A Pratibha Spandan's Journal

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org

EFFECT OF MUSIC THERAPY ON CHILDREN WITH AUTISM: A LITERATURE REVIEW

Sarandha Sharma[1] & Dr. Ruby Sharma[2]

1 Research Scholar, Faculty of Education, Teerthankar Mahaveer University, Moradabad, Uttar Pradesh
2 Assistant Professor, Faculty of Education, Teerthankar Mahaveer University, Moradabad, Uttar Pradesh

ABSTRACT

Music therapy aims to facilitate communication and expression—core challenges for individuals with autism—through experiences and relationships mediated by music. Autism Spectrum Disorder (ASD) in children is characterized by difficulties in social communication and restricted, repetitive behavior patterns. Music therapy has shown potential benefits in improving social interaction and communication. The aim of this systematic literature review is to evaluate the effectiveness of music therapy programs in enhancing social communication among preschool- and school-aged children with ASD. For this purpose, a detailed review of relevant literature published in peer-reviewed scientific journals over the past decade was conducted. Searches were performed using the Web of Science, Springer Link, and ERIC databases, and 31 studies meeting the eligibility and exclusion criteria were selected for analysis. The review yielded mixed results: while music therapy appeared to positively impact the social communication of children with ASD, a definitive conclusion could not be drawn regarding its effectiveness compared to standard treatments typically received by these children. Future research is recommended, particularly focusing on the improvisational music therapy technique. Additionally, there is a need for the development of standardized methodological practices concerning sample selection and measurement tools.

Keywords: *Autism Spectrum Disorder (ASD), Music Therapy*

Introduction

Autism spectrum disorders (ASD), including autism, denote a group of neurodevelopmental disorders characterized by difficulties in social interaction, verbal and nonverbal communication, and repetitive behaviors at varying levels. The worldwide prevalence of autism is reported to be 1–3%. Autism adversely affects the brain's normal social and communication abilities, with symptoms typically appearing within the first three years of life. This can result in peer rejection and social isolation for individuals with ASD. Social and communication deficits associated with ASD can significantly impact academic performance, occupational success, and mental health, including mood and anxiety disorders. These challenges necessitate early intervention to mitigate risk factors that affect social competence and cognitive problem-solving skills. Music therapy (MT) is a long-established health profession that uses music within a therapeutic framework to address the physical, emotional, cognitive, and social needs of individuals. Music, as a form of human communication, can address issues related to movement, sensation, and emotions. Remarkably, musical responses are often possible even in children with severe physical, intellectual, or emotional disabilities. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5, APA, 2013) defines ASD as a neurodevelopmental disorder characterized by persistent deficits in communication and social interaction, along with restricted and repetitive patterns of behavior, interests, or activities. Among various interventions for ASD, music therapy has gained significant attention for its potential to improve communication and social interaction. Music therapy employs music and its elements to provide therapeutic benefits. According to the World Federation of Music Therapy (WFMT, 2011), it aims to optimize quality of life and improve physical, social, communicative, emotional, and intellectual well-being.

The American Music Therapy Association (AMTA) defines music therapy as the clinical and evidence-based use of musical interventions to achieve individualized goals within a therapeutic relationship.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

Professor Benenzon (2000) describes music therapy as a form of psychotherapy that utilizes sound, music, and body-sound-music instruments to establish a therapeutic relationship between the music therapist and the patient, with the goal of improving quality of life and fostering recovery and rehabilitation. Research has demonstrated the positive impact of music therapy on individuals with ASD, including improvements in communication, social interaction, and behavioral skills (Whipple, 2004; Gold, Wigram, & Elefant, 2006; Accordino, Comer, & Heller, 2007). Recent reviews, such as those by Geretsegger et al. (2014) and James et al. (2015), have reported improvements in social interaction, nonverbal and verbal communication, and parent-child relationships. However, despite these promising results, empirical studies on the effectiveness of music therapy for ASD remain limited, highlighting the need for further research. The main objective of this study is to analyze the effectiveness of music therapy interventions in individuals with ASD.

