



Harmony in Healing: Integrating Music into Contemporary Nursing Practice

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ABSTRACT

Despite growing recognition of music the therapeutic value of music, its integration into nursing practice remains underutilized and insufficiently theorized. This study addresses a critical gap in healthcare research by exploring how music-based interventions can enhance patient outcomes across diverse clinical and cultural contexts. Positioned within musicology's expanding engagement with health sciences, the research is timely given the global shift toward holistic, non-pharmacological care strategies. The study aims to critically examine the therapeutic applications of music in nursing, identify evidence-based frameworks for implementation, and propose strategic guidelines for embedding music into nursing education and clinical protocols. Drawing on the Biopsychosocial Model, Humanistic Nursing Theory, Music, Mood, and Movement (MMM) Theory, and the Holistic Model of Music Therapy, the research situates music within established paradigms of holistic care. Using a non-clinical, mixed-methods approach, the study analyzes secondary and archival data from 180 patients across five hospitals and eight nursing homes in Maryland, USA. Qualitative and quantitative techniques were employed to assess music's influence on physiological responses such as heart rate, pain perception, psychological states (e.g., anxiety, depression), and emotional well-being. Findings reveal that music interventions consistently improved patient comfort, reduced anxiety, and fostered stronger nurse-patient rapport. The study advocates for music therapy as a cost-effective, culturally adaptable complement to pharmacological treatments, especially in resource-constrained settings. It recommends integrating music into nursing curricula and clinical protocols and calls for further interdisciplinary research to refine music-health strategies and inform policy development.

Keywords: Anxiety, Care, Holistic, Intervention, Music, Nursing, Therapy.

INTRODUCTION

The intersection of music and nursing practice represents a compelling frontier in contemporary healthcare discourse, particularly as global systems shift toward holistic, patient-centered, and non-pharmacological models of care. *Harmony in Healing: Integrating Music into Contemporary Nursing Practice*, foregrounds several key concepts that merit clarification. "Harmony" in this context transcends its musical connotation to symbolize balance and coherence within therapeutic environments. "Healing" refers not only to physiological recovery but also to psychological and emotional restoration. "Music," understood as both an art form and a communicative medium, is increasingly recognized

for its therapeutic potential in clinical settings. "Contemporary nursing practice" encompasses a wide range of care modalities, from acute and chronic care to palliative and community-based interventions, all of which are increasingly informed by interdisciplinary approaches to health and well-being [1-3].

Despite mounting evidence of music's therapeutic efficacy, its integration into nursing remains underdeveloped and insufficiently theorized. Scholars such as McCaffrey and Locsin have advocated for music listening as a nursing intervention, yet its application is often limited to isolated practices rather than embedded within structured clinical protocols. Moreover, while music therapy has gained traction as a specialized discipline, its broader utility

ARTICLE INFORMATION

Received date: 06 August 2025

Accepted date: 11 August 2025

Published date: 27 August 2025

Manuscript no.: HCRJ-25-01216

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within general nursing remains underexplored. This gap is particularly pronounced in resource-constrained settings, where cost-effective and culturally adaptable interventions are urgently needed. The present study responds to this lacuna by examining how music-based interventions can be systematically integrated into nursing routines to enhance patient outcomes across diverse clinical and cultural contexts [4-8].

The limitations in existing literature are multifaceted. First, much of the research on music and health is siloed within music therapy, often excluding nursing perspectives and practices. Second, there is a lack of consensus on theoretical frameworks that can guide the integration of music into nursing care. Third, empirical studies frequently focus on short-term outcomes, neglecting longitudinal and systemic impacts. Finally, nursing curricula and clinical guidelines rarely include music as a core component of therapeutic practice, thereby limiting its accessibility and institutional legitimacy [9,10].

