International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
Online ISSN: 2349-4182, Print ISSN: 2349-5979
Received: 20-04-2021, Accepted: 06-05-2021, Published: 25-05-2021
Volume 8, Issue 5, 2021, Page No. 31-34

Music therapy: An effective intervention in conjunction with routine rehabilitation programme in stroke patients. Comprehensive Review

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Abstract
Background: Stroke is the main reason of disability in adults which lasts for a prolonged period. Long-term weakness of motor activity, synergetic movements, and spasticity adds to the limitation in Activities of Daily Living, diminished cardiac functions, distorted way of walking, and imbalance during walk etc. Improving functional outcome after brain attack has become a challenge for the physiotherapist. Since ancient period nurses are using music as an auditory stimulation in clinical area to unconscious patients, stroke patients, brain injury patients. It is scientifically proven that using music as stimulation helps in improving emotional, physical, cognitive, and social integrational recovery.
Method: A systematic review was done by the researcher to support the study. A steady flow for the study was established based on the previous studies and review studies with Music Therapy. About 13 studies of last 20 years were included in reviews. For this review search PubMed, AMED, Cinhal, CCRCT, Medline databases were used.
Results: 13 studies were included in the systemic review. Music treatment to stroke patients improves control of the limb muscles. Music Listening enhance cognitive functions, attention span, memory power, organization of thoughts, and problem solving ability. It also prevents depression and anxiety in stroke patients. Recovery of speech and interaction can be speed up by encouraging patients to act in response to the music by singing, associated with dancing.
Conclusion: Almost 80% of review studies had shown the positive result, i.e. proving music therapy helps the patients to improve and maintain their physical and mental health status. Music therapy also helps to improve emotional wellbeing, social status, aesthetic sense, and spiritual aspects. It improve patient's functioning capacity and QOL in special aspects like improved motor activity, cognitive capacity, social skills, behavior skills, etc. So Music Therapy found to be effective in stroke rehabilitation.

Keywords: music therapy, stroke rehabilitation, anxiety and depression

Introduction
Since ancient period nurses are using music as an auditory stimulation in clinical area to unconscious patients, stroke patients, brain injury patients. It is scientifically proven that using music as stimulation helps in improving emotional, physical, cognitive, and social integrational recovery. There is a rising interest in musical stimulation approaches as an addition to standard care in clinical practice and in the field of medical science. Nurses very commonly use music as stimulation to their patients admitted with CNS related problems and for patients suffering from sleeplessness to improve sleep and to alleviate apprehension, sadness and depression.
It was already proven since long time that music has got healing effect. (2011) many were using music as therapeutic agent for many diseases. Music is considered as a type of yoga study by Indians. We think that ragas help to awaken human sense organs and helps for their normal functioning. Indian music's are melodious and Raga is considered as origin of this melody. Diseases related to CNS are greatly affected by ragas and were used often as complementary treatment in clinical areas [19].
Since historical time Music is used by all the civilization to celebrate, grieve, communicate and to reply human feelings. During first and second world wars first time the volunteers played instruments to provide music therapy to patients injured in battle field. When medical professionals observed that there was a considerable improvement in patients physical and mental conditions they started using music therapy with some definite intentions. Thus started the professional music therapy in mid 1900 [18].

Description of the disease condition
Stroke or brain attack is the effect of lack of blood circulation to brain. Deficient blood delivery to brain results in lack of oxygen and nutrients. Brain cells are very sensitive to hypoxia. They stop working within 3-5 minutes if they are not getting oxygen and nutrients. This cell death results in stroke. Stroke is a medical emergency. Immediate treatment can reduce injury to brain and possible complications. There may be stroke due to lack of blood supply from blockage of cerebral arteries or may be due to cerebral hemorrhage [1].
Brain has great capacity to process and integrate multiple sensory information concurrently. So one can learn better in multisensory environment. Combining stimulations from diverse sensory equipment and modalities improve one's skill to sense, differentiate, and identify sensory stimuli. Stimulation of brain has shown hopeful results in aphasia and neglect. As human beings exists in a multisensory surroundings, the communication between genes and atmosphere forms human brains [2].
Impairment in upright posture and gait is a common effect of stroke. Good postural control is necessary for stabilizing

the body in different positions during voluntary movements and for activities of daily living (ADL). Sensory stimulation may improve functional outcome after stroke. Stroke patients received sensory stimulation improved faster and to a better degree than control group clients. (2013) [3].

First three months after stroke is very important for recovery. Many research studies have proven that providing music therapy after stroke have significant positive role in neurological improvement of stroke patients. It also helps to reduce the stroke effects and to enhance the QOL of the patients. But Music therapy needs to be given with the routine medical treatment but not alone. Flowing music can help to improve movement and muscular control of the patients. For eg, playing a drum may improve ROM of the arm, or/and walking can be improved by musical beats. Music treatment to stroke patients can also improve control of the limb muscles. Music Listening enhance cognitive functions, attention span, memory power, organization of thoughts, and problem solving ability. Recovery of speech and interaction can be speed up by encouraging patients to act in response to the music by singing, associated with dancing. (2018) [4].

Description of the intervention

The concept of Music Therapy is dependent on correct intonation and right use of the basic elements of music such as rhythm, volume, beats and piece of melody. There are countless 'Ragas' with countless characteristic peculiarities of their own. No particular Raga for a particular disease is established till now. Different types of Ragas and music 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. In many studies music therapy was given with drums and dancing steps [5].

