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Revisiting the Role of Music in Medical Recovery: A Library Research Perspective

Laura Pranti Tutom^{1*}, Alexander Chelum², Asrul Asshadi Mohamad Morni³
**Corresponding Author*

¹ Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak

² Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak

³ Faculty of Applied and Creative Arts, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak

Email of All Authors: tlprati@unimas.my, calexander@unimas.my, masrul@unimas.my
Tel: 013-8182616

Abstract

Across contemporary medicine, music emerges as a powerful therapeutic tool, offering measurable benefits in neurological and physical rehabilitation. Utilizing a comprehensive library research methodology, this study systematically examines scholarly articles, academic books, and scientific theses to synthesize both conceptual perspectives and empirical findings. Evidence reveals that music actively stimulates cognitive, emotional, and motor functions, particularly supporting recovery in stroke patients. The research underscores music therapy's capacity to foster neuroplasticity and emotional resilience, making it a viable complementary intervention in rehabilitative and clinical care. By bridging scientific rigor and artistic expression, music therapy is affirmed as integral to holistic patient recovery and health.

Keywords: music therapy, medical recovery, neurological rehabilitation, conceptual analysis

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1.0 Introduction

Music has historically been recognized as a profound form of human expression, serving artistic, social, and therapeutic functions. Across diverse civilizations, music was believed to restore harmony among body, mind, and spirit, a concept central to ancient healing traditions. Early evidence of music's medical role appears in ancient Egypt, Greece, China, and India, where sound and rhythm were integral to rituals intended to ward off illness and restore emotional balance (Merriam, 1964; Feder, 1981). In Greek medicine, philosophers such as Pythagoras and Aristotle examined the moral and physiological effects of musical scales on human temperament. Chinese medical philosophy regarded music as a force harmonizing the flow of qi, while in medieval Europe, music was employed in monasteries for spiritual healing and mental purification (Sigerist, 1941; Gaston, 1968). These traditions established a philosophical foundation for understanding music as a curative force that aligns physiological and psychological states.

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1.1 Emergence of Music Therapy as a Scientific Discipline

In the twentieth century, the medical field began systematically exploring music's therapeutic potential. Physicians and psychologists observed measurable physiological responses to musical stimuli. Early studies found changes in heart rate, blood pressure, respiration, and galvanic skin response while people listened to or performed music (Feder, 1981; Gaston, 1968). These findings led to the formal establishment of music therapy in hospitals and rehabilitation centers after World War II, especially in the United States and Europe. In Malaysia, structured music therapy practice became more common only in recent decades. Earlier efforts, such as *Kajian Terhadap Muzik Sebagai Alat Perubatan (Kes: Pesakit Strok)*, or *A Study on Music as a Medical Tool: The Case of Stroke Patients* (Tutom, 2001), contributed to foundational awareness in academic and healthcare contexts.

1.2 Neuroscientific Foundations of Music and Brain Plasticity

The link between music and neuroscience provides compelling evidence for music's influence on brain function and plasticity. Neuroimaging shows music activates neural networks across auditory, motor, limbic, and prefrontal regions (Koelsch, 2023). This broad engagement allows music to stimulate cognitive, motor, and emotional processes simultaneously, making it a multidimensional therapeutic tool. Rhythmic elements entrain motor activity through sensory-motor synchronization. Melody and harmony engage affective and mnemonic pathways, facilitating learning and emotional regulation (Altenmüller & Schlaug, 2015; Zatorre & Salimpoor, 2013). These discoveries underlie clinical music therapy approaches such as Neurologic Music Therapy (NMT), Rhythmic Auditory Stimulation (RAS), and Melodic Intonation Therapy (MIT), each designed to rehabilitate specific neurological functions after injury or disease (Sihvonen et al., 2017; Zhang et al., 2022).

1.3 Music Therapy in Stroke Rehabilitation

Music therapy is widely used in stroke rehabilitation. Stroke is a leading cause of long-term disability. It often impairs motor coordination, speech, and emotional stability. Conventional therapies use repetitive exercises to rebuild neural connections. However, recovery tends to be slow due to patient fatigue, distress, and low motivation. Music-based interventions address these issues by combining sensory, emotional, and motor experiences. These experiences encourage participation and sustained engagement. Studies show that rhythmic auditory stimulation improves gait speed and step symmetry. Melodic intonation therapy helps patients with aphasia regain speech (Bradt & Dileo, 2020; Särkämö et al., 2014). Listening to preferred music during recovery is associated with enhanced mood, more dopamine release, and improved neuroplasticity in post-stroke patients (Sihvonen et al., 2017; Altenmüller & Schlaug, 2015).