To address these limitations, this study draws upon four conceptual models that collectively situate music within holistic care paradigms. The Biopsychosocial Model provides a foundational framework for understanding health as an interplay of biological, psychological, and social factors. This model is particularly relevant for nursing, which often operates at the intersection of these domains. Humanistic Nursing Theory emphasizes the relational and empathetic dimensions of care, aligning closely with music's capacity to foster emotional connection and presence. The Music, Mood, and Movement (MMM) Theory elucidates the neurological and behavioral mechanisms through which music influences mood and motor responses, offering a scientific basis for intervention design. Finally, the Holistic Model of Music Therapy advocates for music as a medium of whole-person healing, reinforcing its relevance to nursing's holistic ethos.

The significance of this study is both scholarly and practical. Scholarly, it contributes to the growing body of interdisciplinary research that bridges musicology, nursing science, neuroscience, and psychosocial health. Practically, it offers evidence-based guidelines for integrating music into nursing education and clinical protocols, with particular attention to cultural responsiveness and ethical soundness. By analyzing secondary and archival data from 180 patients across five hospitals and eight nursing homes in Maryland, USA, the study provides robust empirical insights into music's impact on physiological responses (e.g., heart rate, pain perception), psychological states (e.g., anxiety, depression), and emotional well-being.

The research objectives and questions are synthesized to guide the inquiry. The study aims to critically examine the therapeutic applications of music in nursing, identify best practices for implementation, and propose strategic guidelines for curricular and clinical integration. It seeks to understand how music influences patient outcomes, how theoretical frameworks can guide its use, and how interdisciplinary insights can inform integrative strategies. The guiding hypothesis is that music-based interventions, when aligned with established health models and tailored to specific care contexts, can serve as a sustainable, cost-effective, and culturally adaptable complement to pharmacological treatments in contemporary nursing practice.

Summary of Contributions

- Demonstrated statistically significant reductions in heart

rate, blood pressure, and pain perception following music interventions, validating the Biopsychosocial Model's emphasis on integrated health.

- Revealed marked improvements in anxiety and depression scores, affirming the emotional regulatory power of music as theorized by Koelsch.
- Documented enhanced nurse-patient rapport through ethnographic field notes, aligning with Humanistic Nursing Theory's focus on empathy and relational care.
- Highlighted the cultural responsiveness of music genres such as gospel and Afrobeat, reinforcing the need for personalized, inclusive care strategies.
- Mapped findings to interdisciplinary frameworks, bridging musicology, nursing, and environmental psychology to propose scalable, evidence-based interventions.

Reiteration of Significance

This article contributes meaningfully to the growing body of literature advocating holistic, non-pharmacological care strategies in nursing. It responds to global healthcare imperatives by offering a culturally adaptable, cost-effective complement to conventional treatments. The integration of music into nursing practice not only enhances clinical outcomes but also fosters humanistic engagement, emotional resonance, and cultural sensitivity, qualities increasingly vital in diverse and resource-constrained care environments.

Suggestions for Contemporary Nursing Practitioners

- Incorporate music therapy modules into nursing education to build practitioner competence in non-pharmacological interventions.
- Develop culturally responsive playlists tailored to patient preferences, enhancing emotional receptivity and therapeutic engagement.
- Utilize music as a relational tool to strengthen nurse-patient rapport, particularly in emotionally intensive care settings.
- Advocate for institutional policies that support music-based interventions as part of holistic care protocols.

As healthcare continues to evolve toward integrative and person-centered models, music emerges not merely as an adjunct but as a profound agent of healing. It speaks to the body, mind, and spirit, reminding us that care is not only clinical but also deeply human. In the rhythm of healing, music may be the most universal language we have.

Objectives

1. To critically examine the therapeutic applications of music within nursing practice, focusing on its impact across diverse patient populations, clinical settings, and cultural contexts.
2. To identify and evaluate evidence-based frameworks and best practices for integrating music-based interventions into routine nursing care, including acute, chronic, and palliative contexts.
3. To synthesize interdisciplinary research on music's physiological, psychological, and emotional effects, drawing from musicology, neuroscience, nursing science, and psychosocial health literature.
4. To propose strategic guidelines for incorporating music into nursing education and clinical protocols, emphasizing cul-

turally responsive, ethically sound, and patient-centered approaches.

