

**CARDIORESPIRATORY RESPONSE TO EXERCISE WITH MUSIC AND LEFT
NOSTRIL BREATHING**¹*Dr. Nazia Farha and ²Dr. Praveena Kumari Kadiri¹Assistant Professor, A.C.S.R Government Medical College, Nellore, Andhra Pradesh, India.²Assistant Professor, Government Medical College, Mahabubnagar, Telangana, India.***Corresponding Author: Dr. Nazia Farha**

Assistant Professor, A.C.S.R Government Medical College, Nellore, Andhra Pradesh, India.

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ABSTRACT

Introduction: Exercise an essential part of maintaining a happy and healthy life style is associated with changes in various Cardio-Respiratory parameters. Alternate nostril breathing (ANB) is one of the best and easiest breathing exercises. Music may also have considerable application in the exercise as it increases duration, and intensity of exercise. Thus, music is a powerful tool, is relatively cheap, and is easy to access various cardiorespiratory changes that occur with exercise. The present study aims that role of music with exercise and left nostril breathing on cardiorespiratory responses. **Aims:** The present study aims that role of music with exercise and left nostril breathing on cardiorespiratory responses. **Materials and Methods:** 60 healthy untrained male medical students with in the age group of 18-24 years were selected for the study. The study was carried out in ACSR Government medical college, Nellore, Andhra Pradesh. Student subjects exercised on Harward step test without music and on following day with slow, fast music and left nostril breathing. Pre and post exercise pulse rate (PR), systolic blood pressure (SBP), Diastolic blood pressure (DBP) and Respiratory rate (RR). Measurements were recorded using semi-automatic BP apparatus and Students t test for paired data used to determine significant differences. **Results:** Statistical analysis was done using paired t test. There was a significant decrease in all parameters in post exercise and is statistically significant with P value <0.005. Twenty seven rounds of left nostril breathing produced an immediate statistically significant decrease in all the measured cardiorespiratory parameters with the decrease in PR, systolic pressure (SBP), DBP. The results of this study suggest that cardiorespiratory function significantly improves after the Harward step test and breathing exercise. Therefore, ANB can be recommended for increasing cardiac efficiency. **Conclusion:** Exercise performance is increased when exercising with music.

KEYWORDS: Exercise performance, music, Blood pressure, left nostril breathing, chandra nadi pranayama.**INTRODUCTION**

Exercise an essential part of maintaining a happy and healthy life style is associated with changes in various Cardio-Respiratory parameters.^[1] These parameters return to resting values it takes some time interval. This is called Exercise recovery time (RT).^[2]

Music plays a significant role in range of emotions, regulates mood, evokes memories, increases work output, induces states of higher functioning, and encourages rhythmic movement.^[3] Music may also have considerable application in the exercise as it increases duration, and intensity of exercise. Thus, music is a powerful tool, is relatively cheap, and is easy to access various cardiorespiratory changes that occur with exercise.^{[4][5]} Music is known to reduce pain, anxiety and fear in several stressful conditions. Music motivates exercisers to sustain the effort and at the same time distracts them from the sensation of fatigue from their bodies.^[6]

Post exercise recovery depends on many factors like rest, sleep, massage, nutrition, hydration, cryotherapy, etc.^{[7][8]}

Various studies suggest that in addition to music that affects exercise which causes changes in cardiovascular parameters like pulse rate, systolic blood pressure & diastolic bloodpressure, forced left nostril breathing, pranayama of brathing exercise may cause changes in cardiovascular parameters. Left nostril breathing and music has long been known to effect the human beings influencing health, character, mood and consciousness. Although the role of such music is typically most important it may also serve to promote relaxation and effort on long duration. Breathing solely through one nostril can change our energy and mood. Forced left nostril breathing has been to shown to stimulate the parasympathetic nervous system.^[9]

