

Use of Music Therapy in Cardio Vascular Disorder

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Abstract— The purpose of this study establish the scientific use of Bio-musicology as Complimentary and Alternate Medicine (CAM) in the treatment of Cardio Vascular Disorder (CVD). It explain why we feel cool and calm when we listen specific music. How the music therapies affect us? Is pleasant sound have the power to effect physiology of livings? This study setup a relation between sound and hemato-biochemistry, that can be used to control cardiovascular disorders through neuro-endocrine stimulation up to a limit, but still need more work to be done to say with surety that specific music target specific bio-molecules, which effect the physiology and ultimately behavior of humans. The fast pace of changing our life styles makes adjustment to it difficult. The blood, the blood vessels and the heart together form the cardiovascular system. These blood vessels are of a certain calibre, however they may constrict for a long period of time, thus causing the blood to flow through them under increased tension giving rise to an entity called 'Hypertension' - one of the major manifestations of mental stress and CVD's. Music therapy is based on the associative and cognitive powers of the mind. Sound creates certain vibrations which are picked up and amplified by the human ear. These waves are then picked up by the sensory nerve going into the middle of the brain and redistributed throughout the neuron network to other parts of the brain to distinguish the pitch, tone, and frequency of that sound. During my study I used the sounds of acoustical environment which is the combination of natural sounds (wind, water, wildlife, vegetation) and cultural and historic sounds (battle re-enactments, tribal ceremonies).

In this study conducted over human volunteers, I observed that the music have their impact over the hypertension and CVD's by altering the levels of biochemical and haematological parameters such as significant decrease of serum total cholesterol, non-significant decrease of triglycerides, non-significant decrease of VLDL and LDL, significant increase of HDL in most cases, significant increase of adrenalin by sound A and B in human, significant decrease of cortisol in most cases. The decreases of LDL, VLDL, TG, Cortisol and increase of HDL and adrenalin are indicative of good health and the sounds which are responsible for such changes will be used to cure the patient of CVD, hypertension. On the basis of my finding, I can conclude that music therapy is helpful to control and treatment of hypertension, arteriosclerosis and other CVD's and make us stress free healthy life.

Index Terms— CVD, Music therapy, Alternative Medicine

I. INTRODUCTION

Today we are living in the sea of chemicals. We are using them in most of our activity for making our life easy. They can do this but on the other side they are also responsible for

creating various type of disease or disorder to cure them we are again using chemicals in form of drug. There is no debut that drugs have the ability to cure them, but on the other side it is a well establish fact that each drug have some short of side effects on the body of livings including human body and sometime side effects are converting in to serious problems leading up to death. On the other side today's hectic life style and working stress creating various types of health problems such unusual B.P., Cardiovascular problems, headache, depression, sleeplessness, nervous problems etc. which are sometime converted in to serious problems. Now a days in place to fight these problems most of us and teenagers are starting use of alcohol, smoking and other unhealthy things to overcome the stress, tension, depression but they are helpful for time being and become emerged itself as a new problem after a time period and this will effects the working efficiency of your employee; ultimately the growth of a nation

Music therapy using since time immemorial and it is an established fact that brain is controlling entire metabolism, biochemistry, haematology, physiology etc. of the body, so anything which is capable to influence the brain also influences the entire metabolism and physiology of body. No debut this can be done by sound vibrations in form of music. Music can be used as non-pharmacological aids to the patients of various disorders which are related with the imbalance of various biochemical, studied during the present study. Indian classical 'Ragas' have been acclaimed by Vedic science to have healing effects. Music has frequently been used as a therapeutic agent from the ancient times. Melody is the keynote of Indian Music. There are countless 'Ragas' of course with countless characteristic peculiarities of their own. That is why we cannot establish a particular Raga for a particular disease. Different types of Ragas are applied in each different case. When the term Music Therapy is used, we think world-wide system of therapy. Literature of Vocal part of Indian Classical Music is not sufficient in that case. Classical music with its unique swara/note structure ensures calm and cozy mind by exposure and subdues the emotion provoking situations. Music plays an effective role in subduing the so-called emotional imbalance. Present study is plan to evaluate the effect of different type of sound on hemato-biochemical parameters related with the hypertension and cardiovascular disorders.

Shakespeare once wrote: "If music be the food of love, play on." Profound words, true, but the Bard failed to mention that music is not just nourishment for the heart, but also for the soul.