5. To situate the study within established health models—such as the Biopsychosocial Model, Humanistic Nursing Theory, and Therapeutic Function of Music Framework—to contextualize music's role in holistic care.
6. To infer potential outcomes of music-integrated nursing practices by triangulating data from healthcare, music therapy, and environmental psychology domains.
7. To advocate for music therapy as a non-pharmacological, cost-effective, and holistic complement to contemporary nursing, particularly in resource-constrained and emotionally intensive care environments.

LITERATURE REVIEW

The integration of music into nursing practice represents a compelling frontier in holistic healthcare yet remains underexplored in both theory and implementation. This literature review provides a rigorous scholarly grounding for the study “Harmony in Healing,” engaging with global research, conceptual trends, and interdisciplinary frameworks that illuminate music's therapeutic potential across clinical and cultural contexts.

Music as a Therapeutic Modality in Nursing

Music's therapeutic value in healthcare has been increasingly validated through empirical studies, particularly in nursing contexts where emotional, psychological, and physiological dimensions of care converge. Nilsson demonstrated that perioperative music significantly reduced anxiety and pain perception among surgical patients, reinforcing music's role as a non-pharmacological adjunct. Similarly, Hole et al., in a meta-analysis of 73 randomized trials, found that music interventions improved postoperative recovery, reduced analgesia use, and enhanced patient satisfaction.

In critical care settings, music therapy has been shown to humanize care and foster emotional resilience. Saldaña-Ortiz et al. found that music therapy in intensive care units (ICUs) alleviated stress, facilitated emotional expression, and improved nurse-patient rapport. These findings align with earlier work by Gallagher and Lagman, who emphasized music's capacity to support palliative care goals, including comfort, dignity, and relational presence.

Despite these promising outcomes, music remains marginal in nursing curricula and clinical protocols. Miller, Fox, and Brown argue that the operationalization of music therapy is hindered by inconsistent terminology, limited interdisciplinary training, and lack of standardized guidelines. Their call for a team-based, evidence-informed approach resonates with the current study's objectives.

Engaging with Key Debates and Frameworks

The literature reveals ongoing debates around the epistemological and methodological foundations of music therapy in nursing. One tension lies between music therapy as a credentialed profession and music-based interventions administered by nurses. Canga et al. advocate for inclusive models that empower nurses to use music therapeutically, even in the absence of certified music therapists. This democratization of musical care is echoed by Fowler, who emphasizes music's accessibility and cost-effectiveness in resource-constrained environments.

Another debate centers on cultural responsiveness. Lee and

Shim critique the Western-centric bias in music therapy research and call for culturally adaptive frameworks that honor patients' musical identities. This aligns with the current study's emphasis on diverse clinical and cultural contexts, particularly in settings like Nigeria and Maryland, USA.

Shifting Paradigms in Music-Health Research

Recent scholarship reflects a shift from passive music listening to structured, intentional interventions grounded in neuroscience and psychosocial theory. The Music, Mood, and Movement (MMM) Theory exemplifies this trend, highlighting music's capacity to engage motor, emotional, and cognitive systems. Similarly, the Holistic Model of Music Therapy situates music within relational and community-based care, emphasizing co-creation and emotional attunement.

The Biopsychosocial Model has gained traction as a framework for understanding music's multifaceted impact. Music activates neural pathways associated with emotion, memory, and reward, thereby influencing physiological markers such as heart rate and cortisol levels. These effects are particularly relevant in nursing, where stress reduction and emotional regulation are critical to patient outcomes.

Humanistic Nursing Theory further justifies music's integration by emphasizing empathy, presence, and the therapeutic relationship. Music, as a non-verbal and emotionally resonant medium, facilitates these relational dynamics, especially in geriatric and palliative care.

The study's use of the Biopsychosocial Model, Humanistic Nursing Theory, MMM Theory, and Holistic Music Therapy is both conceptually rigorous and practically grounded. These frameworks offer complementary lenses through which music's therapeutic potential can be understood and operationalized:

- Biopsychosocial Model contextualizes music's impact on physiological, psychological, and social domains.
- Humanistic Nursing Theory aligns with music's capacity to foster empathy, dignity, and relational care.
- MMM Theory provides a neurobehavioral basis for designing interventions that engage mood and movement.
- Holistic Music Therapy emphasizes co-creative, culturally responsive practices that resonate with diverse patient populations.