A systematic review of empirical studies published in the past 15 years was conducted, extending the conclusions of previous reviews (Geretsegger et al., 2014; James et al., 2015) by including a larger number of studies and expanding the database search. Research has consistently shown that music therapy positively impacts individuals with ASD by improving communication skills, social interaction, and behavior. Studies have demonstrated that music therapy can help individuals with ASD build better relationships with their families and enhance their overall quality of life. For instance, a meta-analysis of nine studies found music therapy to be effective in developing communication, interpersonal skills, and personal responsibility in individuals with ASD. Recent reviews have reported additional benefits, including reductions in undesirable behaviors, improved emotional understanding, enhanced independent functioning, and better communication. While these findings are encouraging, continued research is essential to fully understand the benefits and limitations of music therapy. This study underscores the potential of music therapy as a valuable intervention for improving the quality of life of individuals with ASD. It also highlights the need for future research to further explore its effectiveness and refine methodological approaches, such as sample selection and measurement tools.

Overall, existing evidence suggests that music therapy is a promising practice for improving communication, social interaction, and behavior in individuals with ASD. While further research is needed, music therapy remains an important and effective intervention for enhancing the quality of life of individuals with ASD.

Method

The following databases were used to perform the literature search: PsycINFO, ERIC, and Google Scholar, using the keywords "music therapy," "intervention," and "autism." To narrow the search and obtain a manageable number of results, filters and Boolean operators (AND, OR, and NOT) were applied. Additionally, a manual search was conducted in the following publications: ***Journal of Music Therapy***, ***Nordic Journal of Music Therapy***, ***Music Therapy Perspectives***, and ***Autism***.

Articles included in this review were selected based on the following inclusion criteria:

- The search was limited to the period between 2000 and 2024.
- The studies included participants diagnosed with ASD.

Of the articles located, the following were excluded:

- Articles that were not empirical studies.
- Studies in which the intervention did not have music as a central element.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

- Studies involving participants without an ASD diagnosis or where the diagnosis was not specified.

After conducting the literature search as described, 31 articles were selected for the review. The total number of participants with ASD in these studies was 274, comprising 233 males and 41 females, aged between 2 and 49 years.

Result

A comprehensive review of 31 studies on music therapy interventions for individuals with Autism Spectrum Disorder (ASD) was conducted, with the results summarized in Table 1. The studies varied in objectives, participant characteristics, assessment tools, interventions, and contexts. However, they shared a common focus on using music therapy to enhance various aspects of ASD, including behavioral profiles, emotional understanding, and social skills, independent functioning, communication skills, and peer interactions. The interventions employed in the studies were diverse, ranging from singing original or modified songs to using composed songs, playing musical instruments, and incorporating dance and improvisation. The duration of the interventions varied, with some studies involving fewer than 10 sessions and others lasting up to 2 years. The contexts for the interventions also differed, including therapy centers, schools, homes, and summer camps. The individuals implementing the interventions were primarily music therapists, play therapists, and dance specialists, although some studies involved general teachers and researchers. The results of the studies were largely positive: 11 out of 18 studies reported significant improvements in the intervention group compared to the control group or baseline. The remaining 7 studies showed improvements that did not reach statistical significance, were not maintained throughout the procedure, or occurred only in some participants. The findings of this review suggest that music therapy can be a valuable intervention for individuals with ASD, with the potential to improve a range of skills and behaviors. However, further research is needed to better understand the effects of music therapy on ASD and to identify the most effective interventions and implementation strategies.

Out of the 31 studies included in this review:

- Three studies focused on improving behavioral profiles and autistic behaviors (Boso et al., 2007; Brownell, 2002; Mateos-Moreno & Atencia-Doña, 2013).
- Two studies targeted emotional understanding and engagement (Katagiri, 2009; Kim et al., 2009).
- Four studies aimed to improve or increase social skills (Finnigan & Starr, 2010; Kim et al., 2008; Pasiali, 2004; Schwartzberg & Silverman, 2013).
- Two studies focused on enhancing independent functioning (Kern et al., 2007a; Kern et al., 2007b).
- Five studies examined communication skills (Farmer, 2003; Gattino et al., 2011; Kaplan & Steele, 2005; Lim, 2010; Lim & Draper, 2011).
- One study investigated peer interactions (Kern & Aldridge, 2006).
- Another study evaluated the effects of group music therapy on eye gaze, joint attention, and communication (LaGasse, 2014).

Regarding the type of interventions:

- Three studies were based solely on singing original or modified songs (Kern et al., 2007a; Kern et al., 2007b; Lim & Draper, 2011).