During breathing, the nasal airflow is greater in one nostril than in the other due to transient nasal passage obstruction by erectile tissue in the nasal cavity. This

dominance in airflow that alternates between the nostrils is known as the nasal cycle. Studies shows that nasal cycle is the lateralization of cerebral hemisphere mediated through the autonomic nervous system, with sympathetic being active during right nostril dominance and parasympathetic during left nostril dominance. This nasal cycle has been explored in yogic science as breathing practices to influence physiological parameters. Scientific evidence suggest that forced nostril breathing practice can influence physiological parameters like blood pressure, heart rate etc.^[10]

They increase parasympathetic tone, decrease sympathetic activity, improve cardio-vascular and respiratory functions and decrease the effect of stress on the body. Hence a decrease in heart rate may be related to an increase in vagal tone, a decrease in cardiac sympathetic activity.^[11]

The present study was designed to assess the immediate effects of 27 rounds of left nostril breathing, a yogic pranayama technique known as Chandra nadi pranayama on cardiorespiratory parameters in healthy adult males.

The present study aims that role of music with exercise and left nostril breathing on cardiorespiratory responses.

AIMS AND OBJECTIVES

- The study was carried out for evaluation of effect of fast and slow music on various cardiorespiratory parameters following moderate exercise with Harvard step test on male medical students.
- To study the effect of forced left nostril breathing on cardiorespiratory responses.

METHODOLOGY

This Prospective study was carried out in ACSR Government medical college, Nellore, Andhra Pradesh from September 2018 to April 2019.

Study tool: Harvard step test, metronome.

Study Group

60 healthy untrained male medical students with in the age group of 18-24 years who volunteered for the study were taken as subjects. Since menstrual cycle modulates autonomic nervous system, females were not included in the study.^[12]

Inclusion criteria

- 1) No history of Hypertension, Diabetes mellitus and Asthma
- 2) Normal BMI
- 3) No history of any illness that limits exercise activity.

Exclusion criteria

Subjects with history of musculoskeletal, neurological or cardio-pulmonary illness.^[13]

Prior approval from Institutional Ethical Committee is taken before starting this study. An informed written

consent was taken from each subject after explaining the procedure in their local language.

Height measurement: The subject was asked to stand erect on standiometer with bare foot and height was recorded during inspiration, placing the horizontal bar of the standiometer on the vertex of the subject.

Weight measurement: The subject stood erect on the digital standing scale bare foot and wearing light clothes. The readings were recorded from the digital scale of the weighing machine.

Body Mass Index: Weight(in kg)/height²(in m²) by Quetlet's index.

Exercise protocol: Participants were instructed to avoid heavy meal, caffeine for 4 hours prior to testing and avoid strenuous physical activity or exercising for 24 hours prior testing. After 30 minutes of rest, Resting Pulse rate, Resting systolic BP, Resting diastolic BP were recorded using the digital sphygmomanometer prior to exercise in lying down position.

The participants were subjected to moderate exercise by Harvard step test for 3 minutes on 3 consecutive days. They were allowed to test in silence on 1st day, test with hearing slow music on 2nd day and test with hearing fast music on 3rd day. Background music was played using ipod through headphones.^[14]

After that during the post-exercise relaxation time PR, SBP and DBP were measured immediately and after every 1 min. until the parameters returns to resting values.

On 4th day the subjects were instructed to perform left nostril breathing by taking right hand and block the right nostril by putting gentle pressure on it with right thumb. With a long, slow, deep breath, subjects are asked to gently inhale through their left nostril. Try breathing in through the left nostril as described using different counts with a regularity of 6 breaths/min throughout a performance of 27 rounds of LNB which are counted using a stopwatch.

Pre and post breathing exercise heart rate (HR) and blood pressure (BP) measurements were recorded using non-invasive digital sphygmomanometer.

