

# Music-Based Interventions And Human Health Outcomes: A Review Of Psychological And Physiological Effects

Prabhat Bali<sup>1\*</sup>, Dr. Sonia Ahuja<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Performing Arts, Lovely Professional University, Punjab

<sup>2</sup>Assistant Professor, Department of Performing Arts, Lovely Professional University, Punjab

---

## Abstract

The growing prevalence of stress, anxiety, and mental health concerns in modern society has increased the need for effective and accessible approaches to improve overall well-being. Academic pressures, work-related challenges, and changing lifestyles have contributed significantly to psychological and physiological health problems among individuals across different age groups. Although pharmacological treatments continue to play an important role in managing such conditions, increasing attention is being given to non-pharmacological and cost-effective interventions that support health in a more holistic manner. Among these approaches, music-based interventions have emerged as a promising strategy because of their ability to influence both psychological and physiological responses.

The present study aims to examine the impact of music-based interventions on human health outcomes, with a particular focus on psychological and physiological effects. A conceptual review-based methodology was adopted by analyzing published literature from peer-reviewed journals and scholarly sources related to music therapy and health outcomes. The review explored the influence of music interventions on stress, anxiety, emotional well-being, and physiological indicators such as salivary cortisol, blood pressure, and heart rate.

The findings suggest that music-based interventions contribute positively to stress reduction, anxiety management, emotional regulation, and overall well-being. The review also indicates that music may influence physiological functioning through neuroendocrine and autonomic nervous system mechanisms. Furthermore, evidence from selected studies highlights the therapeutic potential of Indian classical music in promoting relaxation and improving concentration. The study emphasizes the potential of music as a supportive, accessible, and preventive approach for enhancing human health and well-being.

**Keywords:** Music therapy, Stress, Anxiety, Indian classical music, Salivary cortisol, Mental health, Physiological outcomes.

**How to cite this article:** Bali P, Ahuja S. Music-Based Interventions And Human Health Outcomes: A Review Of Psychological And Physiological Effects. *Int J Drug Deliv Technol.* 2026;16(50s): 777-7781. DOI: 10.25258/ijddt.16.50s.80

---

## 1. Introduction

### 1.1 Background of the Study

Over the last few decades, research examining the relationship between music and health has expanded considerably and has moved from being a niche area of investigation to an important interdisciplinary field involving psychology, medicine, neuroscience, and public health. The growing body of evidence suggests that music can influence human emotions, cognitive functioning, physiological processes, and overall well-being. Several empirical studies and reviews have demonstrated positive associations between music participation and health outcomes. Research in this area has developed rapidly, producing evidence regarding the role of music in promoting psychological well-being and improving quality of life (Daykin et al., 2018; Sheppard & Broughton, 2020). Reports and large-scale reviews have further strengthened the recognition of music and arts-based interventions as contributors to health promotion and preventive care (Fancourt & Finn, 2019; Gordon-Nesbitt & Howarth, 2020).

At the same time, stress and anxiety have emerged as major psychological concerns affecting people globally. Stress can be understood as the body's response to

internal or external demands that exceed an individual's coping resources, while anxiety often develops as an emotional and physiological reaction to stress (Trivedi & Gupta, 2010; Lazarus & Folkman, 1984). Although moderate levels of stress may motivate individuals and improve performance, excessive stress can negatively affect physical and mental health and can contribute to various health problems including cardiovascular disorders, endocrine disturbances, depression, and impaired immune functioning (Schneiderman et al., 2005; Reiche et al., 2005). Research has also indicated that stress can alter physiological markers such as blood pressure, heart rate, respiration rate, and cortisol secretion (Takai et al., 2004; Linden & Moseley, 2006). Among different population groups, students have been identified as particularly vulnerable to psychological stress and anxiety. Academic expectations, examinations, workload, competition, career uncertainty, social pressures, and personal responsibilities often create significant psychological burdens. Previous studies have observed that stress levels among students, particularly those in higher and professional education, tend to be relatively high and may increase throughout the educational journey

