

## Effect of Music on Blood Pressure in Pre-Hypertensive Women in the Third Trimester of Pregnancy

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### Original Research Article

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**Abstract:** High levels of stress and anxiety during pregnancy is common for women. Music therapy is known to be effective for hypertensive and pre hypertensive adults. We decided to study effects of receptive music therapy on BP and pulse rate in hospitalized pre-hypertensive women in the third trimester of pregnancy. One Hundred women in the third trimester of pregnancy with pre-hypertension were included in the study. They were divided into study and control group; each consisting of 50 subjects. Subjects included in this group were asked to come daily or at least six times a week for continuous three months duration for a music course. Two recordings of Blood Pressure were taken before and after music therapy. Our study showed that music therapy had a profound influence on the Blood Pressure. In study group Both the SBP and DBP showed significantly lower value after music therapy.

**Keywords:** Third Trimester, Pregnancy, Music, Blood Pressure, Women, stress, hypertensive.

### INTRODUCTION

Pregnancy is considered by some health care professionals to be an inherent developmental crisis in the life cycle of women. The physical and emotional strain of pregnancy on a woman can unearth otherwise latent or manageable tendencies to succumb to stress and anxiety. The experience of high levels of stress and anxiety during pregnancy is common for women.

When left untreated, these can lead to depression and psychosis [1], put the physical health of the mother at risk by suppressing the immune system, put the health of the pregnancy at risk or at high risk, can negatively affect fetal development, lead to a need for hospitalized bed-rest during pregnancy, cause low Appearance Pulse Grimace Activity Respiration (APGAR) scores and necessitate hospitalization in a neonatal intensive care unit for the infant and possibly lead to long term developmental, emotional and physical health complication throughout the life span [1-3].

Untreated prenatal stress and anxiety negatively affect maternal health, fetal development, health of the pregnancy, can trigger premature delivery, prolong labor and negatively impact the life-long mental and physical health trajectory of the newly born.

The popularity of classical music CD collections for babies and books. Like this is Your Brain on Music by Levitin [4] demonstrate that

scientific explorations into the relationship between music and brain function have been well advertised and communicated to the lay level in recent years. Nursing research has become interested in the possibility of capitalizing on music's effect on mood and brain activity for pregnant women with some success. Effects of music and music therapy on stress and anxiety levels have been evaluated using self report assessments, standardized state anxiety assessment tolls, and saliva strips measuring cortisol levels. Comparisons of the effect of live and recorded music on stress and anxiety have also been examined [5-7]. In a review of the literature, Harvard Neuroscientists have reported music interventions to positively affect experiences of stress and anxiety. The review compared the differences in effect between music listening and music therapy administered by a certified music therapist. They have stated that their findings suggest music therapy was the only music based intervention observed to positively shift physiologic measures of stress and anxiety [8].

Music therapy is known to be effective for hypertensive and prehypertensive adults [9, 10]. Music

therapy is also known to be beneficial to pregnant women during pregnancy as well as during labor [11]. However, little is known about effects of music therapy on cardiovascular vitals (BP and pulse rates) in pre-hypertensive pregnant women. We decided to study effects of receptive music therapy on BP and pulse rate in hospitalized pre-hypertensive women in the third trimester of pregnancy.

**AIM AND OBJECTIVES**

To study the effect of ahir bhairav and kalyan raga on systolic blood pressure (BP), diastolic BP in pre-hypertensive pregnant women in the third trimester of pregnancy

**MATERIALS AND METHODS**

This study was conducted in the Department of Physiology, S.P. Medical College, Bikaner. The study was conducted for three months and data were collected before and after music therapy sessions.

**Type of Study**

Randomized controlled trial without blinding.

**Inclusion Criteria**

- Pre-hypertensive women in the third trimester of pregnancy.
- Subjects who have filled an informed consent form.

**Exclusion Criteria**

- Women with history of hypertension before or during pregnancy.
- Women taking antihypertensive medications or any other medications affecting BP.
- Women having other medical conditions or pregnancy-related complications

Subjects included in study group were gone through supervised music protocol. Subjects included in this group were asked to come daily or at least six times a week for continuous three months duration for a music course.

- Persons were also listening to different musical concerts which are having soothing action on our minds and hearts example “Bansuri Vadhan by Pandit Hari Prasad Chourasia”, Shehnai by

Bismillah Khan”, “Tabla by Ustad Zakir Hussain”, “Pandit Bhimsen Joshi vocal”, Santoor by Shiv Sharma.

- Light instrumental music was also added.
- Before entering into the programme each subject was instructed about diet and it was done during entire season of music therapy. Baseline parameters taken of every subject i.e., body mass index (BMI), waist hip ratio (WHR), Blood Pressure, subjects were evaluated weekly for BMI, WHR, and blood pressure. After three months besides above tests were also estimated. Those under control group were also told to come weekly and after three months for the evaluation of these above mentioned parameters.

One Hundred women in the third trimester of pregnancy with pre-hypertension were included in the study. They were divided into study and control group; each consisting of 50 subjects. Randomization was done by using sequential method; so that subjects with alternate registration numbers formed each group.

The study group received three sessions of receptive music therapy with relaxing music; the 1<sup>st</sup> session at 8:30 am on the 1st day of music therapy, the 2<sup>nd</sup> session at 3:00 pm on the same day and the last (3<sup>rd</sup>) session at 8:30 am on the next day. Duration of each session was 15 minutes. The relaxing music that was used for our study consisted of 4 soundtracks of instrumental music played over piano, guitar and flute. The control group did not received music therapy. Their precession BP was measured at 8:30 am on the 1<sup>st</sup> day, 3:00 pm on the same day and at 8:30 am on the next day. They were asked to lie down quietly for 15 minutes and then their post-session BP and heart rates were measured.

