A Review On: Healing Power of Sound Assesing Beats, Audio in Music Therapy

[1]Vinay.P.Mule, [2]Apurva. U. Deshmukh, [3]Kartik.D.Pawar, [4]Sachin.J. Dighade
Bachelor of Pharmacy Institute of Pharmacy and Research, Badnera, Amravati Maharashtra, India

Abstract: Neurological disorders affect the nervous system, including the brain, spinal cord, and peripheral nerves. These disorders pose a significant burden on global health. The Global Burden of Disease Study estimates that neurological disorders account for 3% of the worldwide burden of disease. Various treatments are being explored, including sound-based therapies. Binaural beats, isochronic tones, and Tibetan music therapy are being used to promote relaxation and reduce stress. Nada yoga, or the yoga of sound, is an ancient Indian practice that involves listening to and generating healing sounds. Beej mantras, or seed mantras, are sacred sounds in Hinduism and Buddhism that represent the essence of the universe. These mantras are believed to hold potent spiritual energy and are used in meditation and sound healing practices. Research has shown that these sound-based therapies can have a positive impact on mental and emotional well-being.

They can help reduce stress, anxiety, and depression, and improve mood and cognitive function. These therapies are non-invasive and can be used in conjunction with other treatments. Further research is needed to fully understand the effects of these therapies. However, the existing evidence suggests that they can be a valuable tool in promoting relaxation and reducing stress. These sound-based therapies offer a promising approach to managing neurological disorders.

Keywords: Neurological disorders, Binaural beats, Sound healing, Relaxation, Mental health

1.INTRODUCTION

According to the World Health Organization, neurological disorders are any diseases affecting the entirety of the nervous system. These are conditions affecting the Central nervous System's neurons or tracts in the Spinal Cord or in the whole brain or one of its constituents e.g. Cerebrum , Basal Ganglia, Diencephalon, Brain stem ,Midbrain, Pons and Medulla Oblongata, Cerebellum. In addition to conditions affecting the Peripheral Nervous System involving Cranial nerves or their nuclei, Spinal plexuses, Peripheral nerves, nerve roots, autonomic nervous system, neuromuscular junction and Muscles. Neurological disorders pose a large burden on worldwide health. The most Recent estimates show that the neurological disorders included in the Global Burden of Disease Study–Alzheimer's and other dementias, Parkinson's disease, multiple Sclerosis, epilepsy, and headache disorders like migraine, tension-type headache and Medication-overuse headache represent 3 percent of the worldwide burden of disease.[1]

Neurological disorders are Medically defined as disorders that affect the brain as well as the nerves found Throughout the human body and the spinal cord. Structural, biochemical or electrical Abnormalities in the brain, spinal cord or other nerves can result in a range of symptoms.

Examples of symptoms include paralysis, muscle weakness, poor coordination, loss of Sensation, seizures, confusion, pain and altered levels of consciousness World Health Organization data suggest that neurological and psychiatric disorders are important and growing cause of morbidity. The magnitude and burden of mental, Neurological, and behavioral disorders is huge, affecting more than 450-million people Globally. According to the Global Burden of-Disease Report, 33 percent of years lived With disability and 13 percent of disability-adjusted life years are due to neurological And psychiatric disorders.[2]

Type of Neurological disorders

1.Neurodegenerative Disorders:-
Conditions like Alzheimer's disease, Parkinson's disease, and Huntington's disease that involve the progressive degeneration of nerve cells.

2.Cerebrovascular Disorders:-
Conditions such as stroke and transient ischemic attacks that affect blood flow to the brain, leading to brain damage.

3.Epilepsy:-

A group of disorders characterized by recurrent seizures due to abnormal electrical activity in the brain.

4.Multiple Sclerosis :-
An autoimmune disease where the immune system attacks the protective covering of nerve fibers, leading to communication problems between the brain and the body.

5.Peripheral Nerve Disorders:-
Conditions like neuropathy that affect the peripheral nerves, often leading to pain, weakness, and numbness.

6.Brain Injuries:-
Traumatic brain injuries resulting from impacts or accidents can lead to various cognitive and physical impairments.

7.Infectious Diseases:-
Conditions like meningitis or encephalitis, which are caused by infections that affect the brain and spinal cord.

Treatment options:

1. Medications
2. Surgery
3. Rehabilitation therapies
4. Lifestyle modifications
5. Alternative therapies

2 .VERIOUS BEATS USE IN TREATMENT

2.1 Binaural beat : This are illusion created by the brain when you listen to two tones with slightly different frequencies at the same time. When you listen to binaural beats, your brain activity matches the frequency set by the frequency of the beat. This is called frequency following effect . This means you can use binaural beats to entrain your mind to reach a certain mental state.[3]

2.2 Isochronic beat : Isochronic Tones are type of brainwaves entertainment that involves single tone that is turn off and on at regular intervals . Creating a rhythmic pulse. They can be distinguished by their frequency or pitch and the interval or frequency at which they repeat. Isochronic tones are often used inmusic or nature sounds. They are considered to be one of the most effective and pleasant forms of brainwave entrainment.[4]

2.3 Monaural beat : This are a type of auditory beat stimulation (ABS) that involves coperceives the difference between the two frequencies as a beat. For example, if two tones of 330 Hz and 300 Hz are combined, the listener will perceive a beat of 30 Hz .