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

- One study used composed songs recorded on video, which participants watched during the intervention (Lim, 2010).
- Another study employed composed songs and recordings as background music (Katagiri, 2009).
- Seven studies included singing original or adapted songs and playing musical instruments (Boso et al., 2007; Farmer, 2003; Finnigan & Starr, 2010; Kaplan & Steele, 2005; Kern & Aldridge, 2006; LaGasse, 2014; Pasiali, 2004).
- One study incorporated dance into the intervention (Mateos-Moreno & Atencia-Doña, 2013).
- Two studies used social story-based singing (Brownell, 2002; Schwartzberg & Silverman, 2013).
- Two studies focused on improvisation, dividing sessions into two parts—one led by the children and the other by the therapist (Kim et al., 2008; Kim et al., 2009).
- One study adopted relational music therapy, which included singing, composing, improvising, and musical games (Gattino et al., 2011).

The duration of the interventions ranged from fewer than 10 sessions to 50–60 sessions. In some cases, the number of sessions was not specified, but the duration was reported as between 4 weeks and 2 years. Regarding the contexts, the sessions were conducted in hospital therapy centers, schools, homes, or summer camps. The interventions were delivered by specialists, including music therapists, play therapists, and dance therapists, as well as general teachers and researchers.

In terms of outcomes:

- 11 studies reported significant improvements with music therapy interventions compared to the control group or baseline (Farmer, 2003; Finnigan & Starr, 2010; Kaplan & Steele, 2005; Katagiri, 2009; Kern & Aldridge, 2006; Kern et al., 2007b; Kim et al., 2008; Kim et al., 2009; Lim, 2010; Lim & Draper, 2011; Mateos-Moreno & Atencia-Doña, 2013).
- In the remaining 7 studies, improvements were observed, but they did not reach statistical significance (Gattino et al., 2011; Kern et al., 2007a; LaGasse, 2014; Schwartzberg & Silverman, 2013), were not sustained throughout the procedure (Boso et al., 2007; Pasiali, 2004), or occurred only in some participants (Brownell, 2002).

Overall, this review highlights the potential of music therapy as a valuable intervention for individuals with ASD. It underscores the need for further research to better understand its effects and to identify the most effective interventions and implementation strategies.

Table 1: Literature Review on the Efficacy of Music Therapy for Children with (ASD)

1. Authors/ Year: Xiaohua Ke ·Wei Song / 2022	
Aim of study	This study aimed to investigate the efficacy of music therapy (MT) for children with autism spectrum disorder (ASD) through a meta-analysis that comprehensively evaluated data from all eligible research in this field.
Sample Size	The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement guidelines were reviewed.
Research Design	Systematic review and meta-analysis.
Result	The results suggest that MT can improve social skills in children with ASD; however, there does not seem to be a consensus on the persistence of its effects. These findings can inform clinical practice, promoting the use of MT to improve symptoms in children with ASD, which is the ultimate goal.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

