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RESEARCH ARTICLE

The effect of slow and fast musical tempo on post-exercise recovery on recovery period in young adults

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ABSTRACT

Background: Music is a magical medium and powerful too, can be used to soothe and relax. Listening to music reduces muscular and mental tension and thereby decreases sympathetic stimulation and sustains motivation to resist mental and emotional fatigue, and it may even facilitate physical and athletic performance. **Aims and Objectives:** To determine the effectiveness on various parameters of listening to slow and fast music tempo during post-exercise recovery in young adults. **Materials and Methods:** The study procedure was carried out on 50 untrained participants of the age group between 18 and 25 years, at the tertiary health center. Each participant performed the Queen's step test for 3 min. The recovery period of pulse rate, respiratory rate, and blood pressure (BP) during post-exercise without music on the 1st day, with slow on the 2nd day, and fast music tempo on the 3rd day were recorded. The study was conducted in 3 visits. **Results:** The data analysis was done by SPSS-IS software. ANNOVA test was used for statistical analysis. The $P < 0.05$ was considered as significant. With slow music tempo, the mean recovery time for pulse rate (9.38 ± 1.47 min), systolic BP (8 ± 1.10 min), diastolic BP (7.32 ± 0.95 min), and respiratory rate (9.10 ± 1.39 min) was significantly faster than without music and fast music tempo. **Conclusion:** The heart rate, BP, and respiratory rate returned to baseline faster while listening to slow than fast music tempo. The present study concludes that music of slow tempo is a good tool for relaxation following a bout of physical exercise.

KEY WORDS: Slow and Fast Music Tempo; Pulse Rate; Systolic Blood Pressure; Diastolic Blood Pressure; Respiratory Rate

INTRODUCTION

Recovery (or effective recovery) allows the restoration of physiological and psychological processes so that the athlete can train or compete again at a similar level.[1] Music is a magical medium and powerful too, can be used to soothe and relax. Music is a well-known relaxation technique from times immemorial. Music has been widely used to accompany exercise and athletic activity. Music reduces muscular and mental tension and thereby decreases sympathetic stimulation and sustains motivation to resist mental and emotional fatigue, and it may even facilitate physical and athletic performance.[2,3] There is music for every mood and achieving adequate and appropriate recovery from exercise is essential in ensuring optimal performance during repeated bouts of exercise. The use of various interventions has become popular in an attempt to enhance subsequent performance and accelerate post-exercise recovery.

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Physical exercise is associated with changes in cardiorespiratory parameters and increase in psychological stress and exertion. Music acts as a good tool of distraction. Recent studies emphasize the value of music in lowering stress and its role in enhancing the exercise performance.[4]

The tempo of music has its own influence on exercise. Switching of music from slow to fast during progressive

exercise results in significant changes in physiological parameters.[5] Music evokes a "distraction effect" during low-intensity exercise. One musical component that has been implicated in this response is tempo (Holbrook and Anand, 1990, with Husain et al. 2002) suggesting that arousal and musical tempo possess a positive relationship. Music of slow tempo reduced the arousal, leaving the participant in a state of relaxation. It also had an affective component in that it caused a subjective feeling of faster recovery from exertion while compared with no music.[6] Fast music can act as an arousing stimulus which can induce a temporary change in mental focus that cannot compete for internal signals of fatigue.[2] This study intends to give the effectiveness of musical tempo (slow and fast) on the post-exercise recovery of physiological parameters such as pulse rate, blood pressure (BP), and respiratory rate during recovery.

MATERIALS AND METHODS

The study was carried out in 50 medical students of age group 18-25 year of tertiary health center of Municipal Corporation of Greater Mumbai. Participants were untrained and free from any cardiovascular diseases, respiratory diseases, anxiety disorders, neuromuscular disorder, and skeletal deformity. Each participant performed the Queen's step test for 3 min. After the test, the effect of different musical tempos was seen on recovery time and various parameters such as pulse rate, BP, and respiratory rate. Each participant participated in all of the following 3 sessions: To relax without music on the 1st day, with slow music on the 2nd day, and with fast music on the 3rd day after exercise, during the recovery period. The study was conducted in 3 visits. MP3 players with a headphone for music were used during recovery time. Music preferred was slow music (soft, melody, slow music 60-70 bpm, <60 db) and fast music (dance beats fast tempo 100-120 bpm, >80 db). Post-exercise recovery parameters measured are pulse rate was recorded until it returned to resting values. The BPs were recorded immediately after the completion of exercise and then every 2 min until the systolic BP (SBP) and diastolic BP (DBP) returned to resting values and the time required was noted, respiratory rate per minute was recorded in supine position, using stopwatch, until returned to resting values, and the time taken was noted.

Statistical Analysis

The data entry was done in MS-EXCEL and analysis was done by SPSS-IS software. ANNOVA test was used for statistical analysis. The $P < 0.05$ was considered as significant.

RESULTS

In this study, the age of the participants ranged from 18 to 19 years with the average age being 18 years. The number of male and female participants was equal, i.e., 50% each (25 male and 25 female). Each participant performed the Queen's step test for 3 days. The various parameters were measured during the post-exercise period on all 3 days with no music, slow music, and fast music. The "mean" (M) and "standard deviation" (SD) of each parameter were calculated.