Figure 1: Music therapy use

3.MUSIC THERAPY USE IN TREATMENT OF DISEASE

3.1 Vibroacoustic therapy:
It is a form of treatment that uses patented equipment and music Software devised by Olay Skille in 1968. VAT can help with pain management, muscle tension, breathing difficulties, blood Pressure, menopausal symptoms, Alzheimer's disease, fatigue, Vibroacoustic therapy Is a holistic, non-invasive techniques .[6]

3.2 Sound baths:
Sound bath is a meditative experience where those in attendance are "bathed" in sound Waves. These waves are produced by various sources, including healing instruments Such as gongs, singing bowls, percussion, chimes, rattles, tuning forks, and even the Human voice itself.[7]

3.3 Tibetan Music Therapy:
It is an ancient practice that Utilizes sound vibrations to promote physical, emotional, and spiritual well-being. This Holistic approach originated in Tibet over 2,000 years ago .[8]

3.4 Nada yoga :
It is an ancient Indian practice that involves listening to And generating healing sounds to promote physical, mental, and emotional well-being.
It's based on the idea that everything in the universe, including humans, is made up of Vibrations, or nada.[9]

3.5 Beej mantras and vedic chanting :
This are monosyllabic sounds, typically vowels or consonant-vowel Combinations, believed to hold potent spiritual energy.

Example :- The study was conducted on 30 healthy volunteers . There Were statistically significant increase in Green Pixel Parameter which is the colour Energy of Heart Chakra. As far as the cardiac parameters, the study revealed that .Chanting helped in improving the pumping action of the heart as suggestive of Ejection Fraction as well as regulating the Blood Pressure, Pulse, Heart rate and Pulse Pressure Product. It can be concluded ,that chanting "Vitthal" has beneficial action On Physiologic activity and energy of Heart and Heart Chakra.[10]

4. SOUND WAVES USE IN TREATMENT OF DISEASE

4.1 Alpha waves : Alpha waves (8-12 Hz) play a crucial role in brain function and have been explored for their therapeutic potential in various diseases.

Alpha Wave Frequency Ranges:-

1. Low Alpha (8-10 Hz): Relaxation, closed eyes
2. Mid Alpha (10-12 Hz): Focus, concentration
3. High Alpha (12-15 Hz): Enhanced creativity

4.2 Beta waves : Beta waves (13-30 Hz) are a range of frequencies associated with active thinking, problem-solving, and motor activity.

Beta Wave Frequency Ranges:

1. Beta1 (13-16 Hz): Sensory processing, attention
2. Beta2 (16-20 Hz): Thinking, problem-solving
3. Beta3 (20-30 Hz): High-level thinking

4.3 Gamma waves : Gamma waves (30-100 Hz) are high-frequency brainwaves associated with advanced cognitive processing, insight, and spiritual experiences. Gamma Waves refer to neural oscillations in the frequency range of approximately 30–100 Hz. These waves indicate. the synchronization of different nerve cells working together in a network to carry out specific cognitive or motor functions.

Gamma Wave Frequency Ranges:

1. Low Gamma (30-40 Hz): Sensory processing, attention
2. Mid Gamma (40-60 Hz): Working memory, problem-solving
3. High Gamma (60-100 Hz): Insight, intuition, spiritual experiences

5. DISEASES IN WHICH BEATS ARE BENEFICIAL

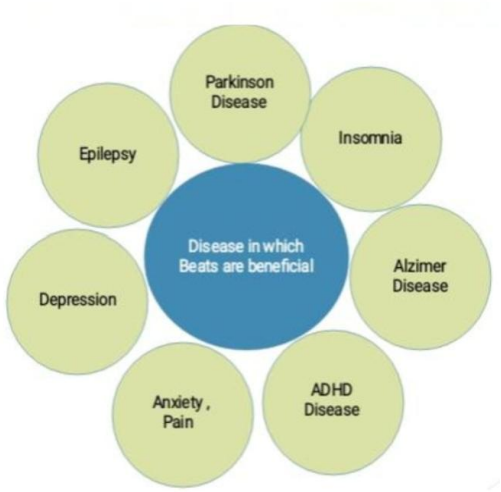

Figure 2: Disease in which beats are beneficial

6. RESEARCH CARRIED OUT IN BINAURAL BEATS

6.1:Ah-Ni Lee et.al.(2024) Effect of dynamic binaural beats on sleep quality:

This study investigates dynamic binaural beats (DBB) as a potential modality to enhance sleep quality. DBB incorporates dynamically changing carrier frequency differences between the left and right ears.The carrier frequency of the right ear varied between 100-103 Hz, while the left ear remained fixed at 100 Hz.The frequency difference range was 0-3 Hz. The study examined the effect of DBB on sleep quality in 10 healthy participants. A cross-over design was used, with participants experiencing DBB and a SHAM condition. Polysomnography evaluation was conducted across two consecutive nights. DBB was administered during pre-sleep initiation, sleep onset, and REM to non-REM transition. Results showed DBB significantly reduced sleep latency. Electrocardiogram analysis revealed diminished heart rate variability. DBB decreased low-frequency power of heart rate during sleep onset. DBB may be effective in improving sleep quality. This suggests potential application in insomnia treatments. Further research is needed to confirm these findings. DBB's effects on sleep

quality are promising. The study's results have implications for insomnia treatment. DBB could be a useful tool for improving sleep quality. The study contributes to the growing body of research on DBB and sleep.[11]

