memory, attention, concentration, physical coordination, and mental development. Some studies have revealed that music decreases stress, anger, anxiety, and frustration. Cortisol and adrenaline, so called the stress hormone, are secreted by the adrenal

gland in response to adrenocorticotrophic hormone or adrenocorticotrophic hormone. It is synthesized by the pituitary in the hypothalamus in the brain in response to the corticotropin-releasing hormone.<sup>[4]</sup> Listening to fast music increases the cortisol level which, in turn, stimulates the sympathetic nerve supply causes the increase in heart rate and blood pressure (BP). Moreover, the exact opposite reaction appears while listening to slow music, which stimulates the parasympathetic nerve supply which, in turn, causes the decrease in heart rate and BP.<sup>[1]</sup> The heartbeat and BP recorded while listening to fast music was approximately 120–130 beats/min and 140/90. Moreover, in case of slow music, it was approximately 55–65 beats per min and 90/60, respectively.<sup>[5]</sup> It is also been proved that the effects of music on patients undergoing surgery have reduced the anxiety and physiological stress in response to a variety of medical setting.<sup>[4]</sup> Music also boosts up our immune system. The best way of using music as a medicine is music therapy – use to find physical, psychological, cognitive, and/or social problems – plays an important role in modern medicine for both children and adult.<sup>[6]</sup>

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**Table 1: Comparison of pulse rate and BP before and after listening to slow beat**

Parameters	Before listening	After listening	P-value
Systole	108.9±12.26	104.03±10.238	0.10 (NS)
Diastole	74.6±5.99	71.5±7.17	0.07 (NS)
Pulse rate	83±9.69	80.96±8.92	0.39 (NS)

BP: Blood pressure

**Table 2: Comparison of pulse rate and BP before and after listening to arbitrary beat**

Parameters	Before listening	After listening	P-value
Systole	105.3±12.01	110.1±11.21	0.11 (NS)
Diastole	75.6±5.76	74.11±7.26	0.38 (NS)
Pulse rate	82±9.42	84.2±8.15	0.33 (NS)

BP: Blood pressure

**Table 3: Comparison of pulse rate and before and after listening to fast beat**

Parameters	Before listening	After listening	P-value
Systole	106.9±12.26	115.43±14.08	0.01 (S)
Diastole	73.6±5.99	78±7.62	0.01 (S)
Pulse rate	82±9.69	86.96±8.22	0.03 (S)

BP: Blood pressure

The current study focuses on the measurements of heart rate, BP, and respiratory rate in three different types of music.

## MATERIALS AND METHODS

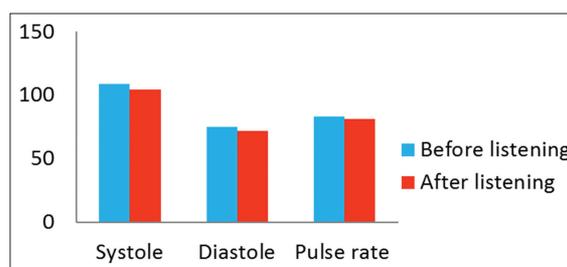
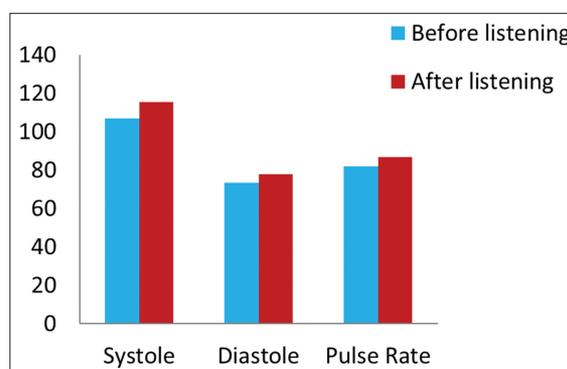
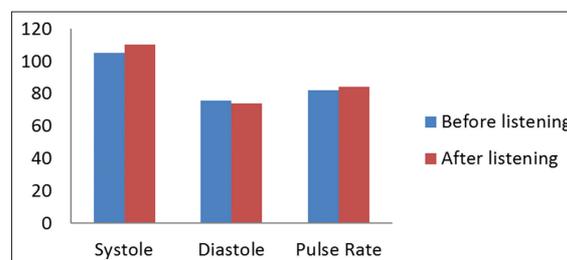
The sample size of this study is about 30 healthy individuals. Three different types of music are used for this study include melody, exciting, and arbitrary type. Participants were asked to listen each type of music separately and measure BP and heart rate. For a music interval, 10 min relaxation has been given and follows the other type of music and measurements will be noted.