---

\*Author for Correspondence: [tonypharmacology@gmail.com](mailto:tonypharmacology@gmail.com)

(Ghosal & Behera, 2018; Sarkar et al., 2017). Persistent exposure to stress may adversely affect academic performance, emotional stability, concentration, and general well-being. Furthermore, many students hesitate to seek professional psychological support because of stigma, social perceptions, or lack of awareness regarding mental health services (Menon et al., 2015). The increasing burden of stress and anxiety has created a need for interventions that are safe, affordable, and accessible. While pharmacological treatment remains an important option for managing psychological conditions, there is increasing interest in non-pharmacological approaches that can complement traditional treatment methods. Such interventions often focus on reducing symptoms without causing adverse side effects and may encourage a more holistic approach toward health management. Non-pharmacological approaches including meditation, yoga, mindfulness practices, and music-based interventions have gained attention because of their ability to support mental and emotional well-being.

Within this context, music has emerged as an important therapeutic tool because of its ability to affect psychological states and physiological processes simultaneously. Studies have suggested that music can reduce anxiety, improve mood, and influence physiological responses including blood pressure, pulse rate, respiration rate, and stress-related hormonal activity (Thoma et al., 2013). Research focusing on Indian classical music has also demonstrated promising outcomes, including reduced stress among patients and improvements in attention and concentration among students (Kotwal et al., 1998; Nagarajan et al., 2015). These findings suggest that music-based interventions may serve as a practical and supportive approach for promoting health and well-being across different populations.

### 1.2 Concept of Music Therapy

Music has long been associated with emotional expression, healing, and human well-being. In recent years, music therapy has emerged as an important interdisciplinary field that uses music and musical experiences to improve physical, emotional, psychological, and social health. Unlike listening to music solely for entertainment, music therapy involves structured interventions designed to achieve specific therapeutic goals. Studies suggest that music can influence emotional states and physiological responses such as heart rate, blood pressure, and cortisol levels, thereby contributing to stress reduction and improved well-being (Thoma et al., 2013).

Music therapy generally consists of active and passive interventions. Active interventions involve direct participation in activities such as singing, playing instruments, composing, or group performances. These activities encourage emotional expression and social interaction. Passive interventions, on the other hand, involve listening to selected music without direct participation and are commonly used to induce relaxation and reduce anxiety (Knight & Rickard, 2001). Different forms of music interventions have been used in therapeutic settings. Classical music interventions are

often associated with relaxation and emotional balance. Instrumental music interventions use music without lyrics and have shown positive effects in reducing stress and improving physiological responses (Kotwal et al., 1998). Vocal interventions, such as singing and choir activities, help improve emotional well-being and social connectedness (Williams et al., 2019). Personalized music interventions involve selecting music based on individual preferences and have demonstrated benefits in reducing stress and pain (Linnemann et al., 2015). Furthermore, Indian Raga-based therapy has gained attention because specific ragas are believed to influence emotions and mental states. Research indicates that Indian classical music may improve attention, concentration, and stress management (Nagarajan et al., 2015).

### 1.3 Stress and Anxiety

Stress and anxiety are among the most common psychological conditions affecting human well-being and have become increasingly prevalent in modern life. Stress can be defined as the body's physical and psychological response to demands or pressures that exceed an individual's available coping resources. According to stress theories, stress arises when individuals perceive that environmental demands outweigh their personal or social capacities (Lazarus & Folkman, 1984). Although moderate stress may improve motivation and performance, prolonged or excessive stress can negatively affect physical and mental health (Schneiderman et al., 2005).

Anxiety is generally considered an emotional and physiological response that develops due to stress and is characterized by feelings of worry, fear, nervousness, and tension. Moderate anxiety may help individuals remain alert and prepared for challenging situations; however, excessive anxiety can disturb emotional stability and daily functioning (Trivedi & Gupta, 2010). Studies have also indicated that untreated anxiety can contribute to psychological and physiological health problems (Kroenke et al., 2007).

