Original Research Article

Effect of Music on Short Term Memory in Elderly Female Individuals

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Abstract:

Background: Memory is the ability to recall past experiences or information. Women generally experience better episodic memory, especially verbal memory, throughout their lifespan compared to men. However, women may also have a steeper age-related decline in memory after a certain age, possibly due to factors like brain atrophy or the presence of APOE-ε4 allele. Music plays an important role in the life of people, regardless of their age. It is used for recreation. Listening to music is associated with strong emotional feelings. It activates the limbic system, which is involved in the processing of emotions and in controlling memory. Music has high impact on our mental health. It improves the mood, mental alertness and memory. Music reduces depression, anxiety and stress levels. **Aim:** The aim of this study is to determine the effect of music on short term memory in elderly female individuals. **Methodology:** It is a quasi-experimental study conducted at Poonimaangadu village, near Tirutani. 30 elderly female individuals in the age group of 60 -70 years were recruited for the study. Then textual memory task was conducted for the participants before and after listening to music. Final scores were calculated. Twenty-four hours later, visual memory task was conducted before and after listening to music. Final scores were calculated. The statistical analysis of the collected data was done. **Results:** There is a significant increase in textual memory task score (7.2 ± 1.01) and visual memory task score (12.3 ± 1.3) after listening to music in elderly female individuals compared to scores before listening to music (textual memory score: 5.2 ± 1.08 & visual memory score: 7.1 ± 1.7). **Conclusion:** Our study concludes that, there is a significant beneficial effect of music on memory which may be utilized as a simple, non-invasive, cost effective, preventive and therapeutic tool in age related decline in memory and other disorders leading to dementia.

Key words: dementia, music, textual memory, visual memory

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Introduction :

Music plays a prominent role in the life of many people, as it has positive effect on the mental health.[1] A lot of people listen to music, regardless of their age. Music relieves us from stress, develops the mind and improves our self - confidence.[2] We human beings experience joy, sadness, anger and other feelings. We have lot of emotions that control our actions.

Music has the ability to influence our mood. It has the potential to change the emotional and physical status of an individual. Music is so widespread and incredible that it can strongly connect memories to the emotions.

Women generally experience better episodic memory, especially verbal memory, throughout their lifespan compared to men. However, women may also have a steeper age-related decline in memory after a certain age, possibly due to factors like brain atrophy or the presence of APOE-ε4 allele. Studies indicate that women have a higher prevalence of dementia and a higher lifetime risk of developing Alzheimer's disease compared to men.[3]

Many research works have been conducted on music and memory in elderly people, as a mission to create and validate therapy for people with dementia.

Aim:

To determine the effect of music on short term memory in elderly female individuals.

Objectives:

1. To assess short term memory by textual memory and visual memory tasks in elderly female individuals.
2. To compare the textual and visual memory task scores before and after listening to music in elderly female individuals.

Materials & Methods:

- Study design : Quasi-experimental study
- Study place : Poonimaangadu village, near Tirutani
- Study sample : 30 elderly female individuals
- Inclusion criteria : Elderly females in the age group of 60- 70 years
- Exclusion criteria : Individuals with hearing problem, visual defect, Alzheimer's disease, head injury, any recent surgery, on psychiatric medications or beta blockers, trained musicians
- Method of selection : Simple random sampling.

Methodology:

Study was conducted after obtaining Institutional ethical committee clearance. Informed written consent was obtained from each subject. Purpose of the study, procedure, benefits and their queries were clarified to the subjects. Proper history was taken and general examination done for all the subjects included in the study.

Textual memory task:

The subjects were given 1 minute to memorize a list of fifteen words, followed by rest for 1 minute. Then the subjects should write down as many words they could remember within 2 minutes. The words were randomly chosen and do not have any interconnection with one another. +1 point was awarded for each correct word, they have written. Then all the points were added to get a final score. Now, previously selected three joyful songs of their own choice were played for each of the subjects for 15 minutes through headphones. The above textual memory task was immediately conducted with another set of fifteen words and final scores were calculated.

Visual memory task:

24 hours later, the subjects were instructed to sit comfortably in front of the lap-top. Randomly 15 faces appear on the screen for 1 minute, followed by rest for 1 minute. Then the subjects were shown 5 new faces along with 15 old faces randomly for 1 minute. They should raise their hand whenever old faces appear on the screen. +1 point was awarded for each correct face recognition. By adding all the points, final score was calculated. Now, previously selected three joyful songs of their own choice were played for each of the subjects for 15 minutes through headphones. The above visual memory task was conducted immediately with another set of faces and final scores were calculated.