6.2:Ruth-Maria-Ingendoh et.al(2023)Binaural beats to entrain the brain :

Binaural beats are an auditory phenomenon where two tones create a third tone. This sensation occurs in the 1-30 Hz frequency range, coinciding with human EEG bands. The brainwave entrainment hypothesis suggests external stimulation affects brain activity. Research on binaural beats' effects on cognitive and affective states is based on this hypothesis. However, existing literature on the topic appears inconclusive. A systematic review of 14 studies found inconsistent results. Five studies supported the brainwave entrainment hypothesis, while eight found contradictory results. Methodological heterogeneity limited the comparability of research outcomes. Standardization in study approaches is necessary for reliable insights. Future research should aim to standardize methods to fully understand binaural beats' effects.[12]

6.3:Susan A Reedijk et.al (2013)The impact of binaural beats on creativity:

Researchers investigated the impact of binaural beats on creativity, focusing on divergent and convergent thinking. The study found that binaural beats affected divergent thinking, which involves generating new ideas, but had no impact on convergent thinking, which involves narrowing down options. Interestingly, the results showed that individuals with low dopamine levels benefited from alpha binaural beats, while those with high dopamine levels were unaffected or even impaired by both alpha and gamma binaural beats. This suggests that binaural beats can influence creativity, but their impact varies depending on individual differences in dopamine levels and cognitive-control systems.[13]

7.CONCLUSION

The review on the healing power of sound emphasizes the significant role of binaural beats and Isochronic beats in therapeutic settings. These sound therapies have been shown to effectively reduce anxiety and depression while enhancing cognitive functions. The ability of sound to influence brainwave patterns suggests potential benefits for individuals with neurological disorders, such as Alzheimer's and Parkinson's disease. Furthermore, the findings indicate that personalized sound therapy can lead to improved emotional well-being and stress management. Continued research is essential to explore the full range of applications and mechanisms behind sound therapy. The integration of these techniques into conventional treatment plans could enhance patient outcomes.

8.REFERENCES

[1] Thakur, K.T., Albanese, E., Giannakopoulos, P., Jette, N., Linde, M., Prince, M.J., fSteiner, T.J. and Dua, T., 2016. Neurological disorders.

[2] Chandra, V., Pandav, R., Laxminarayan, R., Tanner, C., Manyam, B., Rajkumar, S., Silberberg, D., Brayne, C., Chow, J., Herman, S. and Hourihan, F., 2006. Neurological Disorders. Disease control priorities, p.21.

[3] Reedijk, S.A., Bolders, A. and Hommel, B., 2013. The impact of binaural beats on Creativity. Frontiers in human neuroscience, 7, p.786.

[4] Aparecido-Kanzler, S., Cidral-Filho, F.J. and Prediger, R.D., 2021. Effects of binaural Beats and isochronic tones on brain wave modulation: Literature review. Revista Mexicana de neurociencia, 22(6), pp.238-247.

[5] Heidi Moawad, M.D. — Written by Jill Seladi-Schulman, Ph.D. on February 28, 2020

[6] Chaieb, L., Wilpert, E.C., Hoppe, C., Axmacher, N. and Fell, J., 2017. The impact of Monaural beat stimulation on anxiety and cognition. Frontiers in human neuroscience, 11, p.251.

[7] Skille, O., 1989. VibroAcoustic therapy. Music therapy, 8(1), pp.61-77.

[8] Auster, S., 2019. Sound Bath: Meditate, Heal and Connect Through Listening. Tiller Press.

[9] Hersey, B., 2013. The practice of nada yoga: Meditation on the inner sacred sound. Simon and Schuster.

[10] Caraka. Caraka Samhita, Part-1. Carakacandrika Hindi commentary. Brahmananda Tripathi, Ganga sahay Pandey, editors. 1st ed. Varanasi: Chaukhambha Surbharati Prakashana; 2009. Nidanasthana.

[11] Lee, H.A.N., Lee, W.J., Kim, S.U., Kim, H.,

Ahn, M., Kim, J., Kim, D.W., Yun, C.H. and Hwang, H.J., 2024. Effect of dynamic binaural beats on sleep quality: a proof-of-concept study with questionnaire and biosignals. Sleep, p.zsae097.

[12] Ingendoh, R.M., Posny, E.S. and Heine, A., 2023. Binaural beats to entrain the brain? A systematic review of the effects of binaural beat stimulation on brain oscillatory activity, and the implications for psychological research and intervention. Plos one, 18(5), p.e0286023.

[13] Reedijk, S.A., Bolders, A. and Hommel, B., 2013. The impact of binaural beats on creativity. Frontiers in human neuroscience, 7, p.786.