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Music therapy is the prescribed use of music to effect positive changes in the psychological, physical, cognitive or social functioning of individual with individual. Individuals facing cardiac and hypertensive problems can use music control them up to a limit. As we know our most of the behavioral and functional aspects of body are the result of various types of metabolic reactions which are directly or indirectly controlled by the neuro-endocrine system. So music therapy is an effective tool in case of all type of disorders but it is not effective in case of emergency and where surgery is the only cure. The conclusion is based on our studies over albino rats and human volunteers in which we observed that the specific sounds are helpful to control the hypertension and CVD's by altering the levels of various biochemical and haematological parameters.

Findings of present work are so surprising. The biochemical parameters altered significantly in rats, while in humans most parameters altered none significant to very highly significant. The difference in significance level of humans and rats shows that there is factor which is responsible to effect the result in lab and field condition, but it is clear from the present findings that music has the power to effect the hemato-biochemistry of livings and it should be need more investigation from different aspects

II. MATERIAL AND METHODS

A. Selection of Natural Sound (Test compound)

Music are selected on the basis of their property. Specific Indian ragas are selected for the treatment of Albino rat, where as for human volunteers specific songs and music based on ragas are selected from the list they have been provided in questionnaire. Three sets of pre-recorded sounds are selected on the basis of trial and error methods. They are given to the experimental animals for a period of 90 days. The biochemical analysis of blood samples are carried at 30 days, 60 days and 90 days. The results were analyzed and after that the similar sound treatment are given to volunteers for a period of 90 days. The biochemical analysis of blood samples are carried at 30 days, 60 days and 90 days interval. The blood samples of volunteers are collected by a physician hired for the purpose, where as the blood of albino rats was taken in lab from treated and control groups. Sound of specific Indian ragas at a 60-80 db (controlled by sound meter) are given to albino rat for two hours (9-10 AM and 3-4 PM) daily by speakers attached to the wall of their cage for 30, 60, 90 days, whereas human volunteers are allowed to listen a specific sounds through head phones provided them at home (for the same time period as to rats) after training them in workshops organized in department on Sundays and holidays. Control groups of both rats and humans are also assigned to listen to taped "white noise" ("White noise" or "synthetic silence" is an attempt to block out environmental noise. In this case it was a pre nature sound such as sea sounds, which themselves are rhythmic) through headphones, or to a control group.

B. Maintenance and Feeding of Experimental Albino Rats-

The experimental albino rats (*Rattus norvegicus* [Berkenhout]), procured from inbred colony were acclimated for one month to the laboratory conditions (temperature. 25±0.50C, relative humidity 60±5% and photoperiod 12 hr/day)

before using them for the experiment. Adult male and female rats of almost equal size and weight were kept in the polypropylene cages and cleaned regularly to avoid any infection or undesirable odour in the laboratory. Each cage was equipped with a metallic food plate and water bottle. The albino rats were offered fresh feed daily throughout the experimentation on Gold Mohar rat and mice feed at regular interval and water was provided *ad libitum*.

C. Selection of Individuals-

Albino Rats: For the experimentation individuals selected randomly irrespective of sex. Five healthy adult albino rats (6–8 weeks of age, with average body weight of 150–200 g) were selected randomly for test and control studies their blood was collected after 30, 60 and 90 days for the present investigation. Each rat was assigned a number for convenience prior to experimentation.

Volunteers-The Volunteers were selected through a wide publicity (News paper, SMS, TV Programmes) from Agra, Noida, Delhi, Ghaziabad, Gurgaon region. They are provided to fill a questionnaire. On the basis of a questionnaire they are provide a recorded CD of selected songs and sounds.

D. Collection of Blood Samples

The blood from rats collected in the early morning hours (7-8 AM) in lab on the scheduled date. The blood samples were obtained with the help of 2.0 ml disposable syringe from the tail of albino rats, whereas the blood samples of human were collected by a physician hired for the purpose. The various biochemical parameters of rats were analyzed with the help of a standard kit methods in departmental lab, while human blood tests were conducted in authorized labs of a respective city.

III. RESULTS

TABLE: I

Parameters	Albino Rat (In Lab)		
	Sound A	Sound B	Sound C
Adrenalin	↑NS	↑NS	↑NS
Cholesterol	↓VHS	↓NS	↓VHS
Cortisol	↓S	↓NS	↓S
HDL	↑HS	↑S	↑NS
LDL	↓NS	↓NS	↓S
TG	↓NS	↓NS	↓S
VLDL	↓NS	↓NS	↓S

Parameters	Human Volunteers		
	Sound A	Sound B	Sound C
Adrenalin	↑S	↓S	↑S
Cholesterol	↓HS	↓NS	↓S
Cortisol	↓S	↓NS	↓S
HDL	↑S	↑S	↑NS
LDL	↓NS	↓NS	↓S
TG	↓NS	↓NS	↓S
VLDL	↓NS	↓NS	↓S

Significant Level: P < 0.01 (HS=Highly Significant increase ↑ or decrease ↓), P < 0.05 (↑=Significant increase or decrease ↓), P > 0.05 (↑=Non significant increase or decrease ↓).