RESULTS

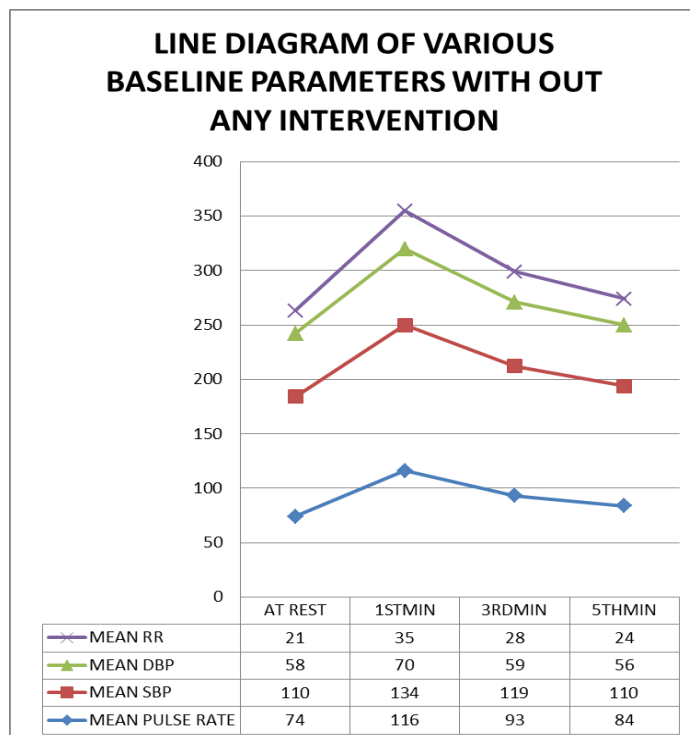
The results are valudated in Microsoft Excel 2010. The results were expressed as Mean \pm Standard Deviation. Pre and post test values are analysed by paired t test with P value <0.005as significant. There was a significant decrease in all parameters in post exercise and is statistically significant with P value <0.005.

Exercise with different types of music and Left nostril breathing produced an immediate decrease in all the

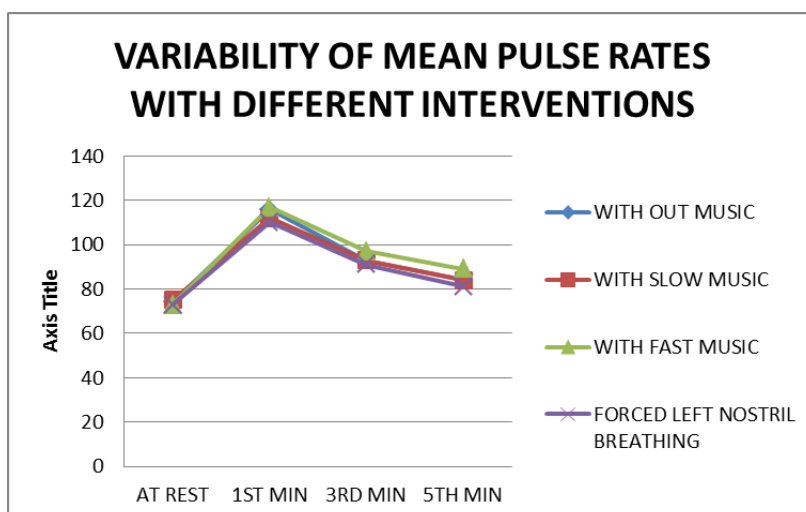
measured cardiorespiratory parameters with the decrease in pulse rate, systolic blood pressure (SBP), diastolic blood pressure (DBP) and respiratory rate and are

statistically significant. The results are expressed in various tables and graphs.

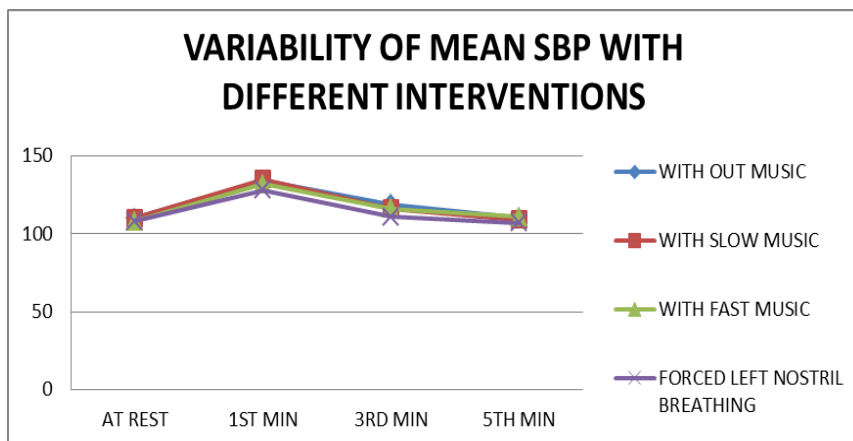
Effect of music on exercise	Mean SD							
	At Rest		1 st min		3 rd min		5 th min	
Pulse rate	74	6.8	116	9.8	93	4.45	84	8.6
SBP	110	9.56	134	16	119	3.5	110	8
DBP	58	11.8	70	6.8	59	9.2	56	6.5
RR	21	7.9	35	8.7	28	7.5	24	4.6