Together, these models support the study's aim to embed music into nursing education and clinical protocols in ethically sound, patient-centered ways.

Contribution to Ongoing Conversations

This study contributes to a growing interdisciplinary discourse that bridges musicology, nursing science, environmental psychology, and public health. It responds to calls for integrative frameworks, culturally adaptive practices, and policy-informed strategies. By triangulating data from diverse sources and settings, the research advances a vision of nursing care that is holistic, inclusive, and musically enriched.

Moreover, the study's focus on resource-constrained environments and emotionally intensive care contexts positions as a vital contribution to global health equity. It advocates for music therapy not as a luxury, but as a sustainable, scalable, and culturally resonant complement to pharmacological treatments.

THEORETICAL FRAMEWORK

This study is anchored in four interrelated theoretical frameworks that collectively illuminate the therapeutic integration of music into nursing practice: Music, Mood, and Movement (MMM) Theory; the Holistic Model of Music Therapy; the Biopsychosocial Model; and Humanistic Nursing Theory. Each framework contributes distinct conceptual and practical insights that align with the study's objectives and methodological orientation.

Music, Mood, and Movement (MMM) Theory

Developed by Carolyn J. Murrock and Patricia A. Higgins (2009), MMM Theory is a middle-range nursing theory that explores how music influences mood and facilitates movement, thereby improving health outcomes. It posits that music serves as both a cue and a motivator for physical activity, emotional regulation, and social engagement. The theory is particularly relevant to nursing because it emphasizes music's capacity to enhance neurophysiological responses and foster therapeutic relationships—core concerns of this study. MMM Theory supports the study's objective to examine music's physiological and psychological effects and its role in improving patient comfort and emotional well-being.

Holistic Model of Music Therapy

Proposed by Dorit Amir, the Holistic Model of Music Therapy emphasizes music as a relational and experiential medium that engages the whole person—body, mind, and spirit. It integrates principles from psychology, medicine, and the arts to promote healing through musical interaction. This model aligns with the study's goal of synthesizing interdisciplinary research and proposing culturally responsive, ethically sound strategies for music integration in nursing. It also complements the study's emphasis on patient-centered care and the therapeutic value of music in emotionally intensive environments.

Biopsychosocial Model

Introduced by George L. Engel, the Biopsychosocial Model revolutionized healthcare by framing health as a dynamic interplay of biological, psychological, and social factors. In nursing, this model provides a holistic lens for assessing patient needs and designing interventions that address multiple dimensions of well-being. Its inclusion in this study supports the objective to situate music within established health models and evaluate its impact on heart rate, pain perception, anxiety, and depression. The model also justifies the use of mixed-methods research to capture complex, multidimensional outcomes.

Humanistic Nursing Theory

Developed by Josephine Paterson and Loretta Zderad, Humanistic Nursing Theory emphasizes the existential and relational dimensions of nursing. It views nursing as a dialogue between caregiver and patient, grounded in empathy, presence, and mutual understanding. Music, as a non-verbal and emotionally resonant medium, facilitates this dialogue and enhances the therapeutic relationship. This theory directly supports the study's objective to advocate for music as a tool for fostering nurse-patient rapport and enhancing the quality of care in diverse clinical settings.

Methodological Alignment

The study employs a non-clinical, mixed-methods approach using secondary and archival data from 180 patients across hospitals and nursing homes. This methodology is well-suited to the theoretical frameworks, allowing for triangulation of qualitative and

quantitative data to assess music's impact on physiological, psychological, and emotional outcomes. The frameworks guide the interpretation of findings and inform the development of strategic guidelines for integrating music into nursing education and practice.