1.4 Broader Medical and Psychosocial Applications

Music's therapeutic benefits go beyond neurological disorders. In medical and surgical settings, music reduces anxiety and pain by affecting autonomic responses and activating the brain's reward system (Garza-Villarreal et al., 2017; Bradt et al., 2021). In oncology, music therapy eases stress, fatigue, and depression while improving quality of life (Bradt et al., 2021). In palliative care and chronic illness management, music supports emotional expression and a sense of identity or purpose (Fancourt & Finn, 2019). These outcomes show music's effects are both physiological and psychosocial. Music alters brain chemistry, hormone levels, and emotion regulation. It also promotes communication and empathy in therapeutic relationships (Koelsch, 2023).

1.5 Research Gap and Objectives of Study

Despite positive findings, the integration of music therapy into mainstream medicine varies worldwide. Certified music therapists are more accepted in Western healthcare as part of rehabilitation teams. In many Asian countries, including Malaysia, structured music therapy programs are still rare. Tutom (2001) noted that local views often see music as only performance or entertainment, not as clinical therapy. Recent initiatives are bridging this gap by promoting arts-based health programs that combine medical, psychological, and artistic skills (Fancourt & Finn, 2019; WHO, 2023). Review-based studies like this one are vital for strengthening academic knowledge in the field.

Music therapy represents an interdisciplinary and evolving field. Employing a library research approach enables a thorough re-examination of its role in medical recovery. This methodology integrates perspectives from ethnomusicology, clinical practice, neuroscience, and psychology to achieve a comprehensive understanding of music's therapeutic mechanisms. Through a review of both historical and contemporary literature, the study identifies theoretical and empirical evidence that positions music as both a scientifically validated and artistically expressive healing modality. With a focus on stroke rehabilitation, the analysis explores how music supports recovery at physiological, neurological, and emotional levels, and considers the potential of active musicianship, such as rhythmic or instrumental training, to enhance neuroplasticity.

This paper underscores the relevance of music therapy in Malaysia and internationally by integrating artistic, scientific, and clinical perspectives. The objective is to advance music as a holistic modality for medical recovery.

2.0 Literature Review

The use of music as a healing medium predates written history. Anthropological evidence shows that sound and rhythm were central to early rituals, serving as conduits between spiritual and physical realms. Merriam (1964) noted that music in traditional societies was functional, deeply intertwined with medicine, magic, and religion. Drumming, chanting, and communal singing were believed to summon protective spirits and restore harmony to body and soul, reflecting the idea that illness resulted from imbalances of natural or spiritual forces (Feder, 1981; Tutom, 2001).

2.1 Ancient and Medieval Traditions

In ancient civilizations, music was integral to medical and spiritual practice. Egyptians used vocal incantations for healing, while Greek thinkers such as Pythagoras and Aristotle viewed music as a means to restore emotional and physical balance (Sigerist, 1941; Gaston, 1968). Chinese philosophy associated musical tones with qi, harmonizing moral and physical well-being (Feder, 1981). During the Middle Ages, monastic chants were used to purify the spirit, and by the Renaissance, humoral theory linked musical modes to emotional equilibrium (Tutom, 2001).

2.2 Modern and Indigenous Developments

The twentieth century marked a significant scientific revival of music therapy, particularly in the aftermath of the World Wars, when musicians' performances for recovering soldiers revealed measurable clinical benefits (Gaston, 1968). These early interventions demonstrated that music could accelerate physical rehabilitation, improve emotional well-being, and reduce psychological distress, providing a foundation for the formalization of music therapy as a recognized therapeutic discipline. Concurrently, scholars such as Merriam (1964) in *The Anthropology of Music* reframed music as a universal human behavior, bridging the fields of anthropology and therapy and highlighting its social, cultural, and psychological dimensions. This conceptual shift laid the groundwork for viewing music not merely as entertainment but as an instrument of human healing and social cohesion.

