

CLINICAL EVALUATION OF EFFECT OF MUSIC WITH CREATIVE VISUALIZATION ON FOETAL GROWTH AND MATERNAL PHYSIOLOGY WITH SPECIAL REFERENCE TO E.C.G

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ABSTRACT

Pregnancy is the divine period of the woman's life where she requires intensive physical as well as psychological care. *Nada* in form of music provides a spiritual experience to communicate with the foetus-in-utero and *Drushya* in form of creative visualization is an intellectual exercise adopted by mother to sustain enlightenment, tranquilisation and creativity which potentiate the *Garbhachaitanya* to reform the foetus into the '*ShreyasiPraja*'. **Objectives:** To study the role of *Satwa* and *GarbhiniSadvrutta* on the mother and foetus by the intervention of Music with Creative visualization. **Method:** A clinical study where 30 healthy singleton pregnant women, 20 weeks onwards, were selected and categorized into control group and trial group. Patients of trial group were subjected to music and visualization. Assessment was done on the basis of foetal movement, foetal kick count, ECG, maternal weight gain, sleep, appetite, thoughts, and neonatal reflexes. **Results:** In the trial group, foetal movement and foetal kick observed in half an hour had significant response. ECG and psychological evaluation of mother showed reduction in the heart rate and perceived stress respectively. The neonates of trial group had significantly better neonatal reflexes. **Conclusion:** Music and creative visualization has better effect on maternal psychology, physiology and the cognitive development of the foetus.

Keywords: *Music, Creative Visualization, ShreyasiPraja, ECG, Neonatal reflexes.*

INTRODUCTION

Human body is an epitome of the universe, so also the fetus¹. The universe is perceived by the human body through *Panchendriya*, in which *Shabda* and *Roopa* are most influential

and efficient conveyers from exterior to interior. *Drushya* and *Shravana* have strong impact on *Jeevachaitanya* of the foetus conveyed by maternal auditory and visual perception.

Present day both of these strong perceptions are not scrutinized. When the pregnant woman gets exposed to indecent versions of these sensations, they may affect the foetus psychologically and physically, as these dreadful experiences may cause harsh impact on cardiovascular and central nervous systems of the woman. Acharya Vagbhatta has quoted “*Apriyavlokanashravanadaya*”² in *Garbhopaghatakarabhava* to support same view. During the period of pregnancy the words and sounds heard by mother along with the visual perception have a persuasive effect on the mother as well as the developing foetus in the womb. Acharya Sushruta has propagated the same thought and stated that the pregnant woman should not be exposed to “*Durdarshana*”³.

Pregnancy is the divine period of the woman’s life. This is the period in which she requires extensive care, healthy diet, rest and along with these a stress-free healthy environment. Now-a-days, due to changes in lifestyle, burden of profession, household workload, a human’s cardiovascular and central nervous systems seems to be under pressure which ultimately results into psychosomatic disorders like stress, depression, hypertension etc. The condition becomes worse in Pregnancy as the stress of the mother directly affects the foetus and interferes in development.

Music can be good preventive therapy and remedy for them. Music loaded with positive thoughts (*Brahmaghosha*⁴ etc.) in soothing tunes act as anti-depressant and mood stabilizer. Certain Indian classical ragas has proven potency to reduce stress, calming the mind and create a peaceful environment. If with this music, visual perception is added, it can prove to

be more beneficial. By creative visualization mind can be dragged towards the direction of good thoughts and pleasant atmosphere which can increase power of positivity. All these factors when conjoined with each other can help in reduction of stress and ultimately may play a pivotal role in the development of healthy progeny.

Along with this background, utilizing strong windows like *Drushya* and *Shravana* with positive thoughts were applied on pregnant women so that the effect could be analysed on foetal growth and maternal physiology with special reference to ECG.

AIMS& OBJECTIVES

- 1) Conceptual study of role of *Satwa* and *Garbhini Sadvrutta* on foetal development and personal health of the mother.
- 2) To study the effect of Music with Creative visualization on the growth of foetus and physiology of expectant mother w.s.r. to cardiac activity evaluated by ECG.

MATERIALS AND METHODS

It was an open randomized control clinical study carried out at Prasutitantra & Streeroga Department, S.D.M. Ayurvedic Hospital, Udupi.

Study design:

A group of 30 singleton pregnant women, diagnosed as normal pregnancy of 20 weeks to 32 weeks of gestation were selected and categorized into 2 groups – Group A (Control group) and Group B (Trial Group), Where mothers of group B were subjected to music with creative visualization for half an hour in

evening daily. Mothers randomized to trial group were given a pre-recorded music audio CD and posters for visualization. All mothers received standard antenatal care. Study was carried out until delivery and in post natal period till day 2. Minimum period of study was 2 months. On first sitting Patients of Trial group were exposed to music and visualization for half an hour. ECG was taken just before starting session and after session. Foetal heart sound and foetal movements were checked and recorded during the session.