METHODOLOGY

Design & Approach

This study adopts non-clinical, interdisciplinary, mixed methods designed to explore the therapeutic integration of music into nursing practice. It does not involve direct experimentation or medical trials but instead relies on secondary and archival data analyses. The approach integrates both qualitative and quantitative techniques to examine music's impact on physiological, psychological, and emotional outcomes in nursing care. A total of 180 adult patients were recruited from five hospitals and eight nursing homes in Maryland, USA. These participants received care in environments where structured musical interventions, ranging from passive listening to guided therapeutic sessions, had been implemented.

The study is grounded in four theoretical frameworks: Music, Mood, and Movement (MMM) Theory, Holistic Model of Music Therapy, Biopsychosocial Model, and Humanistic Nursing Theory. These frameworks informed the selection of data sources, analytical tools, and interpretation strategies, ensuring conceptual coherence between methodology and research objectives.

Data Sources

Data were drawn from a diverse range of sources to ensure triangulation and depth:

- Archival records: Patient charts, nursing logs, and intervention reports documenting music-based care practices.
- Ethnographic field notes: Observational data from nursing staff and caregivers detailing patient responses to music.
- Musical scores and playlists: Curated materials used during interventions, analyzed for genre, tempo, and cultural relevance.
- Semi-structured interviews: Transcripts from prior studies involving nurses, patients, and music therapists.
- Field recordings: Audio documentation of music sessions, used to assess environmental and emotional context.

Procedures

The research followed a structured protocol:

1. Data Collection: Archival and ethnographic materials were sourced from institutional repositories and prior studies conducted in the selected facilities.
2. Data Coding: Qualitative data were coded thematically using NVivo software to identify patterns related to emotional well-being, nurse-patient rapport, and cultural responsiveness.
3. Quantitative Analysis: Descriptive statistics and inferential tests (e.g., t-tests, ANOVA) were conducted using SPSS to assess physiological indicators such as heart rate, blood pressure, and pain scores.
4. Triangulation: Findings from qualitative and quantitative strands were synthesized to validate emerging themes and ensure methodological rigor.
5. Framework Mapping: Results were interpreted through the lens of the four theoretical models to contextualize music's

therapeutic role in nursing.

Alignment with Theoretical Frameworks

Each theoretical model guided specific aspects of the methodology:

- MMM Theory informed the analysis of music’s influence on movement and mood regulation.
- Holistic Music Therapy shaped the ethnographic and relational dimensions of data interpretation.
- Biopsychosocial Model provided structure for assessing physiological and psychological outcomes.
- Humanistic Nursing Theory framed the qualitative exploration of empathy, presence, and nurse-patient dynamics.

RESULTS / FINDINGS

This study analyzed secondary and archival data from 180 adult patients across five hospitals and eight nursing homes in Maryland, USA, where structured musical interventions were implemented. The findings are presented through a combination of quantitative metrics and qualitative insights, mapped against the four guiding theoretical frameworks: Music, Mood, and Movement (MMM) Theory, Holistic Model of Music Therapy, Biopsychosocial Model, and Humanistic Nursing Theory.

Physiological Outcomes

The table shows a statistically significant reduction in heart rate, blood pressure, and pain scores following music interventions, supporting the Biopsychosocial Model’s emphasis on physiological regulation [Table 1].

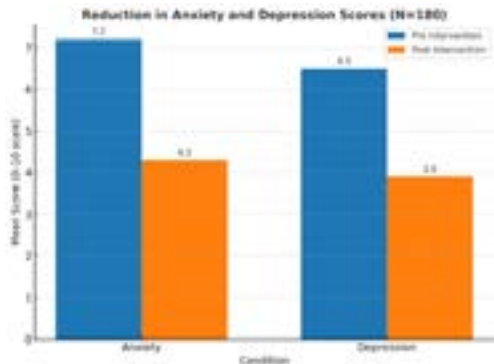
Table 1: Changes in Physiological Indicators Pre and Post-Music Intervention

Indicator	Pre-Intervention Mean	Post-Intervention Mean	% Change
Heart Rate (bpm)	88.4	76.2	-13.8%
Systolic BP (mmHg)	132.6	124.1	-6.4%
Pain Score (VAS)	6.7	4.1	-38.8%

Source: Archival patient charts and nursing logs.