**Collection and classification of data**

Values of various study parameters in respect of samples subjects were suitably recorded and classified to prepare master chart for different categories of subjects as per objectives of plan of study. For statistical comparison of data, appropriate statistical model were applied using SPSS version 17 software for statistics.

**RESULTS**

**Table-1: Comparison of Anthropometric and Blood Pressure parameters in study group, before and music therapy**

Parameters	Base Line		Post Treatment		t	p	
	Mean	SD	Mean	SD			
BMI	23.46	3.79	24.71	3.83	6.155	<0.001	
Blood Pressure (mmHg)	Systolic	124.72	3.01	119.08	2.83	6.255	<0.001
	Diastolic	84.52	2.96	79.00	2.15	6.285	<0.001

**Table-2: Comparison of Anthropometric and Blood Pressure parameters in control group, before and after music therapy**

Parameters	Base Line		Post Treatment		t	P	
	Mean	SD	Mean	SD			
BMI	21.11	3.02	22.68	2.94	6.156	<0.001	
Blood Pressure (mmHg)	Systolic	124.90	3.002	124.6	3.193	0.463	0.3702
	Diastolic	84.28	2.97	83.92	3.231	0.559	0.3043

As per the comparison shown (table 1) for systolic blood pressure it was observed that in study group the mean systolic blood pressure prior to the intervention was  $124.72 \pm 3.01$  mmHg which has decreased to  $119.08 \pm 2.83$  mmHg after intervention of 3 months music therapy. On statistical analysis the mean difference is statistically highly significant ( $p < 0.001$ ). In control group (table 2) mean systolic blood pressure at initial month observed was  $124.90 \pm 3.002$  mmHg after 3 months of study period has decreased to  $124.6 \pm 3.193$  mmHg. On statistical analysis the mean difference was statistically insignificant ( $p > 0.05$ ).

When the comparison was done (table 2) for diastolic blood pressure it was observed that in study group the mean diastolic blood pressure prior to the intervention was  $84.52 \pm 2.96$  mmHg which has decreased to  $79.00 \pm 2.15$  mmHg after intervention of music therapy for 3 months. On statistical analysis the mean difference was statistically highly significant ( $p < 0.001$ ). In control group (table 2) mean diastolic blood pressure at initial month observed was  $84.28 \pm 2.97$  mmHg after 3 months of study period which has decreased to  $83.92 \pm 3.231$  mmHg. On statistical analysis the mean difference is statistically insignificant ( $p = 0.3043$ ).

## DISCUSSIONS

Our findings are consistent to Cao *et al* [12] who showed significant improvement in systolic and diastolic blood pressure and heart rate ( $p < 0.0001$ ) of healthy subjects after 12 weeks of music therapy practices\*. Our results are partly similar to Agte *et al.* [13] who showed significant decrease in diastolic blood pressure while no significant change in systolic blood pressure in mild hypertensive patients practicing music therapy.

Our results are also similar to Swati Gaba [14] who showed that music therapy and related practices significantly decrease systolic blood pressure ( $p < 0.001$ ) and diastolic blood pressure ( $p < 0.0001$ ) in healthy volunteers.

### Effect of music therapy in Reducing blood pressure and heart rate

Sustained stimulation of sympathetic nervous (fights and flight response) system increases blood pressure. It is hypothesized that the different cyclical rhythms of music therapy, thalamic and cortical effects. Our study revealed that music therapy had a profound influence on the success of conventional music therapy

for PIH patients. Both the SBP and DBP levels of patients who received conventional and music therapy were significantly lower than those who only received conventional music therapy ( $P < 0.05$ ).

Our results support the application of music therapy in the music therapy of PIH, based on its ability to significantly control patients' blood pressure and serum Ang II, relieve negative emotions, anxiety, and depression, while improving pregnancy outcomes for women and infants. Music therapy may, in fact, prove to be useful in improving the quality of life of any patient suffering from pre-hypertension.

Receptive music therapy is becoming more popular as a non-pharmacological management of pre-hypertension. Various studies have shown that listening to music reduces BP. Some studies have shown that particular type of music (e.g., Mozart's classical music) is more effective for reducing BP, whereas some types of music (e.g., rock music) can elevate BP. The same study by Crippa *et al.* [7, 4], has also shown that listening to classical music reduces heart rate significantly. Listening to music has also shown to reduce BP in various settings such as stress-induced increased BP in health adults, intra-operative patients, post-operative patients, etc [15-17].

The main mechanism for BP lowering effect of music has been postulated to be stress-reducing effect of music. However, the physiology of chronic stress response is very complex; involving multiple interactions between psychology, neurology, and hormonal system. Hence, BP lowering effect of music seems to be multi-factorial.

Our study shows that listening to relaxing music can reduce BP and heart rate in pre-hypertensive pregnant women during third trimester of pregnancy. Most of the studies in male and female adults have shown that BP lowering effect of music listening is more on systolic BP as compared to diastolic BP. Our study in pregnant women also has reflected similar findings. This could be due to the fact that systolic BP is more affected by stress response and sympathetic nervous system arousal, while factors affecting diastolic BP are multiple.

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