



EFFECT OF VARIED MUSIC TEMPO HEARD WHILE EXERCISING ON AN INDIVIDUAL'S MOOD.

Physiotherapy

Miss Aishwariya Kumar*

BPT, Dr. A. P. J Abdul Kalam College of Physiotherapy, PIMS(DU) *Corresponding Author

Dr. Deepali Hande MPT, Associate Professor, Dr. A.P.J Abdul Kalam College of Physiotherapy

ABSTRACT

Background: Stress is a commonly faced symptom experienced in the 21st century. Aim of the study was to determine effect of different tempo of music heard while exercising had on one's mood.

Methodology: Participants were selected and randomly assigned to each of the five groups. Data Collection was started after obtaining informed written consent. Before and after the intervention mood was assessed using the Abbreviated Profile of mood states questionnaire and using this the Total Mood Disturbance was calculated.

Result: There is change in TMD score after post intervention in all the groups. Indicating the combined positive effect of music and exercise on an individual's mood.

Conclusion: With the help of this study it can be concluded that there is significant changes in the total mood disturbance of the individual after every intervention. This change could be due to the combined effect of exercise and music.

KEYWORDS

music, tempo, stress.

INTRODUCTION

Stress has been defined as an experience which is challenging not only physiologically but also emotionally.¹ A study conducted on the prevalence of stress, depression and anxiety with a sample size of 500 shows that about 18.5% suffers from depression, 24.4% have anxiety and stress is experienced by 20% of the individuals sampled.²

Stress can be managed by using a variety of techniques such as yoga, exercise, meditation, tai-chi, listening to music, getting help from a trained professional.³

Music is a universal language, while still being subjective. Research shows that music has beneficial effect over the various components of stress such as physiological,^{4,5,6} cognitive⁷ and emotional processes.^{8,9}

Despite there being multiple studies on exercise or music having psychological benefit, there are very few studies which take into consideration the effects of both exercise and music on an individual's psychological well-being.¹⁰

Correlational and experimental studies both were picked for a meta-analysis, this revealed a that exercise had positive effects over all individuals regardless of them being healthy or individuals with some form of mood disorder irrespective of their age and gender. Participants with elevated levels of depression and anxiety show significant benefit because there is more scope for change. Exercise also has acute effects and that is a single session of exercise leads to reduction in anxiety, depression. The Endorphin and Monoamine hypothesis is used to explain the changes associated with the mood states, anxiety and depression. Body temperature, physiological reactivity to stress, blood circulation in brain and hypothalamic-pituitary-adrenal axis may show increase due to exercise.¹¹

A research by Hayakawa et al studied the effect of music on various mood states during bench stepping exercise. The authors reached to the conclusion that music was positively related to change in an individual's mood other researches have also reported similar findings.¹²

It is proposed that music produces a psychophysical benefit during physical activity by lowering perception of effort, improving affective states and a synchronization of effort. Thereby causing a reduction in the stress perceived.¹³

Music is known to have an ergogenic effect which means that listening to music before the event helps the athlete with significant improvement in performance¹⁴, to be more motivated¹⁵, increase pre event activation, thus when music is used in such a purposeful manner it improves performance.¹⁴ This improved performance is what is known as ergogenic effect and there have been many studies which

have been conducted across various sports using different music and the direct link between the music tempo and performance has been established by previous studies. The tempo of music heard while running has great impact over the cadence and speed at which an individual runs.¹⁶ Studies clearly demonstrate that the ergogenic effect caused by listening to music when performing exercise is in terms of increased aerobic endurance, improvement in motor performance and also the exercise experience is enhanced. The ergogenic effect that music has is maximum when combined with physical activity such as running and swimming.¹⁷

Varied tempo of music has an effect over an individual's mood this has been documented by a many studies.¹⁸ Studies also point towards music influencing an individual's tendency to help other people, the many components of music such as tempo, lyrics and tune has the power to evoke a specific type emotion in individual's this may be positive or negative depending upon the type of music.¹⁹

An individual's perception of the physical demands imposed by an activity can be quantified subjectively by Rating of Perceived Exertion(RPE). Borg's scale is one of the most widely used Rate of Perceived Exertion tool, the ratings range from 6 to 20. With 6 being no exertion at all and 20 indicating maximal exertion.²⁰

The profile of mood states is an instrument used to evaluate the effect of a short term intervention on an individual's mood, it is an important indicator used to calculate the total mood disturbance of an individual. It is used clinically in field of medicine, allied health sciences, psychology and research.²¹

Materials and Methodology

All potential participants were screened. 50 students between the ages of 18-25 were selected as they satisfied the inclusion criteria. After obtaining written informed consent the participants were randomly allocated to each of the five groups. Participants with history of mood disorders or medications known to alter the mood were excluded from the study. Total mood Disturbance was calculated before and after the intervention using Abbreviated Profile of Mood States Questionnaire. Paired t-test was used.