Table 1 shows that mean recovery time taken to reach the resting pulse rate, resting SBP, resting DBP, and resting respiratory rate with slow music 9.38 ± 1.47 min, 8 ± 1.10 min, 7.32 ± 0.95 min, and 9.10 ± 1.39 min, respectively, which is significantly faster than that with fast music 10.45 ± 1.31 min, 9.30 ± 1.29 min, 8.22 ± 1.21 min, and 10.13 ± 1.10 min and no music 12.05 ± 1.52 min, 10.72 ± 1.26 min, 9.52 ± 1.40 min, and 11.27 ± 1.57 min, respectively. Distribution of various parameters (pre exercise resting values) at the beginning of every session on 3 days were almost same and there was no significant difference are shown in Figure 1.

DISCUSSION

In the present study, the effect of music and different musical tempos on post-exercise recovery time, following Queen's College step test is studied. This study proves that relaxation

Table 1: Parameters showing mean postexercise recovery time with no music, slow music and fast music

Parameters	1st day (no music)	2nd day (slow music)	3rd day (fast music)
Pulse rate (beats/min)	12.05±1.52*	9.38±1.47*	10.45±1.31*
SBP (mm Hg)	10.72±1.26*	8±1.10*	9.30±1.29*
DBP (mm Hg)	9.52±1.40*	7.32±0.95*	8.22±1.21*
Respiratory rate (per min)	11.27±1.57*	9.10±1.39*	10.13±1.10*

Data presented are mean±SD. ANOVA test applied as the data passed normality test; *P<0.05 significant; P>0.05 not significant, SBP: Systolic blood pressure, DBP: Diastolic blood pressure, SD: Standard deviation

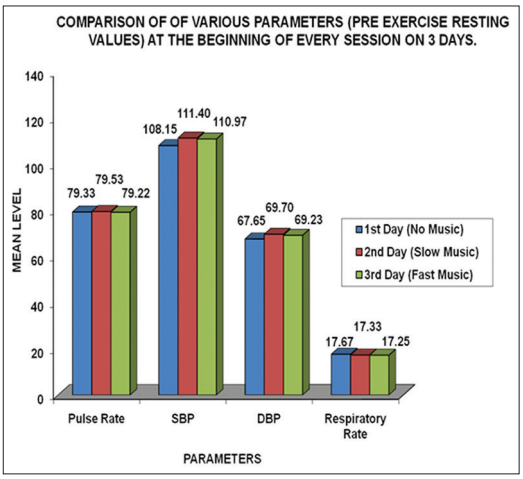

Figure 1: Distribution of various parameters (pre-exercise resting values) at the beginning of every session on 3 days were almost same, and there was no significant difference

with music after the exercise causes faster recovery in parameters such as heart rate, SBP, DBP, and respiratory rate in comparison with relaxation without music. The heart rate and BP returned to baseline faster while listening to slow music tempo as compared to fast music tempo. Probably, music of slow tempo reduced the arousal, leaving the participant in a state of relaxation.[7]

In a previous study, it is shown that relaxation with music after a bout of physical exercise caused faster recovery of physiological parameters namely pulse rate and BP in comparison with relaxation in silence (no music).[6] Survey-based data reported by Priest, Karageorghis, and Sharp (2004) revealed that musical rhythm has a stimulative effect on the human beings irrespective of any synchronization.[7] The relaxing music prevents stress-induced increase in subjective anxiety, SBP, and heart rate in adolescents during the recovery period.[8] Music showed the trends of decreasing the dopamine and norepinephrine levels.[9,10] Thus, listening to music with soothing qualities and resting quietly appeared to be more effective. In addition to this, the plasma catecholamine is also lowered when relaxation is accompanied by music.[9] Probably, these factors together caused recovery of the pulse rate and BP to baseline earlier than relaxation in the absence of music.

Slow music causes relaxation thereby slowing the breathing, as relaxing music reduces the activity of the sympathetic nervous system.[11] The music tempo and respiratory rate have a direct relationship. Music is composed of auditory tones and rhythms that do not direct the mind but distract it, focus attention, facilitate breathing, and stimulate the relaxation response.[12] During slow music tempo, the slower respiratory rate was seen suggesting that arousal (attention) responses reduced and with fast music tempo, the faster respiratory rate was seen suggesting increased arousal.[11]

Music has an ergogenic effect when it enhances work output or yields higher than expected levels of endurance, power, productivity, or strength. In this regard, music can be seen as a type of legal drug that athletes can use in training. The effects of music with video in combination have received scant attention despite the fact that this type of delivery is rapidly usurping the former role of music, particularly in health and fitness facilities.

CONCLUSION

The present study concludes that music of slow tempo is a good tool for relaxation following a bout of physical exercise. Slow music tempo hastened the recovery of physical parameters such as pulse rate, BP, and respiratory rate. It also had an affective component in that it caused a subjective feeling of faster recovery from exertion while compared to the effect of no music or fast music tempo. The present study can also be extended on patients under various types of stress other than exercise also 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. Music has an ergogenic effect when it enhances work output or yields higher than expected levels of endurance, power, productivity, or strength. In this regard, music can be seen as a type of legal drug that athletes can use in training and also would enhance the efficiency of those visiting gym regularly for fitness.

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