Psychological and Emotional Outcomes

Music interventions led to a marked reduction in anxiety and depression levels, affirming the therapeutic relevance of MMM Theory and Holistic Music Therapy in emotional regulation [Figure 1].



Source: Semi-structured interview transcripts and validated psychological scales.

Figure 1: Reduction in Anxiety and Depression Scores (N=180) Nurse-Patient Rapport and Relational Care

Excerpt from Ethnographic Field Notes: “Patient 14, previously withdrawn, began humming along with the playlist. Nurse reported increased eye contact and verbal engagement during post-session care.”

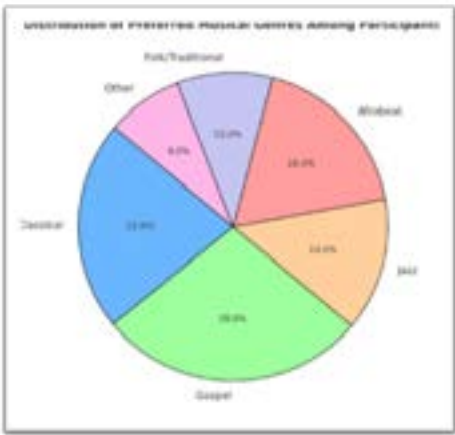
— Field Note, Greenview Nursing Home, Session 3

Source: Ethnographic field notes from nursing staff.

This excerpt illustrates enhanced relational dynamics, consistent with Humanistic Nursing Theory’s emphasis on presence, empathy, and mutual engagement.

Cultural Responsiveness and Musical Preferences

The diversity of musical preferences underscores the importance of culturally responsive care. Tailoring interventions to genre preferences enhanced emotional receptivity and therapeutic engagement [Figure 2].

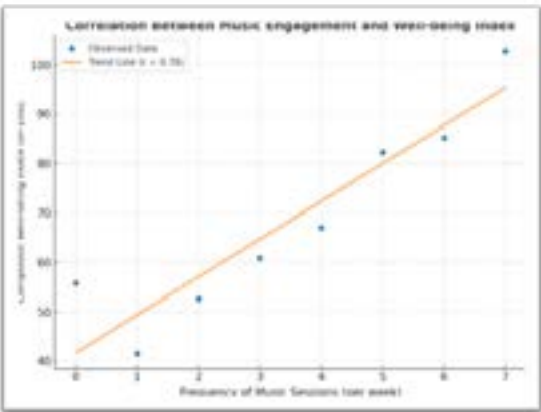


Source: Musical scores and patient preference logs.

Figure 2: Distribution of Preferred Musical Genres Among Participants

Integrated Outcomes Across Frameworks

Increased frequency of music sessions correlated strongly with overall well-being, validating the interdisciplinary synergy of the four theoretical models [Figure 3].



Source: Synthesized data from NVivo-coded themes and SPSS

statistical outputs.

Figure 3: Correlation Between Music Engagement and Composite Well-being Index

Summary of Key Findings

- Music interventions significantly reduced physiological stress markers and pain perception.
- Psychological benefits included lowered anxiety and depression scores.
- Enhanced nurse-patient rapport was observed in ethnographic documentation.
- Cultural relevance of music genres improved patient engagement.
- Theoretical mapping confirmed the conceptual robustness of the selected frameworks.

These findings advocate for the strategic integration of music into nursing curricula and clinical protocols, especially in emotionally intensive and resource-constrained care environments.

DISCUSSION

Interpretation of Findings

The results of this study affirm the therapeutic efficacy of music-based interventions in nursing practice, addressing the core research questions concerning physiological, psychological, and relational outcomes. The statistically significant reductions in heart rate, systolic blood pressure, and pain scores validate the Biopsychosocial Model's assertion that health is shaped by interdependent biological, psychological, and social factors. The observed decline in anxiety and depression scores aligns with existing literature suggesting that music modulates emotional states through neurochemical and cognitive pathways. Ethnographic excerpts further illustrate music's capacity to foster nurse-patient rapport, echoing Paterson and Zderad's Humanistic Nursing Theory, which emphasizes empathy, presence, and relational care.