The physiological mechanisms underlying stress and anxiety involve complex interactions between the brain, endocrine system, and nervous system. One of the primary mechanisms involved is the Hypothalamic–Pituitary–Adrenal (HPA) axis, which plays a central role in regulating the body's stress response. During stressful situations, the hypothalamus stimulates the pituitary gland, which further activates the adrenal glands to release stress hormones, particularly cortisol (Tsigos et al., 2000). Elevated cortisol secretion helps the body adapt to stress by increasing energy availability and supporting immediate physiological responses. However, persistent activation of this system may lead to negative health effects.

Stress also activates the sympathetic nervous system, commonly known as the body's "fight or flight" system. This activation produces physiological changes such as increased heart rate, elevated blood pressure, faster respiration, and increased glucose release to prepare the body for immediate action (Takai et al., 2004; Linden & Moseley, 2006). Continuous activation of these

mechanisms may contribute to physical and psychological health complications over time.

#### 1.4 Research Gap

Existing literature has established the positive relationship between music-based interventions and health outcomes; however, several gaps remain in the current body of research. Most previous studies have focused primarily on Western forms of music, while comparatively limited evidence is available regarding the therapeutic role of Indian classical music and raga-based interventions (Kotwal et al., 1998; Nagarajan et al., 2015). Additionally, many studies have been conducted using relatively small sample sizes, limiting the generalizability of findings. Existing research also lacks sufficient longitudinal studies to examine the long-term effects of music interventions. Furthermore, limited attention has been given to student populations despite increasing stress levels among them, and variations in the use of physiological indicators such as cortisol, blood pressure, and heart rate have resulted in inconsistent findings across studies.

#### 1.5 Research Objectives

1. To examine the effect of music interventions on stress and anxiety levels.
2. To identify physiological changes associated with music therapy.
3. To analyze the role of Indian classical music in health promotion.
4. To compare findings across different music-based interventions.

#### 2. Literature Review

Research on music therapy has evolved considerably over time from traditional healing practices to evidence-based therapeutic applications in healthcare and psychology. Earlier studies viewed music primarily as a source of entertainment and emotional expression; however, recent research has increasingly recognized its therapeutic potential in improving psychological and physiological well-being. The growth of music-health research has produced substantial evidence supporting the use of music in health promotion and disease management. Large-scale reviews and global reports, including the review conducted for the World Health Organization (WHO), have emphasized that music and arts-based interventions can positively influence mental and physical health outcomes (Fancourt & Finn, 2019; Daykin et al., 2018).

Studies focusing on psychological outcomes suggest that music interventions play an important role in stress reduction, anxiety management, and emotional well-being. Music has been shown to reduce perceived stress levels and improve mood by influencing emotional processing and neurobiological responses (Thoma et al., 2013). Similarly, listening to music and engaging in musical activities have been associated with lower anxiety levels and improved emotional regulation (Knight & Rickard, 2001). Group-based interventions such as singing activities have also demonstrated improvements in social connectedness and

psychological well-being among individuals with mental health challenges (Williams et al., 2019).

Research has also highlighted the impact of music on physiological outcomes including blood pressure, heart rate, respiration rate, salivary cortisol, blood glucose, and lipid profiles. Music interventions may activate relaxation responses and influence neuroendocrine pathways, leading to reductions in physiological stress markers (Hou et al., 2017; Sharma et al., 2011). Indian classical music has further gained attention for its therapeutic applications. Studies involving raga therapy, particularly Raga Desi-Todi and flute-based interventions, have shown positive effects on stress reduction and concentration levels (Kotwal et al., 1998; Nagarajan et al., 2015). Existing theoretical explanations are often based on Psychophysiological Theory, Stress Response Theory, Biopsychosocial Model, and Neurochemical Theory of Music. The conceptual framework of the present study assumes that music intervention acts as the independent variable, influencing psychological responses such as stress reduction and emotional regulation, which subsequently affect physiological outcomes including anxiety, cortisol levels, blood pressure, heart rate, and overall health and well-being.