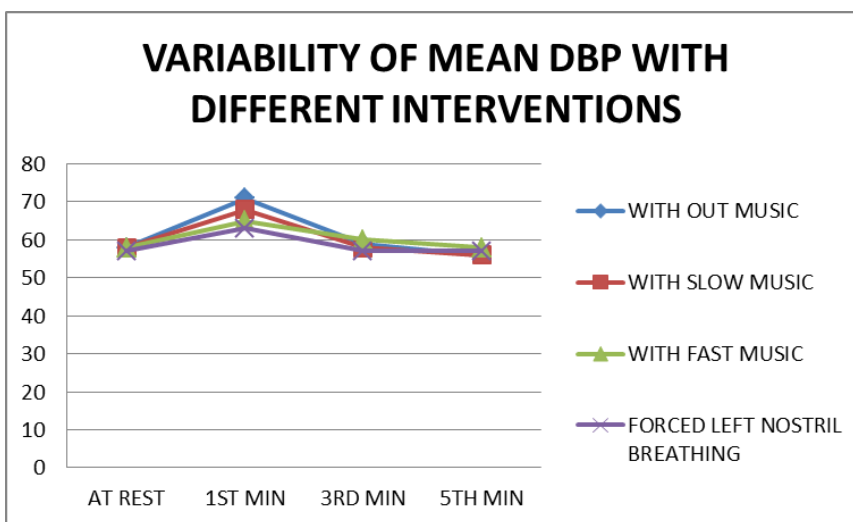
PR	Mean SD							
	At Rest		1 st min		3 rd min		5 th min	
With out music	74	14.2	116	6.8	93	9.2	84	8.2
With slow music	75	8.7	112	11.9	93	12.8	84	9.7
With fast music	73	6	117	19	97	4.4	89	6.8
Forced left nostril breathing	73	11.4	110	8.2	91	12	81	8.8



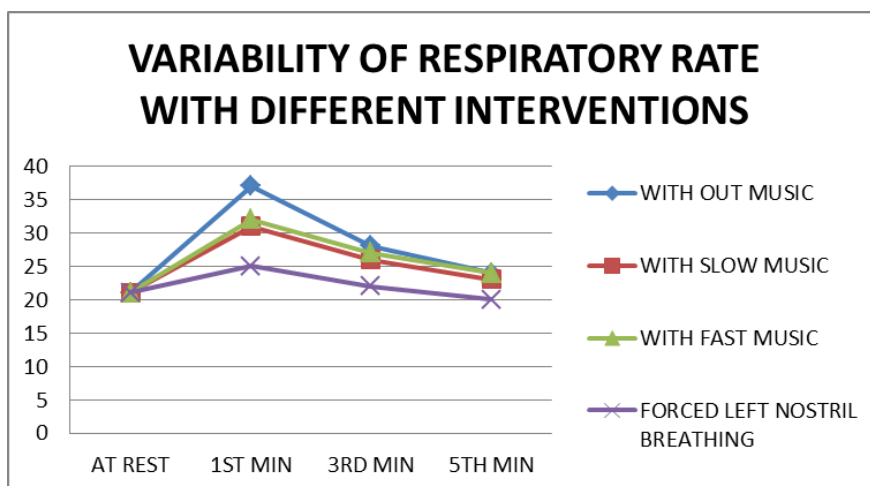
SBP	Mean SD							
	At Rest		1 st min		3 rd min		5 th min	
With out music	110	6.5	134	11.6	119	9.7	110	6.6
With slow music	110	3.8	135	9.8	116	10.4	109	8.2
With fast music	108	2.7	132	6.9	116	9.5	111	10.6
Forced left nostril breathing	108	9.8	128	8.5	111	7.9	107	7.9