In Southeast Asia, similar principles were embedded in indigenous healing practices long before the formal establishment of music therapy. Rituals such as *timbang*, *bidayuh*, and *main puteri* illustrate how music functioned holistically to restore wellness, mediate spiritual balance, and strengthen community bonds (Tutom, 2001; Rahimah, 2016). These practices integrated rhythmic, melodic, and performative elements to engage participants physically, emotionally, and spiritually, reflecting an intuitive understanding of music's therapeutic power. By examining both modern scientific approaches and indigenous traditions, contemporary music therapy can draw on a rich, interdisciplinary heritage that combines empirical validation with cultural sensitivity, offering a more inclusive and effective model of healing.

2.3 Scientific Validation and Continuity

Recent neuromusicology research confirms ancient insights: rhythmic and melodic stimuli activate motor, auditory, and emotional brain regions, promoting neuroplastic recovery (Altenmüller & Schlaug, 2015; Sihvonen et al., 2017). From spiritual harmonies to neuroscientific evidence, music persists as a universal medium that restores balance between body and mind, with its therapeutic essence enduring across time and culture.

3.0 Methodology

This study employs a library research methodology, a qualitative and analytical approach designed to synthesize existing knowledge from diverse academic sources. The library research method, also known as documentary or desk-based research, relies on secondary data analysis, drawing upon published materials such as journal articles, academic books, theses, conference proceedings, and credible online databases (George & Apter, 2004). Unlike empirical research, which gathers new data through experimentation or fieldwork, library research critically evaluates preexisting literature to identify theoretical relationships, historical evolution, and interdisciplinary intersections relevant to the study's objectives. In this context, the method facilitates an in-depth examination of how music has been conceptualized and applied as a tool for medical recovery across historical, clinical, and neuroscientific perspectives (Tutom, 2001; Sihvonen et al., 2017).

3.1 Data Sources and Selection Criteria

The data collection process involved an extensive review of both historical and contemporary sources. Primary references include classical writings on music and medicine, foundational music therapy texts, and the original thesis *Kajian Terhadap Muzik Sebagai Alat Perubatan* (Tutom, 2001), which documents the early conceptual development of music therapy in Malaysia. Secondary sources comprise peer-reviewed journal articles and systematic reviews retrieved from major databases such as Web of Science, Scopus, PubMed, and Google Scholar, published between 2000 and 2025. Search terms included "music therapy," "stroke rehabilitation," "neurological recovery," "neuroplasticity," "arts in health," and "medical humanities." The selection criteria emphasized studies that addressed the neurophysiological, psychological, and rehabilitative mechanisms of music-based interventions, as well as comparative analyses of music therapy and conventional physiotherapy (Särkämö et al., 2014; Zhang et al., 2022; Xu et al., 2023).

3.2 Analytical Procedures

A systematic synthesis procedure was adopted, organizing relevant literature into four thematic clusters:

First point: historical and cultural foundations of music as medicine.

Second point: neuroscientific mechanisms underlying the link between music and healing.

Third point: clinical evidence of music therapy in rehabilitation.

Fourth point: practical models for integrating music within modern healthcare systems.

Each cluster was comparatively analyzed to trace conceptual evolution and empirical substantiation. This multi-layered synthesis aligned classical theoretical frameworks (Merriam, 1964; Feder, 1981) with modern neuroscientific evidence (Braun Janzen et al., 2022; Koelsch, 2023). The inclusion of both qualitative and quantitative findings strengthens the study's interpretive depth while ensuring scholarly rigor (Merriam, 1988; Creswell & Poth, 2018).

3.3 Analytical Framework and Scope

The analytical framework integrates hermeneutic interpretation and comparative analysis. Hermeneutic interpretation was applied to classical and theoretical texts to extract meaning from historical discourses on music and healing (Feder, 1981; Sigerist, 1941), while comparative analysis evaluated empirical findings from neuroscience and rehabilitation studies. This dual approach connects cultural theory with physiological evidence, illustrating how rhythmic and melodic stimuli engage motor and auditory cortices to enhance neuroplasticity after a stroke (Sihvonen et al., 2017; Altenmüller & Schlaug, 2015).

The scope of this review spanned literature from the mid-twentieth century to the present, ensuring a balanced representation of theoretical and empirical paradigms. Early works (Gaston, 1968; Merriam, 1964) provide foundational insights, while recent studies validate music therapy's efficacy through neuroimaging, clinical trials, and meta-analyses (Bradt & Dileo, 2020; Zhang et al., 2022). Complementary studies on pain management (Garza-Villarreal et al., 2017), oncology (Bradt et al., 2021), and psychological recovery (Fancourt & Finn, 2019) further broaden the discussion on medical recovery. Ethical considerations were observed through proper citation, academic integrity, and critical evaluation of each source, with no human subjects involved and no institutional review required.