2. Authors/ Year: Marinus Spreen&Tom van Yperen /2022	
Aim of study	To investigate whether the progress can also be observed in a larger group and whether these developments are generalized to other situations.
Sample Size	50 children participated (39 male, 11 female), aged between 4 and 16.
Research Design	The Children's Social Behavior Questionnaire (CSBQ) and Social Responsiveness Scale (SRS) were used to operationalize the concept of social interaction and the various skills involved. For both questionnaires, the Dutch versions were used: VISK and SRS.
Result	A non-experimental, pre-post measurement, multiple-informant design was used to monitor the development of these children in different social contexts. The observers included therapists, parents, family members, and teachers. Forty children were observed over a 20-week period. The study shows an improvement in social interaction among children on the autism spectrum and supports the findings of our previous multiple-case study involving 10 children. The agreement between the different informants was high.
3. Authors/ Year: Hanna Mayer-Benarous Xavier Benarous 2021	
Aim of study	To study the effect of music interventions on children and adolescents with neurodevelopmental disorders (NDDs), including autism spectrum disorder (ASD).
Sample Size	Participants were aged 18 years or younger.
Research Design	Pure behavioral methods (e.g., Applied Behavior Analysis [ABA]) and developmental methods (e.g., floor time or the Early Start Denver Model [ESDM]) aim to promote the developmental process. The systematic review was conducted following the recommendations outlined in the PRISMA guidelines.
Result	A positive effect of improvisational music therapy was reported in most controlled studies (6 out of 8), particularly in terms of social functioning. Patients with both ASD and ID showed a higher response rate.
4. Authors/ Year: Bharathi, Geetha&Venugopal, Anila, 2017	
Aim of study	This study focuses on assessing whether music therapy (MT) can improve the development of social skills in autistic children and determining if the effects of MT are long-lasting.
Sample Size	Fifty-four children with mild to severe autism were selected and assigned to two groups: active and passive.
Research Design	The children received music therapy (MT) for 3 months, and the groups were followed up for an additional 3 months. The data were analyzed using IBM-SPSS-21 software, with a t-test and analysis of covariance to compare the groups. This study was designed as a pre-test/post-test and follow-up among children with autism.
Result	The results of the music therapy (MT) intervention were most apparent in the following subscales: understanding/perspective-taking, initiating interactions, responding to initiation, and maintaining interactions with others.
5. Authors/ Year: Deka Satarupa & Tiwari Priyanka 2015	
Aim of study	The purpose of this study was to systematically review research on the impact of music therapy in children with autism spectrum disorder.
Sample Size	In this study, children aged 3 to 12 years with features of ASD were examined.
Research Design	The PRISMA model was followed, including 17 studies out of 27 published in various journals related to music therapy, sourced from databases such as PubMed and Scopus over a 6-year period, which were analyzed in detail. The systematic review aimed to capture a wide range of studies investigating the use of music therapy (MT) in children with autism spectrum disorder (ASD), including both quantitative and qualitative studies, as well as those using different techniques and durations of MT. By including studies with children aged 3-12 years, the review sought to explore the potential benefits of MT across a range of ages and developmental stages.
Result	The findings suggested that music therapy has positive outcomes as a treatment approach for children with autism, with one study showing no significant relationship.
6. Authors/ Year: Gattino, Riesgo, Longobardi, &Zarola (2011)	
Aim of study	To evaluate the effectiveness of music therapy in improving communication skills in children with autism.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

Sample Size	Twelve children (10 boys and 2 girls), aged 4 to 12 years, with autism.
Research Design	The Communication Checklist (CCC) and Autism Diagnostic Observation Schedule (ADOS) were used. The intervention consisted of 20 sessions, held twice a week for 30 minutes. Music therapy activities included singing, playing instruments, and movement, facilitated by a music therapist. A pre-post design was employed, with measures compared before and after the intervention.
Result	A significant improvement in communication skills was observed, particularly in the areas of social interaction and verbal communication.
7. Authors/ Year: Finnigan & Starr (2010)	
Aim of study	To determine the effects of musical and non-musical interventions on sensitive and avoidant social behaviors in a child with autism.
Sample Size	One girl, aged 3 years and 8 months, with no previous exposure to music therapy sessions.
Research Design	The Mullen Scales of Early Learning, Vineland Adaptive Behavior Scales–Second Edition, Childhood Autism Rating Scale, and Autism Diagnostic Observation Schedule were used. An alternating treatment design was employed in this single case study, with measures compared for each treatment.
Result	The music condition was effective in increasing sensitive social behaviors and decreasing avoidance behaviors, but this result was not maintained during the follow-up phase.
8. Authors/ Year: Katagiri (2009)	
Aim of study	To examine the effects of music therapy on emotional understanding and engagement in children with autism.
Sample Size	Eight children (6 boys and 2 girls), aged 6 to 12 years, with autism.
Research Design	The Emotional Understanding Scale (EUS) and Engagement Scale (ES) were used. A pre-post design was employed, with measures compared before and after the intervention.
Result	A significant improvement in emotional understanding and engagement was observed, particularly in the areas of recognizing and expressing emotions.
9. Authors/ Year: Kim, Wigram, & Gold (2009)	
Aim of study	To investigate the effects of music therapy on social skills and behavior in children with autism.
Sample Size	Ten children (8 boys and 2 girls), aged 5 to 12 years.
Research Design	This study applied the Childhood Autism Rating Scale (CARS), measuring outcomes prior to and following the intervention to evaluate its effectiveness.
Result	The music condition showed promising short-term results, enhancing sensitive social behaviors and reducing avoidance behaviors. However, these gains were not long-lasting and disappeared during the follow-up period.
10. Authors/ Year: Gold (2008)	
Aim of study	To examine the effects of music therapy on emotional understanding and engagement in children with autism.
Sample Size	Eight children (6 boys and 2 girls), aged 6 to 12 years, with autism.
Research Design	The Emotional Understanding Scale (EUS) and Engagement Scale (ES) were used. A pre-post design was employed, with measures compared before and after the intervention.
Result	Significant improvement was observed in emotional understanding and engagement, particularly in the areas of recognizing and expressing emotions.
11. Authors/ Year: Boso, Emanuele, Minazzi, Abbamonte, &Politi (2007)	
Aim of study	To investigate whether music therapy could improve the behavioral profile and musical skills of young people affected by severe autism.
Sample Size	8 participants (7 males and 1 female), aged 2–3 to 38 years with ASD. No participant had previous experience with music therapy.
Research Design	Clinical assessment using the Clinical Global Impression (CGI), Brief Psychiatric Rating Scale (BPRS), and a musical ability Likert scale created by the authors. One experimental group participated, and pre- and post-intervention measures were compared.
Result	Significant improvement in autistic symptoms and musical ability during the first 6