Statistical analysis was done using SPSS software 23. The continuous variables were presented as

Mean ± SD. Pre and post memory tasks data were compared using paired Student's t-test. Value of $p < 0.05$ was considered as statistically significant.

Results:

Main aim of this study is to study the effect of music on short term memory in elderly female subjects. The mean of the participants was 62.4 years (Table 1).We observed statistically significant difference in textual and visual memory task scores before and after listening to music in elderly female individuals with increase in scores of both tasks after listening to music (Table 2 & Chart 1).

Table 1 : Age parameter of the elderly female participants

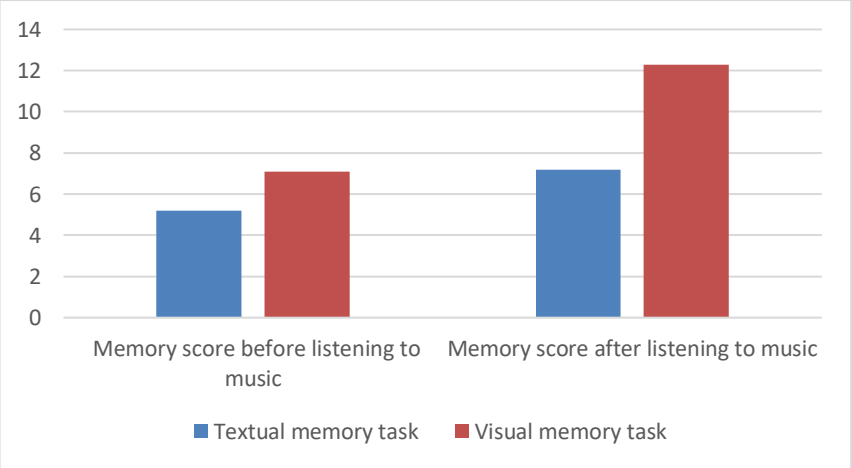
Parameter	N =30 Mean ± SD
Age (years)	62.4± 1.5

Table 2 : Comparison of textual and visual memory task scores before and after listening to music in elderly female individuals

Parameter	**Memory score before listening to music (N=30) Mean ± SD**	**Memory score after listening to music (N=30) Mean± SD**	**p value**
Textual memory task score	5.2 ± 1.08	7.2 ± 1.01	0.001*
Visual memory task score	7.1 ± 1.7	12.3 ± 1.3	0.0001*

*p value < 0.05 is significant.

Chart 1 : Comparison of visual and textual memory task scores before & after listening to music in elderly female individuals



Discussion:

Music plays an important role in everyday life. It is a tool that can influence our emotions. Since the invention of radio and recordings, many people listen to music, regardless of their age. The lyrics and melodies from various songs, are rooted in the soundtrack of a person's life. It helps to relax the mind, can bring back many vivid memories. Music can evoke intense emotional response. It improves memory, mood, mental alertness etc. It reduces depression and anxiety.

The present study on short term memory responses in elderly female individuals, in the age group of 60-70 years, shows statistically significant increase in both textual memory score and visual memory task scores after listening to music.

Proverbio and his colleagues in their study on the effect of background music on memory and autonomic responses found that, listening to emotionally touching music enhances the capacity of the facial memory.[4]

Also Slumming et al., (2007), found that in musicians compared with non-musicians, there is more gray matter in the frontal cortex that accommodates many neural networks involved in the process of working memory.[5]

Neurological research shows that, the brain simultaneously processes the words and visual images, when auditory areas are stimulated, which helps the brain to carry out cognitive memory functions.[6]

The memories are encoded through neural network in the brain, which integrate the surrounding context and resulting emotional feelings that are associated with music.

Hence, music is widespread and can be used in therapeutic applications, to enhance and improve memory. This can be applied in areas of challenging memory impairments and inability in individuals suffering from Alzheimer's disease and brain injury.

Conclusion:

The short-term memory responses such as textual memory and visual memory task scores before and after listening to music shows significant increase in both the scores after listening to music.

Thus, the intricate connections between music and memory reveal that music has the capacity to change human emotions, experiences and memories.

Moreover many research studies have shown that, by activating neural pathways associated with cognition and emotion, music acts as a unique tool enhancing memory, giving hope to elderly individuals suffering from dementia.

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Conflict of interest: Nil

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