PROCEDURE

Ethical Clearance was obtained from the Institutional Ethical Committee of Dr A. P. J. Abdul Kalam College of Physiotherapy (PIMS/CPT/IEC/2018/552).

Participants were assigned to each of the categories on the basis of simple random sampling:

- Music with more than 140bpm on high volume.
- Music with more than 140bpm on low volume.
- Music with 60 bpm on high volume.

- Music with 60 bpm on low volume.
- No music.

A chart explaining the Borg RPE and a copy of the Abbreviated POMS was given to each of the participant and they were asked to mark appropriately on the scale ranging from not at all(0) to extremely(4). The Borg RPE chart was explained.

Then the participant were asked to stand on the treadmill and the machine was switched on. The buttons to reduce the speed and to stop the treadmill were explained to the individual and in case of any emergency or discomfort at any point the individual was instructed to inform the researcher so that the treadmill could be stopped. The first session was conducted wherein the participant were familiarised with the treadmill. The volume and type of music was pre-set for each category. All individuals were asked to bring their own pair of earphone's to prevent any contamination/infection. The entire duration of running on the treadmill was set for 10 minutes. Starting with a warm up period of 2 minutes wherein the individual's RPE was not allowed to exceed 9. After two minutes the speed was increased and the increase in speed was made every two minutes till the sixth minute. At the highest speed it was made sure that participant's RPE did not exceed 14. After which the speed was slowly reduced to such that the individual's RPE was between 9-11. At the tenth minute the treadmill was brought to a stop.

The participant were made to sit in a comfortable chair and asked to fill the Abbreviated POMS. The scores were then calculated on the basis of the scoring key. A record of this data was maintained. The participating individual was asked about any discomfort faced while running. This procedure was conducted for a total of five times per participant using a combination of different music tempo and the volume at which the music was played.

OUTCOME MEASURES

BORG RATE OF PERCEIVED EXERTION

The participants were asked to be seated and Borg's RPE was explained with the help of a chart which showed the corresponding number to the level of exertion in an individual. Borg's RPE scale ranges from 6 to 20 and the numbers are an indicator of the difficulty level of the activity that is being performed. Where 6 is indicative of being very, very light and 20 signifies maximum exertion. The participants were asked to ascertain their exertion levels before beginning the treadmill protocol. During the exercise session Borg's RPE chart was administered at an interval of two minutes to the participant. The RPE obtained at the end of first session was used as benchmark as the same RPE was used in all of the five sessions.

Intraclass reliability was 0.78 and single-trial reliability was 0.64 and the validity for % HR max was 0.66.²²

ABBREVIATED PROFILE OF MOOD STATES

It is a tool which has been used to assess the mood of an individual. Comprising of forty questions to which the answers range from a Not at all to Extremely which is scored as 0 to 4 respectively. The scale comprises of negative as well as positive sub categories. The negative components are Tension, Depression, Anger, Confusion, Fatigue. The positive components are Vigour and Esteem related Affect. The score for Total Mood Disturbance of an individual is calculated by summing the total for the negative components and then subtracting the sum total of the positive components from it. A constant of 100 was used so as to prevent the score from being negative.

The mean reliability was 0.80.²³

INTERVENTION

A total of 57 participants were sampled out of which on 50 matched the set inclusion criteria. Then written informed consent was taken from all the participants and they were assigned to the each of the five groups on the basis of lottery system.

Prior to the treadmill protocol the participants were asked to fill the Abbreviated POMS. Participants were then asked to run on the treadmill for ten minutes. The ten minute of treadmill running comprised of warm up which lasted for two minutes and then the next six comprised of the participant running at a comfortable speed. After every two minutes the Participant's RPE was recorded and when Eight minutes of treadmill running was completed the speed was reduced

and the cool down phase was started. At ten minutes the treadmill was stopped. The Abbreviated POMS was administered again at the end of the intervention.

DATA ANALYSIS AND RESULT

The study was undertaken to see what effect does varied tempo of music, heard at different volume while exercising have on an individual's mood. The scores were calculated by adding the positive and the negative values obtained. Total mood disturbance was indicative of the changes in mood that occurred due to the Exercise intervention and Music.