## RESULTS

The mean values of pulse rate, systole, and diastole were not significantly reduced from resting state when compared between before and after listening to slow and arbitrary music [Tables 1 and 2]. However, the fast beat showed the increased mean (standard deviation [±SD]) values of pulse rate, systole, and diastole which have a significant effect on individual [Table 3].

## DISCUSSION

Listening to music is a multiplex sensation. From every individual to individual, it shows a huge variability. Music-induced emotions which are perceived by the listeners and its rhythmic aspects are one of the major determinants of physiological response.<sup>[1]</sup> In this study,

**Figure 1: Mean of pulse rate and blood pressure before and after listening to slow beat****Figure 2: Mean of pulse rate and blood pressure before and after listening to fast beat****Figure 3: Mean of pulse rate and blood pressure before and after listening to arbitrary beat**

the mean (±SD) values of pulse rate, systole, and diastole were not significantly reduced when compared between the pre- and post-exposure to slow music and arbitrary music [Figures 1 and 3]. These findings were not correlated with the findings of Suguna and Deepika. Similar results were also observed by Loomba *et al.*<sup>[7]</sup> During listening to fast beat, the mean value showed significant increase of pulse rate, systole, and diastole BP [Figure 2]. The pulse rate, systole, and diastole mimic the beat we listen to. It is consistent with other studies which proved that music has the potential to reduce physiological indicators of anxiety including pulse rate and blood pressure.<sup>[8]</sup> Music has reduced the muscular and mental tension and thereby decreased sympathetic stimulation as observed. In addition to this, the plasma catecholamine is also reduced when relaxation is accompanied by music. The heart rate and blood pressure returned to normal range faster while listening to slow music when compared to fast music probably music of

slow tempo reduced the arousal, making the listener in a state of relaxation.<sup>[8]</sup> The study indicated that fast music may lead to stress and restlessness, sleep disturbances, fatigue, exhaustion, impairment of the immune system, hardness of hearing, and/or loss of hearing. This music promotes disappointment, rage, and aggressive behavior while causing both heart rate and blood pressure to increase. Breastfeeding mothers should avoid this music because there is a negative influence on milk flow.<sup>[9]</sup> Thus, fast beat intensity was indicated to influence cardiac autonomic regulation.<sup>[10]</sup> The cardiovascular responses to sound may be conducted through many pathways and one example is the startle response mediated by a brainstem circuit. The acoustic startle reflex, a well-known effect of fast beat on cardiovascular system, is described as the abrupt response of the heart rate and BP to a sudden loud sound stimulation. The responses were regarded as startle and defense response in humans or a fight/flight reaction in animals. The rise of blood pressure and heart rate to acoustic startle stimuli indicated an autonomic function responding to the acoustic stimuli.<sup>[11]</sup> Even greater relaxation was induced by a randomly inserted pause, suggesting that a pause (or perhaps a slowing of music tempo) may be crucially important in determining some of the relaxing effects of music.<sup>[12]</sup> Playing slow music during short breaks in between work time would hasten mental and physical relaxation and would improve the work efficiency of the employees at the workplace. The acute exposure to slow beat music reduced the sympathetic modulation of the heart, while fast beat music has decreased the global variability of the heart rate.<sup>[13]</sup> The present study concluded that music of slow tempo is a good tool for relaxation. Slow music hastened the recovery of physical parameters such as pulse rate and blood pressure. It also had an affective component in that it caused a subjective feeling of faster recovery from efforts when compared to no or fast music.<sup>[14]</sup>

## CONCLUSIONS

Listening to slow beat music can benefit the health of an individual by modulating the cardiovascular rhythms, whereas fast beat music is ineffective and often dangerous. Thus, listening to slow music not

only makes us happy but also has a significant result on our body.

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