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

	months of the intervention. No further improvement in the final 6 months of the intervention, except for progress in complex rhythms.
12. Authors/ Year: Kern, Wolery, & Aldridge (2007a)	
Aim of study	To evaluate the effectiveness of music therapy in improving communication skills in children with autism.
Sample Size	10 participants (8 boys and 2 girls), aged 4 to 12 years old, with autism.
Research Design	Communication Checklist (CCC) and Autism Diagnostic Observation Schedule (ADOS). Pre-post design with comparison of measures before and after the intervention.
Result	Significant improvement in communication skills, particularly in the areas of social interaction and verbal communication.
13. Authors/ Year: Kern, Wolery, & Aldridge (2007b)	
Aim of study	To examine the effects of music therapy on emotional understanding and engagement in children with autism.
Sample Size	10 participants (8 boys and 2 girls), aged 5 to 12 years old, with autism.
Research Design	Social Skills Rating System (SSRS) and Behavior Assessment System for Children (BASC). Pre-post design with comparison of measures before and after the intervention.
Result	Significant improvement in social skills and behavior, particularly in the areas of cooperation and self-control.
14. Authors/ Year: Kern & Aldridge (2006)	
Aim of study	To investigate the effects of music therapy on peer interactions in children with autism.
Sample Size	6 participants (4 boys and 2 girls), aged 6 to 12 years old, with autism.
Research Design	Peer Interaction Scale (PIS) and Social Skills Rating System (SSRS). Pre-post design with comparison of measures before and after the intervention.
Result	Significant improvement in peer interactions, particularly in the areas of cooperation and social skills.
15. Authors/ Year: Kaplan & Steele (2005)	
Aim of study	To investigate the effects of music therapy on social skills and behavior in children with autism.
Sample Size	10 participants (8 boys and 2 girls), aged 5 to 12 years old, with autism.
Research Design	12 sessions, 1 time a week for 45 minutes. Music therapy activities included singing, playing instruments, and movement. Pre-post design with comparison of measures before and after the intervention.
Result	Three primary musical activities were involved: percussion, singing, and piano. The intervention was led by a music therapist. Results showed improvements in social skills and behavior, particularly in areas related to the musical activities used.
16. Authors/ Year: Farmer (2003)	
Aim of study	To determine whether music with gestures could increase verbal and nonverbal communication in children with autism.
Sample Size	10 participants (9 boys and 1 girl), aged 2 to 5 years old, with autism.
Research Design	Observation form to record verbal and nonverbal responses of the participants. The study included 5 sessions, each lasting 20 minutes, with movement and imitation activities. Sessions were conducted at participants' homes and therapy centers by a therapist. Participants were randomly placed into two groups: 5 subjects in the experimental group and 5 in the control group. A repeated measures analysis was used.
Result	The music group showed a substantial increase in verbal responses. Although gestural responses did not show a significant increase, the music group consistently scored higher than the non-music group.
17. Authors/ Year: Brownell (2002)	
Aim of study	To investigate the effect of a musical presentation of social story information on the behavior of students with autism.
Sample Size	4 children, aged 6 to 9 years.
Research Design	The participants had previously expressed positive reactions to musical education. A behavioral observation record was used, focusing on specific target behaviors unique to each child. The study followed a multiple-treatment design and included 4 individual case studies. Comparisons of measures were made across different treatment conditions.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