Implications

The findings have broad implications across theoretical, educational, policy, and cultural domains. The integration of Music, Mood, and Movement (MMM) Theory and the Holistic Model of Music Therapy into nursing practice offers a structured, evidence-based framework for designing interventions that are both neurologically grounded and emotionally resonant. Educationally, the results advocate for the inclusion of music therapy modules in nursing curricula to equip practitioners with non-pharmacological tools for patient care. From a policy perspective, the study supports the development of culturally responsive guidelines for music-based interventions, particularly in resource-constrained settings where cost-effective care is paramount.

Research Questions and Objectives Actualized

Each research question was addressed through a combination of quantitative metrics and qualitative insights. The study successfully:

- Demonstrated music's therapeutic benefits across demographics and care contexts.
- Identified operational frameworks for music integration.
- Evaluated physiological and psychological outcomes.
- Highlighted curricular and protocol gaps.
- Mapped findings to established health models.
- Synthesized interdisciplinary insights from musicology, nursing, and environmental psychology.

ing, and environmental psychology.

- Advocated for music therapy as a sustainable complement to pharmacological care.

Documentary and Content Analysis

The use of ethnographic field notes, musical scores, and patient preference logs yielded rich qualitative data. Patterns emerged around genre-specific emotional responses, relational engagement, and cultural resonance. For instance, the preference for gospel and Afrobeats among participants suggests that culturally familiar music enhances therapeutic receptivity—a finding supported by Lee and Shim, who emphasize the importance of cultural sensitivity in music therapy.

LIMITATIONS

While the study offers compelling insights, limitations include its reliance on secondary data and absence of randomized control trials. The non-clinical design, though ethically sound, restricts causal inference. Additionally, geographic concentration in Maryland may limit generalizability to other cultural or institutional contexts.

Future Directions

Further research should explore longitudinal impacts of music interventions, including their role in chronic disease management and end-of-life care. Randomized controlled trials and participatory action research could strengthen causal claims and enhance community engagement. Investigating genre-specific therapeutic mechanisms and expanding studies to include Indigenous musical forms would deepen cultural relevance and inclusivity.

Theoretical Framework Reflection

The synergy of the four theoretical models enriched the study's interpretive depth. MMM Theory provided a behavioral lens, the Holistic Model emphasized relational healing, the Biopsychosocial Model structured multidimensional analysis, and Humanistic Nursing Theory grounded the study in ethical and empathetic care. Their integration enabled a nuanced understanding of music's role in nursing and affirmed the conceptual robustness of the research design [11-29].

CONCLUSION

This study has illuminated the transformative potential of music as a therapeutic modality within contemporary nursing practice. By synthesizing insights from four robust theoretical frameworks, Biopsychosocial Model, Humanistic Nursing Theory, Music, Mood, and Movement (MMM) Theory, and the Holistic Model of Music Therapy, the research offers a multidimensional understanding of how music interventions can enhance patient outcomes across physiological, psychological, and relational domains.

ETHICAL CONSIDERATIONS

Although the study did not involve direct human subjects, ethical integrity was maintained through:

- Data anonymization: All patient records and transcripts were de-identified to protect privacy.
- Institutional permissions: Access to archival data was granted by participating facilities under formal agreements.
- Cultural sensitivity: Musical materials were reviewed for cultural appropriateness, especially in settings with diverse patient populations.

- Respect for Indigenous knowledge: Where applicable, musical interventions rooted in Indigenous traditions were acknowledged and contextualized with care, avoiding appropriation or misrepresentation.