#### 3. Research Methodology

##### 3.1 Research Design

The present study adopts a conceptual review-based research design to examine the impact of music-based interventions on psychological and physiological health outcomes. The study synthesizes existing literature to understand the relationship between music and human well-being.

##### 3.2 Sources of Data

The study is based on secondary data collected from peer-reviewed journal articles, books, reports, and published research studies related to music therapy and health outcomes.

#### 4. Results and Findings

The review of existing literature indicates that music-based interventions demonstrate a generally positive influence on both psychological and physiological health outcomes. One of the most consistent findings across studies is the role of music in reducing stress and anxiety levels. Research suggests that exposure to music interventions helps individuals experience lower perceived stress, improved emotional stability, and reduced psychological burden (Thoma et al., 2013; Knight & Rickard, 2001). Group-based musical activities and listening interventions have also been associated with improved emotional well-being and social connectedness (Williams et al., 2019).

The reviewed studies also indicate that music produces measurable physiological changes. Several investigations reported reductions in blood pressure, heart rate, respiration rate, and salivary cortisol levels, suggesting that music can influence autonomic and endocrine responses associated with stress (Hou et al., 2017; Siritunga et al., 2013). Improvements in blood glucose levels and certain biochemical indicators were

also observed in some studies, indicating broader health implications of music interventions (Sharma et al., 2011).

Another important observation emerging from the literature is the increasing therapeutic relevance of Indian classical music. Studies focusing on raga-based interventions and instrumental music, particularly flute-based interventions involving Raga Desi-Todi, reported positive outcomes related to stress reduction, relaxation, attention, and concentration (Kotwal et al., 1998; Nagarajan et al., 2015).

The findings also reveal several limitations within existing research. Most studies have concentrated on Western music interventions, while evidence regarding Indian classical music remains comparatively limited. Small sample sizes, variations in physiological measurements, and lack of long-term investigations were frequently identified as major research limitations. Overall, the literature suggests that music-based interventions can act as a useful and accessible approach for promoting psychological well-being and improving physiological health outcomes.

### 5. Discussion and Conclusion

The reviewed literature shows that music-based interventions have a positive influence on both psychological and physiological health outcomes. One major finding is the relationship between music and cortisol reduction. Since cortisol is a major stress hormone, its decrease after music exposure suggests that music may help regulate the body's stress response. Previous studies have also indicated that music can reduce salivary cortisol levels and support recovery from stress by influencing the HPA-axis and autonomic nervous system (Thoma et al., 2013; Hou et al., 2017).

Music also appears to be effective in reducing anxiety and emotional tension. Prior studies have reported that relaxing music can prevent stress-induced increases in anxiety, blood pressure, and heart rate (Knight & Rickard, 2001). This supports the view that music works not only as entertainment but also as a simple psychological support system for emotional regulation. The findings related to Indian classical music are particularly important. Studies on Indian classical instrumental music and raga-based listening suggest positive effects on stress reduction, attention, and concentration. Raga Desi-Todi played on flute has also been used in music intervention studies, showing the therapeutic possibility of culturally rooted music forms (Kotwal et al., 1998; Gupta & Gupta, 2005; Nagarajan et al., 2015).

Biologically, music may work by activating relaxation responses, reducing sympathetic nervous system activity, improving parasympathetic balance, and influencing neurochemical processes such as dopamine release. These mechanisms may explain reductions in cortisol, blood pressure, heart rate, and respiration rate after music exposure (Suttoo & Akiyama, 2004; Siritunga et al., 2013).

In conclusion, music-based interventions appear to be a promising, low-cost, and non-pharmacological approach for improving mental and physiological health. However, more rigorous studies are needed, especially

on Indian classical music, long-term effects, and standardized physiological indicators.

