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Short Communication

Effect of different types of music on exercise performance in normal individuals

Anuprita M. Thakur^{1*} And Sujata S. Yardi¹

Department of ¹Physiotherapy,
Dr D.Y. Patil University,
Navi Mumbai, India

Abstract

While exercising, people seem to enjoy listening to music believing that it relaxes them or helps give the necessary rhythm for exercise. But is music really beneficial ? In view of different people listening to different types of music, this study was intended to assess effect of different types of music on exercise performance. 30 healthy female college students in the age group of 18 to 25 years were made to walk on the treadmill 3 times at one week interval: without music (A), with slow music (B), with fast music (C). Duration of exercise and rate of perceived exertion were recorded at the end of each session. The results showed an increase in the duration of exercise in Group B and Group C as compared to Group A and the increase was more in Group C as compared to Group B. It was observed that level of RPE was the same at the end of every exercise session. The reason for increase in exercise duration with music could be because of various factors like dissociation, arousal, motivation, etc. It can be thus suggested that exercises can be performed for longer duration with music than without music and the effect is more with fast music than with slow music. Also with music, the same level of exertion is perceived though the walking duration is considerably increased.

Introduction

Music is defined as an artistic form of auditory communication incorporating instrumental or vocal tones in a structured and continuous manner. People generally seem to enjoy listening to music while exercising. This could be with a belief that music relaxes them or helps gives the necessary rhythm for exercise or purely because it entertains them.

But is music really that beneficial ? In view of different people listening to different types of music, this study was intended to assess effect of different types of music on exercise performance. In this study, the tempo of the music was considered. Tempo is defined as speed or pace of the music. It is indicated as beats per minute (bpm). Music tempo more than 100 beats per minute was considered as fast and below 100 beats per minute was considered as slow (1).

Materials and Methods

The ethical approval to conduct this study was taken from the Ethics Committee of Pad Dr D. Y. Patil University, Navi Mumbai. 30 healthy adult college female students in the age group of 18 to 25 years

*Corresponding author :

Dr. Anuprita M. Thakur, 501/1, Chhaya, 13th Rd., Chembur,
Mumbai – 400071, Ph.: 9820132985
E-mail : anupritathakur@yahoo.com,
drsujatayardi@gmail.com,
physiotherapy@dypatil.edu

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TABLE I: Demographics of the study subjects.

Parameters	n=30
Age (yrs)	22.8±4.227
BMI (kg/m ²)	22.371±3.88

Data presented as mean±SD.

from Pad Dr D. Y. Patil Vidyanagar, Navi Mumbai were randomly selected. The demographics of the subjects are given in Table I.

None of the subjects gave any recent history of musculoskeletal, neurological or cardio-pulmonary illness. The subjects did not perform any regular exercise during the last 3 months. The subjects were explained about the study and written consent was taken. Before the actual exercise session, trial for the walk on treadmill was given. Warm up program and cool-down for 10 minutes each was taught to the subjects to be practiced prior to and post exercise during every session. Parameters like Blood pressure, heart rate; respiratory rate was assessed prior to the exercise. The following treadmill exercise protocol was kept standard for all subjects. The initial speed was maintained at 3kph for the first 3 minutes, which was increased to 4.5 kph at the next 3 minutes. At the end of 6 minutes the speed was increased to 6 kph and this speed was maintained throughout the exercise session. This speed was coincided with 70-80% of maximum heart rate. An inclination of 2% was maintained at all speeds as this inclination takes care of the air resistance that is encountered during walking out in the open. Each subject walked for three sessions with 1-week interval between each session (2). All the exercise sessions were conducted in the morning between 10.00 am and 12.00 pm. The first session was without any music (A), 2nd session while listening to slow music (B) and 3rd session while listening to fast music (C). Music played was common familiar Hindi music. The music was delivered through the CD player and the headphones. Heart rate was monitored at every 3 minutes of the exercise using the Polar Heart rate monitor. The volume of music was loud enough to prevent external noise from being heard and at the same time comfortable for the subject. The subjects were blinded to the distance and time they walked

for to prevent any goal setting. The duration for which the subject walked was decided by the subject. Post exercise parameters like Blood pressure, heart rate, respiratory rate, time duration of the exercise, Borg Rating of Perceived Exertion (RPE)(3) and Visual Analog Scale (VAS) (4) for music liking were assessed.

Borg rating of perceived exertion

Perceived exertion is the subjective intensity of effort, discomfort and/or fatigue that is experienced during exercise. The scale ranges from 6 to 20, where 6 means “no exertion at all” and 20 means “maximal exertion.” The subject had to choose the number that best described the level of exertion.

Visual analog scale for music liking

A visual analogue scale is a psychometric response scale, which measures subjective characteristics or attitudes that cannot be directly measured. In this study, the VAS was used to assess subjective liking of music. The scale is a horizontal 10 cm line, with words like minimum liking to maximum liking at each end. The subject was instructed to mark on the line the point that she felt represented her music liking. The score was determined by measuring in centimeters from the left hand end of the line to the point that the subject marks.