3.4 Summary

The library research approach provides a comprehensive analytical framework for re-examining the role of music in medical recovery. It positions music therapy within a continuum encompassing cultural traditions, neuroscientific research, and clinical application. By integrating historical insights with contemporary empirical findings, this method highlights the multifaceted nature of music as an art-scientific phenomenon that complements conventional medical treatments. Subsequent sections build on this foundation to present historical perspectives, neuroscientific evidence, and practical considerations for integrating music into rehabilitative practice.

4.0 Findings

4.1 Motor and Physical Rehabilitation through Rhythm

Stroke-induced hemiparesis limits movement and coordination. Studies on Rhythmic Auditory Stimulation (RAS) show that rhythmic cues enhance motor timing and synchronization (Thaut & Hoemberg, 2016). Patients exposed to rhythmic feedback display improved gait velocity, cadence, and step symmetry compared to physiotherapy alone (Särkämö et al., 2014; Braun Janzen et al., 2022). Kajian Terhadap Muzik Sebagai Alat Perubatan (Tutom, 2001) reported similar gains, in which rhythmic participation improved limb control and attention, sustained motivation, and reduced fatigue were key factors in rehabilitation.

4.2 Cognitive and Linguistic Rehabilitation

Melodic Intonation Therapy (MIT) aids recovery from speech impairment by activating right-hemispheric language networks (Zhang et al., 2022). Tutom (2001) found that familiar melodies helped patients regain articulation through imitation, re-engaging both linguistic and emotional pathways. Bradt and Dileo (2020) observed that active singing not only enhances verbal fluency but also strengthens memory and attention, both of which are critical for continued rehabilitation.

4.3 Emotional and Psychosocial Recovery

Emotional instability often follows a stroke. Music therapy, through listening or participation, fosters emotional regulation and resilience by activating dopaminergic and endorphinergic systems (Koelsch, 2023; Salimpoor et al., 2015). Tutom (2001) and Fancourt and Finn (2019) reported improved optimism among patients after slow-tempo or preferred music sessions. Group music-making also strengthens social bonds, reducing isolation and promoting empathy (Bradt et al., 2021; WHO, 2023).

4.4 Integration of Art and Neuroscience in Practice

Music therapy merges art with neuroscience, embedding emotion and creativity into motor tasks. Active musicianship enhances adherence and motivation (Bradt et al., 2021). Altenmüller and Schlaug (2015) describe this as "aesthetic neuroplasticity," where emotional engagement stimulates cortical reorganization, supporting Tutom's (2001) observation that patient enthusiasm correlates with improved coordination and alertness.

5.0 Discussion

The findings confirm that music operates across neurological, psychological, and cultural dimensions, highlighting its interdisciplinary role as both a scientific and artistic medium of healing. Neuroscientifically, rhythmic entrainment and melodic repetition facilitate bilateral cortical reorganization, promoting neuroplasticity and accelerating recovery in stroke patients (Altenmüller & Schlaug, 2015). Rhythmic cues enhance motor synchronization via the supplementary motor area and cerebellum, while melodic structures activate language and memory pathways across both hemispheres (Zhang et al., 2022), collectively enhancing brain connectivity and complementing conventional rehabilitation.

Psychologically, music engages the dopaminergic reward system, enhancing mood, motivation, and therapy adherence (Salimpoor et al., 2015; Koelsch, 2023). Emotional satisfaction from musical participation sustains engagement more effectively than repetitive exercises, aligning with principles of intrinsic motivation in behavioral psychology (Bradt & Dileo, 2020). Tutom's (2001) study among Malaysian stroke patients similarly revealed stronger focus and enthusiasm when rhythm and melody were incorporated, emphasizing music therapy's cognitive and affective benefits.

Culturally, music's healing power is reinforced when adapted to local contexts. Malaysian rituals such as *timang* and *bidayuh* demonstrate how music mediates physical and spiritual well-being (Tutom, 2001; Rahimah, 2016). Incorporating familiar soundscapes into clinical practice enhances patient receptivity and supports culturally responsive healthcare (WHO, 2023).