Interventions

Music: Certain Indian Classical Ragas like Raga *Kalyana*, Raga *Kedara*, and Raga *Bhoopali* with antidepressant property were selected in instrumental form and *Atmashatakam* – a composition consisting of 6 fold Shlokas written by AadiShankaracharya. *Atmashatakam* reminds the soul its true nature i.e. truth (*Sat*), knowledge (*Chit*), internal joy (*Anand*).

Visualization: For selection of creative visualization, pictures with positive thoughts like blossoms, natural sceneries and cute babies were used. Patients were provided guidance to create a visual imagery with the help of the pictures and concentrate upon positive thoughts. Pictures were given with the predominance of colours specifically green and blue which gives joy and relaxing effect to the mind.

Inclusion criteria

- Primi and multigravida who were undergoing simple antenatal care with normal course of pregnancy.

- Age groups between 18-35 years were selected.
- Pregnant women with gestational age of 20 weeks to 32 weeks.

Exclusion criteria

- Previous cesarean section.
- Patients with multiple pregnancy & IUGR.
- Patients with history of ante partum hemorrhage or placenta previa.
- Systemic disorder like hypertension, Diabetes mellitus, tuberculosis etc.
- Grand multigravida.
- Patients with incompetent cervix.
- Patients with previous history of contracted pelvis.
- Severe anemia, eclampsia, pre-eclampsia.

Assessment criteria

The response of the patient was assessed on the basis of antenatal parameters including ECG, foetal kick count, foetal movement, increase in weight, appetite, sleep, mood and thoughts. Post natal assessment was based on foetal birth weight, APGAR Score, and neonatal reflexes.

Investigations

Routine Antenatal investigation like Hb%, Blood grouping with Rh type, BT, CT, RBS, Platelet count, HIV, HBsAG, VDRL, Urine routine and **ECG** was done during antenatal period.

Statistical analysis

The statistical analysis was carried out by using IBM SPSS (version 20). Baseline variables were compared using *t* and χ^2 statistics with 95% confidence intervals

(CI). The study was approved by institutional ethics committee.

RESULT

A total of 30 pregnant woman including *primigravida* and *multigravida* attending antenatal clinic at a gestation of 20 weeks to 32 were the subject of the study. The females of trial group were randomized to receive exposure of music and creative visualization in addition to standard antenatal care (intervention arm, $n = 15$) and female of control group received standard care alone (control arm, $n = 15$). Analysis was done on the basis of Foetal movement, foetal kick count, ECG, Increase in weight, Appetite, Sleep, Mood, thoughts in trial and control group. Changes in ECG were evaluated only in trial group before and after the ½ hour session of music and creative visualization on first visit. The groups were comparable at baseline (Table 1).

Statistical analysis revealed that the maximal beneficial effect was seen in the parameters Foetal movement (95% CI, $t^2 = 26.500$, $P < 0.001$), foetal kick count (95% CI, $t^2 = 26.800$, $P < 0.001$), maternal mood (95% CI, $t^2 = 30.000$, $P < 0.001$) and Thoughts (95% CI, $t^2 = 30.000$, $P < 0.001$) during pregnancy in the trial group. Data of ECG taken before and after the session revealed significant changes on theRate (95% CI, $t = 13.679$, $P < 0.05$). Except from that there were no significant changes found on other parameters of ECG. On maternal weight, appetite and sleep there were no significant difference observed in both groups.

The baseline comparison of neonatal parameters (Table 2) depict that the new-borns of trial group showed a significant response towards better sensory and motor performance including Sucking reflex (95% CI, $t^2 = 13.889$, $P < 0.001$), Moro reflex (95% CI, $t^2 = 5.400$, $P < 0.05$) at the time of birth and visual response (95% CI, $t^2 = 20.769$, $P < 0.001$) and auditory response (95% CI, $t^2 = 26.250$, $P < 0.001$) on the 2nd day. There was no significant difference found on the parameters like Foetal birth weight, APGAR score, Crossed extensor reflex and Response to catheter in nostril.

DISCUSSION

Music is an energy form which leads to spiritual experience and enlightening which affects a person's physical as well as psychological physiology and emotions. Soothing music such as Indian classical music induces pleasure with a surge in intense emotional arousal, including changes in heart rate, pulse, breathing rate and release of a feel good chemical i.e. dopamine.⁵ Dr. Alfred A. Tomatis claimed that listening to Mozart music in D major increases intelligence and reasoning skills in the foetus-in-utero.⁶ After 20 weeks of gestation, the foetus in the womb is able to hear the voice. The auditory information obtained by the foetus is not left unnoticed. Sound acts as a stimulus to the foetus which encourages the foetal movement.⁷ Music given in specific tune, pitch, tempo and rhythm shows increase in foetal movement and foetal count in a rhythmic pattern. This explains that the foetus is able to hear voice as well as respond to the stimuli. Music heard by mother produce theta

