



EFFECT OF CLASSICAL MUSIC (Rag Bilahari) ON REACTION TIME AND BLOOD PRESSURE

Physiology

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ABSTRACT

Aims & Objectives: The mechanism of the effects of music is still under scientific study and needs to be understood in a better way. We designed this study to see how music affects reaction time, concentration and blood pressure. The aim of our study was to study the effect of classical music (Rag bilahari) on reaction time & blood pressure.

Material And Methods: 40 healthy subjects were selected for the study. Baseline record of Visual online Reaction time test was taken. Online visual reaction time & Blood pressure were measured before listening to classical music & 4 wks after listening to classical music.

Results: The reaction time & blood pressure were decreased significantly $p < 0.01$. 4 wks after listening to music.

Conclusion: Listening to music at work area reduces distractions, helps increase concentration and delays fatigue. The present study shows that classical music decreases the reaction time & blood pressure after 4wks listening to music. It can be used to heal tinnitus, as an educational tool to develop children with special needs, Alzheimers disease, to improve motor skills in Parkinsonism and help alleviate pain after surgery. (6)

KEYWORDS

Classical music, Rag Bilhari, Reaction time, Blood pressure

INTRODUCTION

Music has become part and parcel of our life. Listening to music seems to have soothing effect and change the emotional state of an individual [1,2].

The singing of the birds, the sounds of the endless waves of the sea, the magical sounds of drops of rain falling on a tin roof, the murmur of trees, songs, the beautiful sounds produced by strumming the strings of musical instruments—these are all music. Some are produced by nature while others are produced by man. Natural sounds existed before human beings appeared on earth. Was it music then or was it just mere sounds? Without an appreciative mind, these sounds are meaningless. So music has meaning and music needs a mind to appreciate it. (4)

Music therefore may be defined as a form of auditory communication between the producer and the receiver. There are other forms of auditory communication, like speech, but the difference is that music is more universal and evokes emotion. It is also relative and subjective. What is music to one person may be noise to another. (3,4)

It is quite often noted that people listen music to improve their concentrating ability as noted among students, drivers or at work place. There are studies which consider music as distracter and deteriorate cognitive performance. But there are other studies which show improvement in response time to various stimuli. The effects are debatable. (3)

Reaction speed is the ability to give a quick motor response to a definitive stimulus and the time taken for a motor reaction for a sensory stimulus is called reaction time. This response time includes the time required for conduction of sensory impulse, processing of stimulus and to execute motor response. Thus the measure of reaction time in-turn indicates the integrity of central nervous system. If the pathways of motor and sensory system are intact reaction time will depend on the ability of central processing of stimulus. (5)

Music affects human beings and influences them in very different ways. Although several studies have shown the effect of music on cardiovascular parameters, no musical influencing variable with a direct effect on the cardiocirculatory system is known.

In our study, listening to classical music resulted in lowered blood pressure & Reaction time. These drops in blood pressure were clearly expressed for the classical music of **Rag Bilahari**. The present study examined the effects of type of classical music on speed of cognitive-motor performance using visual reaction time (VRT) for different colors & Blood pressure.

Reaction time is influenced by many factors such as the consumption

of stimulants including nicotine, caffeine in the form of smoking or sedatives like alcohol. Reaction time is also altered in disease conditions like hypothyroidism and hyperthyroidism and parkinsons disease. Reaction time reflects the level of physical and mental integration of a subject.

AIMS AND OBJECTIVES-

To record reaction time to visual stimuli & blood pressure with classical music and note the effect of music on reaction time & blood pressure.

METHODOLOGY

Study Design:

It is a pre and post intervention study design on the same study group. Sample size: 40

Sample Selection And Method

Subjects for this study were randomly selected irrespective of their gender from 1st MBBS batch 2018-2019 of VDGMIS, Latur aged between 17-19 years. Before selecting them as participants they underwent general physical examination, systemic examination even to rule out ophthalmological diseases & Hypertension. The participants had no visual defects including colour blindness & Hypertension. Before they were selected, procedure of the study was explained in detail and they had given informed written consent for participation. Ethical approval of the research committee was taken before starting the study.