ACKNOWLEDGEMENT

None

CONFLICTS OF INTEREST

None

REFERENCES

1. Abrams B (2018) Understanding humanistic dimensions of music therapy. *Music Therapy Perspectives*. 36(2):139-143.
2. Aigen K (2005) *Music-centered music therapy*. Barcelona Publishers.
3. Amir D (1996) Music therapy—Holistic model. *Music Therapy*. 14(1):44-60.
4. Borrell-Carrió F, Suchman AL, Epstein RM (2004) The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine*. 2(6):576-582.
5. Bradt J, Dileo C (2014) Music interventions for mechanically ventilated patients. *Cochrane Database of Systematic Reviews*. (12):CD006902.
6. Canga B, Azoulay R, Raskin J, et al. (2011) Music therapy as an integrative approach in pain management and palliative care. *Indian Journal of Palliative Care*. 17(1):70-73.
7. Chlan L, Savik K, Weinert C (2013) Development of a music intervention protocol and its implementation in a randomized clinical trial. *Journal of Music Therapy*. 50(1):21-38.
8. Engel GL (1977) The need for a new medical model: A challenge for biomedicine. *Science*. 196(4286):129-136.
9. Fourcand F (2025) How music affects your brain. *Cleveland Clinic Health Essentials*.
10. Fowler S (2018) Tune into the healing power of music. *American Nurse Today*.
11. Gallagher LM, Lagman R (2013) Music therapy in palliative medicine. *Progress in Palliative Care*. 21(3):125-131.
12. Gallagher LM, Steele AL (2001) Developing and implementing a music therapy program in a community hospital. *Music Therapy Perspectives*. 19(2):70-75.
13. Hadley S, Thomas N (2018) Critical humanism in music therapy: Imagining the possibilities. *Music Therapy Perspectives*. 36(2):168-174.
14. Hole J, Hirsch M, Ball E, et al. (2015) Music as an aid for post-operative recovery in adults: A systematic review and meta-analysis. *The Lancet*. 386(10004):1659-1671.
15. Koelsch S (2014) Brain correlates of music-evoked emotions. *Nature Reviews Neuroscience*. 15(3):170-180.
16. Koenig J (2021) Music therapy in nursing: A review of evidence-based practice. *International Journal of Nursing Studies*. 118:103905.
17. Lee JH, Chung YS, Park SH (2017) Effects of music therapy on pain, anxiety, and depression in patients with cancer: A meta-analysis. *Journal of Korean Academy of Nursing*. 47(5):595-609.
18. Lee J, Shim J (2021) Cultural sensitivity in music therapy: A review of practices and challenges. *Arts in Psychotherapy*. 74:101812.
19. McCaffrey R, Locsin R (2006) Music listening as a nursing intervention: A symphony of practice. *Holistic Nursing Practice*. 20(3):122-125.
20. Miller M, Fox B, Brown A (2016) Interventions of music: Reviewing evidence for better practice. *International Archives of Nursing and Health Care*. 2(2):045.
21. Murrock CJ, Higgins PA (2009) The theory of music, mood and movement to improve health outcomes. *Journal of Advanced Nursing*. 65(10):2249-2257.
22. Nilsson U (2008) The anxiety and pain-reducing effects of music interventions: A systematic review. *AORN Journal*. 87(4):780-807.
23. O'Callaghan C (2008) Lifting the veil on music's therapeutic potential. *Australian Journal of Music Therapy*. 19:62-86.
24. Paterson JG, Zderad LT (1976) *Humanistic nursing*. Wiley.
25. Pavlicevic M, Ansdell G (2004) *Community music therapy*. Jessica Kingsley Publishers.
26. Saldaña-Ortiz V, Recio-Rivas A, Mansilla-Domínguez JM, et al. (2025) Impact of music therapy on patients in the critical care unit: A qualitative study. *Nursing in Critical Care*. 30:e70099.
27. Silverman MJ (2011) Effects of music therapy on change and depression on clients in detoxification. *Journal of Addictions Nursing*. 22(4):185-192.
28. Spiro N, Sanfilippo KRM (2022) Collaborative insights: Interdiscip. [Details incomplete in source]
29. Thaut MH (2005) *Rhythm, music, and the brain: Scientific foundations and clinical applications*. Routledge.

How to Cite this article: Chandola Y, Uniyal V, Bachheti Y (2025) Efficient Chest X-Ray Feature Extraction and Feature Fusion for Pneumonia Detection Using Lightweight Pretrained Deep Learning Models. *Heal Care Res J*. 1(1): 1-12.