wave in the brain,⁸ which provides pacification to the mother. As the sound is an energy form not in matter form, it does not give any impact on the maternal weight gain. Appetite and sleep are physiological process of human body which can be influenced by psychological factors like stress and depression. As in present study stress level of the patients was mild to moderate level, there were no significant effect on these factors found. A study carried out in Institute of Medical Science, Tripura shows that acute mental stress causes ECG changes such as increase in heart rate, decrease in PR interval, decrease in QT interval and prolongation of QTc interval because of increased sympathetic activity.⁹ With this background present study was carried out to evaluate any possible changes in ECG with the anti-depression and stress reducing intervention i.e. music with creative visualization in the pregnant woman as a new experiment. In this study, the pregnant women included, were having healthy heart condition and mild to moderate stress level. Therefore all the ECG parameters may found within normal limits before and after the session.

Creative visualization is the cognitive process of purposefully generating visual mental imagery with intent to experience a subsequent beneficial psychological and physiological effect. The process involves intentional sustaining or maintaining of imagery, participation of direct attention across and around the image and increased degree of mental aptitude and physical ability.¹⁰ When the music is combined with creative visualization, the effect of them on human body can be magnified. These effects may include reduction in stress and

anxiety, enhanced positivity, emotional stability, higher intellectual function such as strengthening of memory and quick learning ability.¹¹

In this study observation of foetal birth weight and APGAR in both groups were found within normal limits, as in this study the patients were healthy, with good dietary supplements and keen observation throughout gestational period. Observation of good neonatal reflexes indicates that the foetus is able to learn and remember familiar auditory stimuli in the womb. Music given in the gestational period plays a crucial role in the maturation of neurological connectivity which further leads to better intellectual capacity and memory. These memories include predetermined experience of sensory factors like sound, test and odour and motor functions i.e. movement of limbs, head, jaw, eyelids etc. in the foetal life which are represented in new born by neonatal reflexes. A good primitive reflex represents a well-developed brain with function individual, which ultimately indicates "*MedhaVruddhi*" in the baby.

Music with creative visualization given in gestational period can provide these beneficial effects to the mother as well as to the foetus. Hence in present study, we have utilised combination of sound with mental imagery along with routine antenatal care to analyse effect on maternal physiology, psychology, foetal growth and neonatal outcome.

CONCLUSION

The study indicates that Music with creative visualization provides beneficial effect on ma-

ternal physiology, psychology and for the cognitive development of the foetus. Music with creative visualization gives pacification & emotional stability, thus an effective intervention for increase positivity and acts as mood stabilizer. Study indicates that on ECG parameters rate reduces. Other than that there are no changes in any parameter of ECG. Good neonatal reflexes indicate towards ability of the foetus to learn and remember auditory stimuli which was given in the foetal life & the baby is habituated to that specific music which his mother was listening during gestational period. This study was carried out with evaluative parameters specifically ECG with routine ANC investigation. For better knowledge of the subject EEG, MRI and Doppler study can be included in the further study.

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Table 1: Baseline comparisons of relevant maternal variables between music and control groups

Variable	Group A Control group (n = 15) Mean	Group B Music group (n = 15) Mean	Test statistic	P value
Foetal movement in ½ hour	2.4667	5.5333	$\chi^2 = 26.500$	0.000
Foetal kick count in ½ hour	0.6667	3.0000	$\chi^2 = 26.800$	0.000
Changes in Rate of ECG (before & after the session) mean ± SD	84.533 ± 6.005, 78.800 ± 6.005	-	t = -3.679	0.002
Increase in weight	2.1333	2.3333	$\chi^2 = 0.561$	0.755
Appetite	2.0000	2.0000	-	-
Sleep	1.0000	1.0000	-	-
Mood	2.0000	1.0000	$\chi^2 = 30.000$	0.000
Thoughts	2.0000	1.0000	$\chi^2 = 30.000$	0.000

Table 2: Baseline comparisons of relevant neonatal variables between music and control groups

Variable	Group A Control group (n = 15) Mean	Group B Music group (n = 15) Mean	Test statistic	P value
Foetal birth weight	3.1333	3.5333	$\chi^2 = 4.000$	0.261
APGAR score	3.0000	3.0000	-	-
Neonatal reflexes at birth				
Sucking reflex	2.2667	2.9333	$\chi^2 = 13.889$	0.000
Moro reflex	2.4667	2.8667	$\chi^2 = 5.400$	0.020
Crossed extensor reflex	3.0000	2.9333	$\chi^2 = 1.034$	0.309
Response to catheter in nostril	2.8667	2.9333	$\chi^2 = 0.370$	0.543
On 2 nd day				
Visual response	1.2000	2.3333	$\chi^2 = 20.769$	0.000
Auditory response	1.889	2.3333	$\chi^2 = 26.250$	0.000

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