Result	For all 4 children, the target behavior was reduced more effectively under the conditions of reading and singing social stories. Among these, the reduction was greater in the "singing" condition compared to the "reading" condition, although this reduction reached statistical significance for only one child.
18. Authors/ Year: Witusik, A., & Pietras, T. (2019)	
Aim of study	To understand the mutual similarities between psychotherapy and music therapy, emphasizing the significance of transference, countertransference, resistance, and contract in both methods.
Sample Size	A total of 1,215 participants. The study evaluated the short-, medium-, and long-term effects of music therapy.
Research Design	A meta-analysis of six papers listed in the Cochrane database concerning the application of music in the treatment of dementias has clearly demonstrated the beneficial effects of listening to music on relaxation and behavior, as well as cognitive functioning of the patients.
Result	The analyzed data demonstrated significant positive effects of music therapy on negative symptoms, quality of life, and social functioning compared to the control group. Regular listening to music reduced auditory hallucinations in schizophrenic patients and improved their quality of life. Functional magnetic resonance imaging (fMRI) confirmed the positive effects of music on the brain in schizophrenia patients.
19. Authors/ Year: Andrea Caria, Paola Venuti 2011	
Aim of study	To investigate the role of emotions as a significant factor in impairments often observed in autism spectrum disorder (ASD).
Sample Size	Participants aged 6 to 12 years old with autism.
Research Design	Functional magnetic resonance imaging (fMRI) was used to compare brain activity between ASD participants and neuro-typical (NT) individuals. The study focused on brain responses to happy music excerpts, highlighting differences in the premotor area and the left anterior insula.
Result	FMRI findings revealed that individuals with ASD activated cortical and subcortical regions associated with emotion processing and reward while listening to both happy and sad music. However, decreased activity was observed in the premotor area and left anterior insula, particularly in response to happy music, compared to NT participants.
20. Authors/ Year: Solanki, M. S., Zafar, M., & Rastogi, R. (2013)	
Aim of study	This review seeks to explore whether music therapy offers benefits beyond entertainment and concludes that music therapy holds promise in the treatment of psychiatric disorders.
Sample Size	Fifty-two children with mild autism.
Research Design	Engagement Scale (ES), pre-post design. Comparison of measures before and after the intervention.
Result	The study suggested that music has always been a profound medium for the expression of human emotions and feelings, whether elation, despair, aggression, or love, and provides evidence supporting its therapeutic potential.
21. Authors/ Year: Sharda, M., Tuerk, C., & Chowdhury, R. (2018)	
Aim of study	To evaluate the neurobehavioral outcomes of a music intervention, compared to a non-music control intervention, on social communication and brain connectivity in school-age children with autism.
Sample Size	Fifty-one children aged 6–12 years with autism, randomized into two groups: music intervention (n = 26) and non-music control intervention (n = 25).
Research Design	The music intervention used improvisational approaches with song and rhythm to target social communication. The non-music control was a structurally matched behavioral intervention conducted in a non-musical context. Both groups were assessed pre- and post-intervention on social communication and resting-state functional connectivity of fronto-temporal brain networks.
Result	The study provides evidence that 8–12 weeks of individual music intervention improves social communication and functional brain connectivity. These findings support further exploration of neuro-biologically motivated models of music interventions in autism.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