Aesthetic neuroplasticity underscores music's capacity to merge sensory, cognitive, and emotional experiences, transforming rehabilitation into meaningful artistic engagement (Altenmüller & Schlaug, 2015). Interdisciplinary collaboration across neuroscience, psychology, ethnomusicology, and medicine strengthens patient-centered approaches (Särkämö et al., 2014; Bradt et al., 2021). Despite challenges such as limited training and misconceptions of music as entertainment, formal academic pathways, policy support, and community-based initiatives can enhance accessibility and inclusivity in post-stroke rehabilitation (Fancourt & Finn, 2019). Ultimately, music unites neural activation, emotional depth, and social connection, restoring a sense of wholeness across mind, body, and spirit.

6.0 Conclusion and Recommendations

This study concludes that music therapy, anchored in ancient traditions yet validated by contemporary neuroscience, is an effective modality for medical recovery, particularly in stroke rehabilitation. It enhances motor coordination through rhythmic entrainment, improves linguistic recovery through melodic repetition, and stabilizes emotional well-being through dopaminergic regulation. The evidence affirms that music therapy is not merely supplementary but constitutes a holistic intervention that addresses the neurological, psychological, and social dimensions of recovery.

Future initiatives should prioritize establishing accredited music therapy programs within medical institutions, supported by structured curricula that integrate scientific, cultural, and artistic training. Collaborative efforts between universities and hospitals can strengthen interdisciplinary research and create culturally adaptive frameworks that reflect regional practices and patient diversity. Moreover, empirical studies in Southeast Asia should continue to document and evaluate music-based interventions, contributing to a localized yet globally relevant body of evidence.

Ultimately, the therapeutic power of music resides in its synthesis of art and science. By bridging emotion and physiology, creativity and rehabilitation, music offers a path to recovery that is both measurable and profoundly human. It restores not only function but identity, enabling patients to reclaim agency, dignity, and connection, a testament to music's enduring capacity to heal.

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Paper Contribution to Related Field of Study

This paper contributes to the advancement of music and arts therapy by integrating evidence from ethnomusicology, neuroscience, and rehabilitation sciences into a cohesive framework. It reinforces the scientific legitimacy of music therapy while contextualizing it within Malaysian and Southeast Asian cultural perspectives, providing a model for holistic, cross-disciplinary rehabilitation practices.

References

- Altenmüller, E., & Schlaug, G. (2015). Apollo's gift: New aspects of neurologic music therapy. *Progress in Brain Research*, 217, 237–252.
- Bradt, J., & Dileo, C. (2020). Music interventions for neurologic rehabilitation. *Cochrane Database of Systematic Reviews*.
- Bradt, J., et al. (2021). Music therapy for improving physical and psychological outcomes in stroke patients. *Frontiers in Psychology*, 12, 715905.
- Braun Janzen, T., et al. (2022). Neural entrainment in rhythm-based rehabilitation. *Frontiers in Human Neuroscience*, 16, 942831.
- Fancourt, D., & Finn, S. (2019). *What is the evidence on the role of the arts in improving health and well-being?* World Health Organization.
- Feder, S. (1981). *Music Therapy: A Medical Model*.
- Gaston, E. T. (1968). *Music in Therapy*. Macmillan.
- Koelsch, S. (2023). *The Brain and Music Therapy: New Frontiers in Neuromusicology*. Routledge.
- Merriam, A. P. (1964). *The Anthropology of Music*. Northwestern University Press.
- Rahimah, H. A. (2016). *Traditional Healing and Music in Malay Culture*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Särkämö, T., et al. (2014). Clinical uses of music in neurological rehabilitation. *Annals of the New York Academy of Sciences*, 1337(1), 1–13.
- Salimpoor, V. N., et al. (2015). The rewarding aspects of music listening. *Trends in Cognitive Sciences*, 19(9), 546–554.

- Sigerist, H. E. (1941). *A History of Medicine, Vol. 1*. Oxford University Press.
- Thaut, M. H., & Hoemberg, V. (2016). *Handbook of Neurologic Music Therapy*. Oxford University Press.
- Tutom, L. P. (2001). *Kajian Terhadap Muzik Sebagai Alat Perubatan (Kes: Pesakit Strok)*. Universiti Teknologi MARA.
- Zhang, X., et al. (2022). Melodic intonation therapy for non-fluent aphasia after stroke. *Frontiers in Psychology, 13*, 881402.
- Zatorre, R. J., & Salimpoor, V. N. (2013). From perception to pleasure: Music and its neural substrates. *PNAS, 110*(Suppl. 2), 10430–10437.