IV. DISCUSSION

Lipid bound proteins are called lipoproteins. Lipoproteins are found in plasma and their function is to transport lipids. Lipoprotein includes VLDL, LDL and HDL. In the present study VLDL and LDL are decrease non-significantly except in case of sound "C". The HDL significantly increased in most cases. The decrease of serum LDL and VLDL will lead to the decrease of triglycerides and cholesterol which means favourable lipid concentration in body and a healthy heart. In the present study sound of nature are found to increase the adrenalin level in both humans and albino rats while decreasing the level of cortisol. The decreases of various lipids are indicative of good health and support the view that sound can be used as a drug to control various lipid parameters. The findings can be correlated with the metabolism and used for the treatment of hypertension and CVDs.

Most of the above biochemical findings of present investigation are helpful to establish the doctrine that music can be used cure or control for various cardiovascular disorders an hypertension. The effect of music on the cardiovascular disorders has been initially evident in "Lancet"(medical journal), In which Vincent and Thompson (1929) made an attempt to discover the influence of listening to gramophone, and radio, music on blood pressure and he observed that listening to music was accompanied by a slight rise in blood pressure in the listener. Bason and Celler (1972) observed that the human heart rate could be varied over a certain range by entrainment of the sinus rhythm with external auditory stimulus. Bason's paper is important for supporting the proposition often made by music therapists that meeting the tempo of the patient influences their musical playing and is the initial key to therapeutic change. An extension of this premise, that musical rhythm is a pacemaker, was investigated by Haas *et al.* (1986) in terms of the effects of perceived rhythm on respiratory pattern, a pattern that serves both metabolic and behavioural functions. He hypothesized an external rhythmical musical activity, in this case listening to taped music.

Several authors have investigated this relationship in the setting of hospital care (Bonny1983; Davis *et al.* 1987; Zimmerman *et al.* 1988; Guzzetta 1989; Philip 1989; Elliott 1994) often with the intent of reducing anxiety in chronically ill patients (Gross and Swartz 1982; Standley 1986), for treating anxiety in general (Robb 2000), or specifically in musicians (Brodsky and Sloboda 1997). Bonny (1978,1983) has suggested a series of musical selections for tape recordings which can be chosen for their sedative effects and according to other mood criteria, associative imagery and relaxation potential, none of which have been empirically confirmed. For this Updike (1990) conducted an experiment and confirms Bonny's impression that there is a decreased systolic blood pressure, and a beneficial mood change from anxiety to relaxed calm, when sedative music is played. Rider (1985a,b) explained that disease related stress was caused by the desynchronization of circadian oscillators and that listening to sedative music, with a guided imagery induction, would promote the entrainment of circadian rhythms as expressed in temperature and corticosteroid levels of nursing staff. This study found no conclusive results, mainly because there was no control group. Guzzetta (1989) conducted a study to determine whether relaxation and music therapy were

effective in reducing stress in patients admitted to a coronary care unit with the presumptive diagnosis of acute myocardial infarction. In this experimental study, 80 patients were randomly assigned to a relaxation, music therapy, or control group. Music therapy was comprised of a relaxation induction and listening to a 20 minute musical cassette tape selected from three alternative musical styles; soothing classical music, soothing popular music and non-traditional music. Stress was evaluated by apical heart rates, peripheral temperatures, cardiac complications, and qualitative patient evaluative data. Data analysis revealed that lowering apical heart rates and raising peripheral temperatures were more successful in the relaxation and music therapy groups than in the control group. The incidence of cardiac complications was found to be lower in the intervention groups, and most intervention subjects believed that such therapy was helpful. Both relaxation and music therapy were found to be effective modalities of reducing stress in these patients, and music listening was more effective than relaxation alone. Furthermore, apical heart rates were lowered in response to music over a series of sessions thus supporting the argument that the assessment of music therapy on physiological parameters is dependent upon adaptation over time. Further research strategies may wish to make longitudinal studies of the influence of music on physiological parameters.

Bason's (1972) study could influence heart rate by matching the heart rate of the patient, then we must conclude that studies of the influence of music on heart rate must match the music to the individual patient. This also makes psychological sense as different people have varied reactions to the same music. Furthermore, improvised music playing which takes meeting the tempo of the patient as one of its main principles may have an impact other than the passive listening to music. In addition, the work of Haas (Haas *et al.* 1986) mentioned above showed that listening, coupled with tapping, synchronizes respiration pattern with musical rhythm, further emphasizing that active music playing can be used to influence physiological parameters and that this synchronization can be learned.

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