Aim of the systemic literature review

The aim of the author to conduct this review was

- To explore the literature that high light the effectiveness of music therapy on cognitive improvement, and in prevention of anxiety and depression of stroke patients
- To identify the studies proving the effect of music therapy on cognitive improvement, and in prevention of anxiety and depression of stroke patients.
- To high light the use of music therapy as stroke rehabilitation.

Methodology

A systemic review of the literature was chosen to be done by the author as it is one of the best methods available to effectively analyze the available research studies and bring out definitive answers to the questions than one single study. The literature search was performed during January 2019 to December 2019. The electronic databases using which the search done were Cumulative index to nursing, and Allied Health Literature (CINHAL), Medical Literature Online (Medline), Pubmed, CCRCT, AMED.

The search terms include Music Therapy, stroke rehabilitation, anxiety and depression. Though evidences were effectively searched using the key words the authors also used the bibliographic searching method from the obtainable literatures to spot out similar studies meeting the objectives. The investigator focused on identifying studies on effectiveness of Music Therapy. Total number of searches using the search terms were about 200. Out of which 120 studies were eliminated due to irrelevance. 60 titles and abstracts were screened and out of which 13 studies were included.

The studies selected were categorized in to following headings:

1. Effect of Music Therapy in improving depressive mood, anxiety, social skill, cognitive improvement, decision making skill and confidence in post stroke clients [6, 7, 8, 9, 11, 12].
2. Effect of music therapy in enhancing apraxia, dysarthria, spontaneous movements gait and balance in limb movements [13-17].
3. Music therapy is effective in sensory processing, attention, and memory, and can stimulate complex cognition and multisensory integration [10].

Type of outcome measures

- The main outcomes assessed in the studies were motor and sensory functions of upper limb. Some studies assessed balance, Activities of Daily Living, strength upper limb muscles.
- Tools used to measure outcome: Fugl Mayer assessment scale, Sensory Modality Assessment Scale, Modified Ashworth scale, Nottingham Sensory Assessment, BAI (Beck Anxiety Inventory) and BDI (Beck Depression Inventory), Functional Independent Measure, Barthel Index Scale, Montreal Battery of Evaluation of Amusia (MBEA) Rivermead Behavioural Memory Test (RBMT), Wechsler Memory Scale.
- Duration of interventions: in maximum studies the interventional period was 4 to six weeks with a follow-up of up to 6 months.

Search results

Studies were identified after a vigorous search through Cumulative index to nursing, and Allied Health Literature (CINHAL), Medical Literature Online (Medline), Pubmed, CCRCT, AMED. After screening of duplicate references 200 studies are selected as possible eligible trials. Out of 200, 180 studies are excluded as were not meeting eligibility criteria. 13 studies were selected for review study.

List of studies included in the review

13 trials found to be fitting in the criteria of selection.

All 13 studies were meeting inclusion criteria (Aguilar M 2011, Kim DS. 2011, Urbenjaphol P 2009, Sarkamo T2008, Nayak S 2000, Strzemecka J 2013, Suh J 2014, Rebacca H 2009, Kim M-K 2015, Watson C 2017, Thaut MH 2010, Salehi N 2008, Geeta S 2018).

Study Design

Pretest – post test control group design [7, 8, 9, 11, 12, 13, 19] single blinded, randomnized controlled trial [6, 7, 14]. One descriptive study is also included [10]. Selection of the samples was done randomly in maximum studies [3, 5, 7, 8, 9, 11] Maximum studies in the review had used SPSSS software

for statistical analysis.

Discussion

The main purpose of this review was to evaluate the effect of music therapy for improving depressive mood, anxiety, social skill, cognitive improvement, decision making skill, confidence, gait, limb movements, apraxia, dysarthria, attention and memory in post stroke clients. 13 studies were included in this review study, with more than 300 participants that compared music therapy with either routine treatment or with other conventional therapies. It is found from all the reviews that music therapy was more effective when it is given with routine treatment to improve ADL, depressive mood, anxiety, social skill, cognitive improvement, decision making skill, confidence, gait, limb movements, apraxia, dysarthria, attention and memory in post stroke clients compared with routine treatment and other interventions. Seven studies reviews evaluated depressive mood, anxiety, social skill, cognitive improvement, decision making skill and confidence, five for spontaneous movements, apraxia, dysarthria, gait and balance in limb movements and one for sensory processing, attention, and memory. Music therapy was considered to be effective in all the above situations. The results of the review indicate that Music Therapy can be included in daily nursing care protocol of stroke patients as many studies have already proven the positive effect of this. Music therapy can be used as an additional intervention for stroke patients in rehabilitation centers. It is also proven by the study that music therapy helps to improve Activities of Daily Living in stroke patients. Still there is a need for well designed RCT studies with large sample sizes to generalize the study findings more effectively. New researches can be conducted comparing music therapy with other alternative therapies to see the outcome.

Conclusion

Almost 90% of review studies had shown the positive result that, proving music therapy was effective in improving depressive mood, anxiety, social skill, cognitive improvement, decision making skill and confidence in post stroke clients. So Music Therapy found to be effective in stroke rehabilitation.

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