Results

The results from 26 subjects were evaluated, as 4 subjects did not complete all the 3 sessions. The results show that the duration and distance covered during exercise was maximum with fast music followed by slow music and the least is in the no music condition. The RPE values and the change in heart rate, systolic and diastolic blood pressure and respiratory rate between pre exercise and immediate post exercise were only slightly different in the 3 groups and this difference was not significant statistically. Based on the visual analog scale for music liking, it was also seen that 20% of the subjects (6) preferred slow music to fast music ($p<0.0001$). However the duration of exercise was more with fast music in these subjects as well.

TABLE II: Means and SD's of duration of exercise, distance covered, RPE, change in Heart rate, Blood pressure and respiratory rate.

<i>Parameters</i>	<i>Group A (No music)</i>	<i>Group B (Slow music)</i>	<i>Group C (Fast music)</i>	<i>P values</i>
Duration (minutes)	14.844±4.13 [#]	16.77±6.41 [*]	19.94±7.64 ^{***}	0.0178
Distance covered (km)	1.21±0.40 [#]	1.45±0.63 [*]	1.75±0.77 ^{***}	0.009
RPE	11.88±1.79	11.46±1.87	11.6±1.97	0.2845
Change in Heart rate (between Pre and immediate Post exercise)	73.87±19.30	75.29±13.04	71.58±13.49	0.6870
Change in Systolic BP (between Pre and immediate Post exercise)	22.09±9.431	22.09±8.739	21.72±12.578	0.9910
Change in Diastolic BP (between Pre and immediate Post exercise)	-7.23±8.426	-3.61±7.606	-4.952±9.992	0.4029
Change in Respiratory rate (between Pre and immediate Post exercise)	8.63±3.531	8.631±4.27	7.78±3.119	0.7181

Data presented is as mean±SD. Analysis was done by Analysis of variance (ANOVA) and post-hoc by Tukey-Kramer test. The * depicts comparison with group A, # depicts comparison with group B, **P<0.05, *P>0.05, #P>0.05.

Discussion

The first objective of the study was to examine if listening to music had an impact on exercise performance. The results confirm that distance covered during exercise and the exercise duration was more when the subject was exposed to slow or fast music than when she exercised without music. Also it is seen that the distance covered and duration of exercise was more with fast music than with slow music. Various factors could have led to improvement in exercise performance with music. Music may cause dissociation, which is the process of focusing on an external stimuli unrelated to the task such as surroundings or conducting mental arithmetic thereby reducing the perception of internal bodily cues (5). During submaximal exercise, music helps to divert the mind from sensations of fatigue and focus on the music thus making it possible to exercise for longer durations. Studies have revealed that music can alter emotional and physiological arousal (6) and help the individuals to narrow attention, focus inward and block out distractions (7). Also music is known to promote a state of flow, which is characterized by numerous factors including distorted sense of time, a lack of negative self-judgments, and immersion in the exercise activity etc (8). This helps the subjects to immerse and completely focus on the activity, which probably allows them to overcome any sign of fatigue or discomfort and continue for a longer time. Well-

selected music enhances positive dimensions of mood like vigor, excitement while reducing negative aspects such as tension, fatigue (9). Intrinsic motivation is characterized by interest and enjoyment derived from an activity. Music makes the activity enjoyable and thus helps to motivate the person to continue with the activity. Also, motivation helps better adherence to the exercise program. As listening to music provides this motivation, the adherence to exercise program is better when one listens to music while exercising. This is also reflected in the fact that the RPE was maintained similar in all the three exercise conditions though the exercise time and the distance covered increased from exercising with no music to exercising with music indicating that music had the ability to manipulate the effort sense despite increased work.

The second objective of the study was to assess which of the two types i.e fast or slow had more effect on exercise performance. The results showed that though both the types of music increased the duration of exercise, however the increase was more with fast music. Thus fast music seems to more suits for this exercise program. This could be because fast tempo and strong rhythms are inherently stimulative (10) and thus create greater arousal. Arousal and musical tempo possess a positive relationship i.e faster the tempo the greater the intensity of the arousal response (1, 11, 12).

Thus the focusing on the activity and blocking out of distractions was more with fast music than slow music. Also the synchronization of the music beats or tempo with the movements are coordinated when the tempo is fast. In this study, the number of steps that the subjects walked at 6 kph was on an average around 128, which roughly coincided with the tempo of the fast music (10, 13, 14). Thus, better synchronization with fast music. The tempo of the songs was between 120 and 140 beats per minute

for better exercise performance as this corresponded to the average person's heart rate of my study subject.

Conclusion

In general, results of this study indicate that music: both fast and slow music have a positive effect on exercise performance. However, fast music increases the exercise duration more than slow music.

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