DBP	Mean SD							
	At Rest		1 st min		3 rd min		5 th min	
With out music	58	4.9	71	6.3	59	11.6	56	7.9
With slow music	58	6.1	68	12.8	58	8.9	56	8.2
With fast music	58	8.5	65	15.1	60	6.5	58	9.9
Forced left nostril breathing	57	5.7	63	9.7	57	6.9	57	8.7



RR	Mean SD							
	At Rest		1 st min		3 rd min		5 th min	
With out music	21	8.6	37	6.5	28	7.5	24	9.6
With slow music	21	12.4	31	5.9	26	6.9	23	8.6
With fast music	21	9.8	32	8.7	27	12.4	24	14.2
Forced left nostril breathing	21	11	25	6.9	22	11	20	9.8



DISCUSSION

The present shows that relaxation with music after moderate exercise caused a faster recovery of physiological parameters like PR, SBP, DBP and RR comparison with silence. The recovery with slow music was faster than the recovery with fast music.^[16] This probably because slow music reduce the arousal, subject being in a state of relaxation. The individual parameters of the music had an effect on the relaxation time music reduced muscular and mental tension. There by reduced sympathetic stimulation as observation of some studies. A study done by Desai RM et al. Effect of music on post-exercise recovery rate in young healthy individuals shows that Post-exercise recovery time was significantly faster in slow music therapy when compared to fast music therapy.^[13]

It consistent with other study which proceed that music has the potential to reduce physiological indicators of anxiety including pulse rate, respiration rate and blood pressure. There is decreased plasma concentration when relaxation is accompanied by music. These factors may caused recovery of respiration rate, pulse rate, and blood pressure top base line and then relaxation in the observe of music

Slow music is a good tool for relaxation following strenuous physical exercise. Slow music hastened the recovery of physical parameters like pulse rate, respiration rate and blood pressure. It also had an affective component in that it caused a subjective feeling of faster recovery from exertion when compared to no or fast music. The individual music preferences had a significant influence on the effect of music on the relaxation time. A study done by Sheetal Diliprao Bhavsarshows that music hastens post-exercise recovery and slow music has greater relaxation effect than fast music.

The present study showed a statistically significant reduce in the all parameters in the recovery stage and with left nostril breathing.^[14] Studies suggest that the parasympathetic dominance of left nostril breathing is

strong enough to bring down the elevated cardio-vascular parameters in the post exercise state faster even while the participant breathes normally. The earlier observations that the left nostril potency causes an increased activity in the right cerebral hemisphere and right cerebral hemisphere is found to have predominantly parasympathetic activity may be used to explain these findings.

Drawing a parallel, the post exercise period can be linked to a state of cardiac dysautonomia with increased sympathetic activity, with the cardio-vagal compensatory mechanisms attempting to normalize the increased sympathetic activity. This allow us to consider studying the effect of forced left nostril breathing a maneuver that allows to voluntarily manipulating the nasal cycle to make it left dominant, in a state of sympathetic activity such as post exercise period. It found effective to hasten the recovery of blood pressure, heart rate, and respiratory rate.

Left nostril breathing can be developed in a non pharmacological adjunct to therapy in conditions like supraventricular tachycardia and essential hypertension.^[15]

CONCLUSION

The present study shows statistically significant decrease in PR, SBP, DBP and RR with left nostril breathing and in the post recovery phase of exercise. Further studies are required to enable a deeper understanding of the mechanisms and duration BP lowering effect persists. We recommend that this simple and cost effective technique be added to the regular management protocol of essential hypertension and utilized when immediate reduction of BP is required in day-to-day as well as clinical situations.

This study conclude that medical students are going through various stress conditions in their regular curriculum and advised to do left nostril breathing and exercise with music.

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