Statistical analysis was done using Graph Pad In Stat 3. Various statistical measures such as mean, standard deviation [S. D], degree of freedom and test of significance such as paired 't' test and one-way analysis of variance were utilized to analyse the data. It was concluded that the results were highly significant with $p < 0.0001$. Paired 't' test was used to compare the difference in the score obtained before and after the intervention in each sub-category.

The pre and post total mood disturbance was calculated under every category.

No music condition has a p-value and t-value of <0.0001 and 8.250 respectively. In fast music high volume intervention p-value <0.0001 and t-value 7.361. In fast music low volume p-value <0.0001 and t-value 7.513. With slow music high volume the p-value and t-value obtained was <0.0001 and 11.657 respectively. When slow music coupled with low volume was used p-value obtained was <0.0001 and t-value was 8.913.

The data collected was found to be highly significant. When the post intervention TMD was compared using One-way ANOVA the result was found to be not significant.

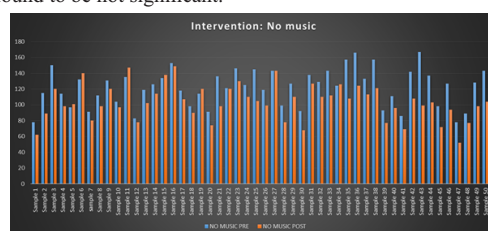


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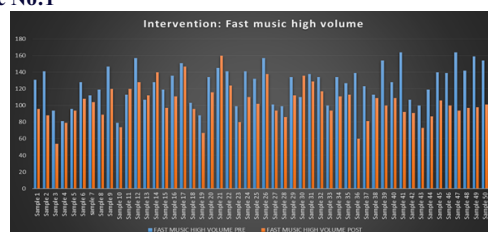


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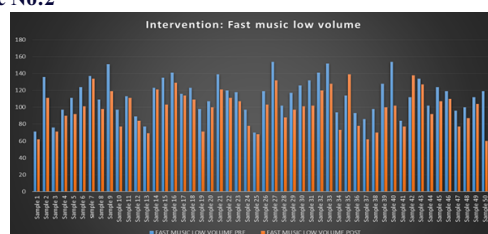


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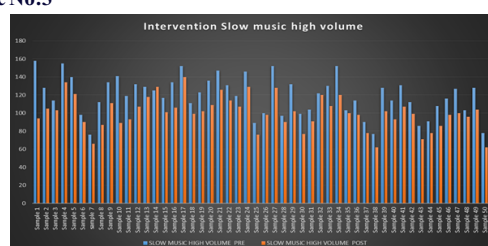


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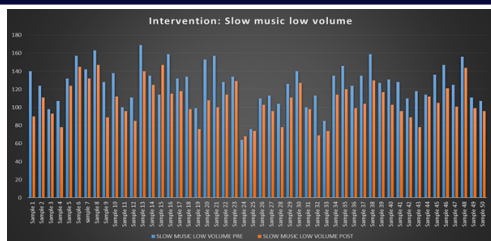


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DISCUSSION

This study aimed to evaluate what effect does listening to music of different tempo at a particular volume while exercising have on an individual's mood.

Exercise is known to have effect over the mind and body of an individual. Even a single exercise session is very beneficial. There is marked changes in ventilation and this rapid rise in ventilation may be attributed to motor centre activity and afferent impulses originating from the proprioceptors of the muscles, limbs and joints. The cardiovascular system undergoes a major change as the resting blood flow to the muscle increases. This leads to increase in heart rate, cardiac output, this change is mediated by vagal inhibition and is sustained by the autonomic sympathetic responses besides this there a host of psychological benefits that accompany exercise. One of them being a positive boost in an individual's mood and lowered rates of depression. The key benefit that accompanies regular physical activity is that it is known to improve self-esteem This occurs as the body releases endorphins in response to exercise and these endorphins interact with the receptors in the brain and reduce the individuals perception of pain. Along with this endorphin also triggers a positive feeling in an individual.

The Abbreviated POMS used to assess the mood of the individual before and after the intervention. There is significant change between the pre and post mood of the individual, the tempo of music and the volume is key factor in influencing the mood and thus the total mood disturbance. The benefit of this intervention was that depending upon the individual's preference the type of music used can be self-administered to improve and manage mood.

There is a marked difference between the pre and post intervention scores of Abbreviated POMS. The post scores of TMD are reduced. This difference was due to the combined positive effect of exercise and music.

Results concluded by this study support the finding of previously done studies.

CONCLUSION:

It can be concluded that there is significant changes in the total mood disturbance of the individual after every intervention. This change could be due to the combined positive effect of exercise and music.

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