The study was conducted in a quiet room of Research Laboratory in Physiology Dept., VDGMIS, Latur. VRT and blood pressure were recorded of each participant initially without listening to music and 4 wks after listening to music. The students were asked to listen to a preselected classical music (Rag Bilahari) for 30 minutes daily for 4 wks in sitting posture with the aid of earphones. Baseline record of Visual Reaction time test was taken using a computer online Windows 7. The Online Reaction Time Test consists of a traffic light signal of red, yellow and green. The subject is instructed to click on a button to begin when ready, to wait for the stoplight to turn green, and click when it turns green quickly. The average of three responses in seconds is taken as reading. Online visual reaction time was measured before listening to classical music and 4wks after listening to classical music. The systolic and diastolic blood pressure, were measured in the seated position after resting comfortably about 30 minutes. Each measurement was repeated once and the mean was taken for the analysis.

Blood pressure was measured by sphygmomanometer apparatus by auscultatory method.

The duration of study was 4 wks

Special Education :

Music helps improve the coordination of children with neurological disabilities, such as cerebral palsy, as well as those who are blind or deaf. When incorporated into group activities, it also contributes to socialization(10.) Regular exposure to music is likely to be part of the special education program for a hyperactive child because of its calming effects.

The recordings were entered into a master chart and appropriate statistical methods were applied to note the effect of classic music on cognitive-motor performance.

Statistical Plan For Data Analysis

Paired "t" –test was employed to evaluate the difference in reaction time and Blood pressure before and after listening to music p-value of <0.01 was taken as significant. Microsoft Excel 2010 software was used to analyze the data.

RESULTS

The mean visual reaction time without listening to music was found to be 0.836 ± 0.24 ms. The mean visual reaction time in subjects listening to classical music was 0.55 ± 0.14 ms and the mean systolic blood pressure before listening to music was 117.5 ± 7.04 mmHg. After listening to music was 113.85 ± 5.44 mmHg. The mean diastolic blood pressure before listening to classical music was 76.25 ± 4.55 mmHg. After listening to music was 74.5 ± 4.95 mmHg the decreased in visual reaction time, systolic blood pressure & diastolic blood pressure while listening to classic music on statistical analysis was significant

DISCUSSION

In the present study, the subjects reaction time & blood pressure were evaluated before listening to music and after listening to music. The results indicate that decreased in VRT and BP of subjects when recorded with after listening to music. But decreased in VRT noted is statistically significant ($p < 0.01$) after listening to music compared to before listening to music. Similar decreased in BP noted is statistically significant for after listening to music. This improvement indicates that there is facilitation in processing of stimuli in the somatosensory cortex and hence leading to acute motor response.

The classical piece being Mozart's overture to the magic flute and the heavy rock song "Hopeless" from the band Breaking Benjamin. Both of which were found to prolong the reaction time. A number of studies have been published on the effect of music on reaction time with varying conclusions. This could be due to varied selection criteria in the study protocol for the different genres of music (like classical, rock, techno, dubstep, night core or hip-hop), whether it is vocal or instrumental and also could be due to familiarity of the song with the subjects.(4)

Prasad BK in his study on the effect of listening to rock and instrumental music on the reaction time showed a significant improvement to the reaction times of the subjects while listening to the music(5)

Cockerton, Moore, and Norman found that background music facilitated cognitive task performance. Two intelligence tests were given to undergraduate students, one in silence and the other with background music. Their analysis showed that more questions were answered correctly under the music condition compared to the control condition of no music [7].

Salame and Baddeley examined the effects of background music on memory performance. They presented their subjects various kinds of music during a serial recall task. They found that vocal music was significantly more disruptive than instrumental music response.(9)

The findings in a study performed by Maja Mesko et al in 2009 on the effect of listening to techno music on reaction time to visual stimuli in 10 subjects had shown that there was a significant reduction in the reaction time of the subjects 30 minutes after listening to techno music and not during the time of the listening(10). Listening to loud music has a small effect on reaction time. Music at low and moderate levels does not affect reaction time in a significant way.