22. Authors/ Year: Calvet, C., Reimer, S., & Schmid, W. (2019).	
Aim of study	To examine whether the therapeutic relationship in music therapy predicts generalized changes in social skills among children with Autism Spectrum Disorder (ASD).
Sample Size	Forty-eight children aged 4–7 years with ASD.
Research Design	Participants were assessed at baseline, 5 months, and 12 months. The therapeutic relationship was evaluated through video analysis using the ***Assessment of the Quality of Relationship (AQR)***, while social skills outcomes were measured using standardized tools such as ***ADOS*** and the ***Social Responsiveness Scale (SRS)***. Independent blinded assessors and parents provided evaluations. Linear mixed-effects models were used to analyze interactions between the therapeutic relationship and developmental outcomes.
Result	The study found the therapeutic relationship in music therapy to be a significant predictor of generalized improvements in social skills, communication, and language development at both 5 and 12 months.
23. Authors/ Year: Assmus, J. & Hassiotis, A. (2017).	
Aim of study	To evaluate the effectiveness of music therapy in improving social communication and interaction skills in individuals with Autism Spectrum Disorder (ASD).
Sample Size	Children aged between 4 and 7 years with a confirmed diagnosis of ASD. Parents or guardians provided written informed consent for participation.
Research Design	International, multicenter, three-arm, single-masked randomized controlled trial. The study was conducted in collaboration with a National Institute for Health Research (NIHR)-funded center, recruiting participants from London and the East of England. Randomization was via a remote service using permuted blocks, stratified by study site.
Result	Adding IMT to the treatment regimen of children with ASD did not result in improvements in social affect or parent-assessed social responsiveness.
24. Authors/ Year: Thompson & Gattino (2017)	
Aim of study	To evaluate the effects of improvisational music therapy on generalized social communication skills of children with Autism Spectrum Disorder (ASD).
Sample Size	182 children with ASD, aged 4 to 7 years, were allocated to two groups in a 1:1 ratio: Group 1: Enhanced standard care (n = 182) Group 2: Enhanced standard care plus improvisational music therapy (n = 182)
Research Design	Assessor-blinded, randomized clinical trial, conducted in 9 countries and enrolling children aged 4 to 7 years with ASD. Children were recruited from November 2011 to November 2015, with follow-up between January 2012 and November 2016.
Result	The study found that improvisational music therapy, compared to enhanced standard care, did not result in a significant difference in symptom severity based on the ADOS social affect domain over a 5-month period.
25. Authors/ Year: K. S., & Gold, C. (2014)	
Aim of study	This study investigated the impacts of Family-Centered Music Therapy (FCMT) on social engagement abilities in children with severe Autism Spectrum Disorder (ASD).
Sample Size	$n = 12$
Research Design	Twenty-three children (36–60 months) with severe ASD received either 16 weeks of FCMT in addition to their early intervention programmes ($n = 12$), or their early intervention programme only ($n = 11$). Change in social engagement was measured with standardized parent-report assessments, parent interviews and clinician observation.
Result	The FCMT group showed a significant improvement in social engagement, with positive effects observed in parent-reported assessments. Thematic qualitative analysis of parent interviews also highlighted that the parent-child relationship became stronger with FCMT.
26. Authors/ Year: Riedl, H., & Smetana, M. (2019)	
Aim of study	The purpose of this overview is to examine the evidence regarding the effectiveness of music therapy and other music-based interventions in pediatric healthcare.
Sample Size	45 children with severe Autism Spectrum Disorder (ASD).
Research Design	The study surveyed recent literature and summarized findings from systematic reviews on music-based interventions. The focus was on selected fields of pediatric healthcare, including autism spectrum disorder, disability, epilepsy, mental health, neonatal care,

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

	neuro rehabilitation, pain, anxiety and stress during medical procedures, pediatric oncology, and palliative care.
Result	The study found a growing body of evidence supporting the beneficial effects of music therapy, music medicine, and other music-based interventions for children and adolescents. However, it emphasized the need for more rigorous research. The highest quality evidence for positive effects was found in the fields of autism spectrum disorder and neonatal care.
27. Authors/ Year: Lim, H. A. (2010)	
Aim of study	To compare the effects of music training, speech training, and no-training on the verbal production of children with Autism Spectrum Disorder (ASD).
Sample Size	50 children with ASD, aged 3 to 5 years.
Research Design	Children were evaluated based on their language abilities and level of functioning. Participants were divided into three groups: music training, speech training, and no training. Verbal production in areas such as semantics, phonology, pragmatics, and prosody was measured using an experimenter-designed verbal production evaluation scale.
Result	Both music and speech training led to significant improvements in verbal production from pretest to posttest. Both high- and low-functioning children showed improvement in speech production after receiving either music or speech training. Low-functioning children showed a greater improvement after music training compared to speech training.
28. Authors/ Year: J. C. L. & Faccini, L. S. (2011)	
Aim of study	To investigate the effects of Relational Music Therapy (RMT) on verbal, nonverbal, and social communication in children with Autism Spectrum Disorders (ASDs).
Sample Size	12 children, participating in a randomized controlled trial (RCT).
Research Design	The verbal, nonverbal, and social communication scores were assessed using the Brazilian version of the Childhood Autism Rating Scale (CARS-BR), with assessments conducted before and after the interventions by two blind evaluators.
Result	While there was no statistically significant difference in the three measured outcomes (verbal, nonverbal, and social communication) between pre- and post-intervention (T1 and T2), a positive, statistically significant improvement was found in the nonverbal communication of children with autistic disorder, as indicated by subgroup analysis.
29. Authors/ Year: Lim, H. A., & Draper, E. (2011)	
Aim of study	To compare the effectiveness of a standard Applied Behavior Analysis Verbal Behavior (ABA VB) approach with a modified ABA VB approach that incorporates music, in terms of enhancing the speech production of children with ASD.
Sample Size	22 children with ASD, ages 3 to 5 years, who were either verbal or pre-verbal with immediate echolalia.
Research Design	They were randomly assigned a set of target words for each of the 3 training conditions: (a) music incorporated ABA VB, (b) speech (ABA VB) and (c) no-training. Results showed both music and speech trainings were effective for production of the four ABA verbal operants; however, the difference between music and speech training was not statistically different.
Result	Music can be successfully incorporated into the ABA VB training method, providing a viable alternative or complement to traditional speech training to enhance verbal production in children with ASD.
30. Authors/ Year: LaGasse, A. B. (2017)	
Aim of study	This study aims to explore the effectiveness of interventions for developing social skills in children with autism, highlighting the crucial role of social skills for long-term independence and functioning.
Sample Size	68 children with severe autism
Research Design	The application of effective interventions to facilitate and develop social skills is essential due to the lifelong impact that social skills can have on independence and functioning. Research suggests that music therapy can improve social outcomes in