### REFERENCES & BIBLIOGRAPHY

- Daykin, N., Mansfield, L., Meads, C., Julier, G., Tomlinson, A., Payne, A., Griffin, M., Boddy, K., Victor, C., & Dolan, P. (2018). What works for wellbeing? A systematic review of wellbeing outcomes for music and singing in adults. *Perspectives in Public Health*, 138(1), 39–46. <https://doi.org/10.1177/1757913917740391>
- Fancourt, D., & Finn, S. (2019). *What is the evidence on the role of the arts in improving health and well-being? A scoping review*. World Health Organization.
- Gordon-Nesbitt, R., & Howarth, A. (2020). The arts and the social determinants of health: Findings from an inquiry conducted by the United Kingdom All-Party Parliamentary Group on Arts, Health and Wellbeing. *Arts & Health*, 12(1), 1–22. <https://doi.org/10.1080/17533015.2019.1567563>
- Hou, Y. C., Lin, Y. J., Lu, K. C., Chiang, H. S., Chang, C. C., & Yang, L. K. (2017). Music therapy-induced changes in salivary cortisol levels are predictive of cardiovascular mortality in patients under maintenance hemodialysis. *Therapeutics and Clinical Risk Management*, 13, 263–272.
- Knight, W. E., & Rickard, N. S. (2001). Relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy males and females. *Journal of Music Therapy*, 38(4), 254–272. <https://doi.org/10.1093/jmt/38.4.254>
- Kotwal, M. R., Rinchen, C. Z., & Ringe, V. V. (1998). Stress reduction through listening to Indian classical music during gastroscopy. *Diagnostic and Therapeutic Endoscopy*, 4(4), 191–197.
- Kroenke, K., Spitzer, R. L., Williams, J. B., Monahan, P. O., & Lowe, B. (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine*, 146(5), 317–325.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Linnemann, A., Kappert, M. B., Fischer, S., Doerr, J. M., Strahler, J., & Nater, U. M. (2015). The effects of music listening on pain and stress in the daily life of patients with fibromyalgia syndrome. *Frontiers in Human Neuroscience*, 9, Article 434. <https://doi.org/10.3389/fnhum.2015.00434>
- Nagarajan, K., Srinivasan, T. M., & Ramarao, N. H. (2015). The immediate effect of listening to Indian raga on attention and concentration in healthy college students: A comparative study. *Journal of Health Research and Reviews*, 2(3), 103–107.
- Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology*, 1, 607–628. <https://doi.org/10.1146/annurev.clinpsy.1.102803.144141>
- Sheppard, A., & Broughton, M. C. (2020). Promoting wellbeing and health through active

- participation in music and dance: A systematic review. *International Journal of Qualitative Studies on Health and Well-Being*, 15(1), Article 1732526. <https://doi.org/10.1080/17482631.2020.1732526>
13. Siritunga, S., Wijewardena, K., Ekanayaka, R., & Mudunkotuwa, P. (2013). Effect of music on blood pressure, pulse rate and respiratory rate of asymptomatic individuals: A randomized controlled trial. *Health*, 5, 59–64.
  14. Sutoo, D., & Akiyama, K. (2004). Music improves dopaminergic neurotransmission: Demonstration based on the effect of music on blood pressure regulation. *Brain Research*, 1016(2), 255–262. <https://doi.org/10.1016/j.brainres.2004.05.018>
  15. Thoma, M. V., la Marca, R., Brönnimann, R., Finkel, L., Ehlert, U., & Nater, U. M. (2013). The effect of music on the human stress response. *PLoS ONE*, 8(8), Article e70156. <https://doi.org/10.1371/journal.pone.0070156>
  16. Tsigos, C., Kyrou, I., Kassi, E., & Chrousos, G. P. (2000). Stress, endocrine physiology and pathophysiology. In L. J. De Groot (Ed.), *Endotext*. MDText.com.
  17. Williams, E., Dingle, G., Jetten, J., & Rowan, C. (2019). Identification with arts-based groups improves mental wellbeing in adults with chronic mental health conditions. *Journal of Applied Social Psychology*, 49(1), 15–26. <https://doi.org/10.1111/jasp.12561>