Edward Mjoenin his study on comparing memory recollection and

reaction time in which the subjects were made to listen to 3 forms of music: Radio Music, popular Radio Music Played Classically and Unfamiliar Radio .Music Played classically found that the unfamiliar music played classically yielded the fastest reaction time of the 3 scenarios though it was not clinically significant.(11)

This study concludes that there is improvement of ART and VRT with background music due to facilitation of processing of stimuli in somatosensory cortex. The improvement is better with instrumental background music. The hypothesis is proved to be null. These results have to be confirmed over larger population. With volume of background music being in comfortable zone would improve reaction time, but with increased volume distracting effect may be noted.(14)

The Mozart Effect concluded in 1999 that listening to classical music temporarily improved spatial reasoning. Since then, studies have been done to determine the effects of different kinds of music on a variety of kinds of tasks, including reaction time. The spatial reasoning improvements originally seen were done using a Mozart recording, but other studies broadened to include other composers and types of music. The effect on spatial reasoning lasts 10 to 15 minutes after listening to the music. There have been varied results to these studies, and some question whether the Mozart Effect exists at all.(15)

It is well known that music is used to manage organic disorders such as pain, and for rehabilitation after a stroke or a serious accident. It helps improve coordination and alleviates perception of pain by stimulating an increase in endorphins especially in polio patients. The aged and patients with Parkinson's disease, improve coordination and learn to walk with a steadier gait by exercising to music.(20)

The data indicated that sitting quietly and listening to the classical music was more beneficial in reducing blood pressure than only sitting in silence. Music's mechanism of action itself is still very controversial. Music, which can cause slow and regular breathing, is known to affect reflex control of cardiovascular system and modulate blood. Some studies found that music relaxes the body hence improve physiological outcomes such as heart rate & BP reduces anxiety level.(21) but it appears that music has beneficial effects in the reduction of SBP, DBP, in a variety of clinical settings such as the pre-operative setting and the ICU. These physiological changes may be the result of and/or aid in the relief of patient anxiety.(23)

This study concludes that there is decreased in VRT after listening to music due to facilitation of processing of stimuli in somatosensory cortex.

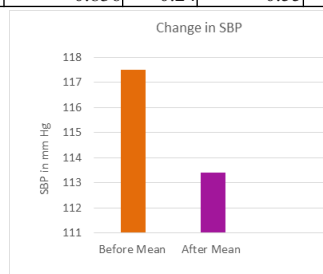
Lacunae and Future Studies: Measuring the cortisol levels and endorphins would help explain the effect of music on neuroendocrine system. It would also play an important role in understanding the underlying physiology of the relaxation music on decreasing reaction times and helping maintain the alert, awake, aroused state. Duration of music and therapy in various diseases needs to also be scientifically studied.

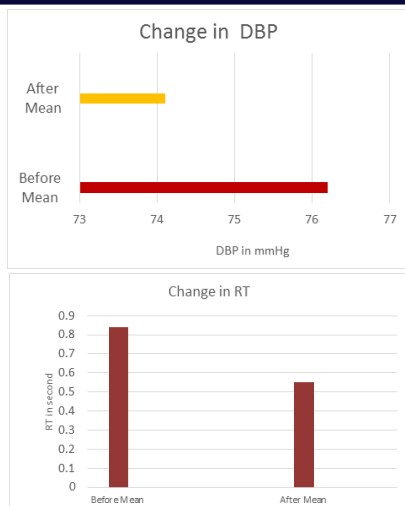
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Table-1

Change In Response After Music As Intervention					
Parameters	Before Mean	SD	After Mean	SD	P value
SBP	117.5	7.04	113.85	5.44	<0.01
DBP	76.25	4.55	74.5	4.95	<0.01
RT	0.836	0.24	0.55	0.14	<0.01





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