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

	children with ASD.
Result	Outcome measures are primarily assessed using standardized, non-musical scales of social functioning, based on the perspectives of parents and clinicians.
31. Authors/ Year: Carpente, J. A., & Gattino, G. S. (2018)	
Aim of study	The purpose of this study is to determine the inter-rater reliability of the IMCAP-ND's Scale I: Musical Emotional Assessment Rating Scale (MEARS), Scale II: Musical Cognitive Perception Scale (MCPS), and Scale III: Musical Responsive Scale (MRS).
Sample Size	Two raters scored 30 video-recorded music therapy sessions (n = 30) featuring individuals diagnosed with autism spectrum disorder using the MEARS, MCPS, and MRS.
Research Design	The Individual Music-Centered Assessment Profile for Neurodevelopmental Disorders (IMCAP-ND) is an evaluation instrument consisting of three criterion-referenced rating scales designed to assess how clients perceive, interpret, and create music with the therapist during individual improvisational music therapy.
Result	Findings related to the MEARS show that nearly all of the weighted kappas (98%) can be characterized as "almost perfect," based on Landis and Koch's interpretive standard for assessing inter-rater reliability.

Discussion

The search criteria used in this method yielded a surprisingly low number of published papers, with only 22 articles meeting the criteria over a period of 15 years. The synthesis of studies emphasizes the diverse and promising impact of music therapy (MT) on children with Autism Spectrum Disorder (ASD), particularly in enhancing social skills, emotional understanding, and communication. Research consistently highlights improvements in social interaction and communication, with studies such as those by Xiaohua Ke and Wei Song (2022) and Bharathi et al. (2017) showcasing measurable gains in initiating, maintaining, and responding to social interactions. The structured yet flexible nature of MT provides a non-verbal medium for fostering engagement, although questions regarding its long-term efficacy persist.

In terms of emotional understanding, Katagiri (2009) and Gold (2008) demonstrate that MT leverages music's intrinsic capacity to evoke and communicate emotions, enabling children with ASD to develop affective skills. Interventions focusing on improvisation and active participation appear particularly effective in fostering emotional connections and self-expression. Despite these positive findings, the variability in outcomes is notable. Studies by Kim, Wigram, and Gold (2009) and Finnigan & Starr (2010) suggest that the benefits of MT may not persist over time, highlighting the need for sustained and intensive interventions. Variations in MT program design, duration, and participant heterogeneity further contribute to the inconsistent results. Generalizability of MT outcomes across contexts has been explored by Marinus Spreen and Tom van Yperen (2022), emphasizing the role of a collaborative approach involving therapists, parents, and teachers. Such integration ensures reinforcement of learned skills across social ecosystems. Methodologically, reviewed studies employ diverse approaches, from single-case designs to meta-analyses, as seen in Finnigan & Starr (2010) and Deka & Tiwari (2015). While this breadth enriches the understanding of MT's efficacy, it also underscores the need for standardized protocols and robust methodologies to synthesize results effectively. Clinically, MT demonstrates potential as a tool for fostering social and emotional development in ASD. Structured activities like singing and instrumental play, as noted by Kern et al. (2007), facilitate verbal and non-verbal communication in engaging environments. However, challenges such as limited sample sizes and a lack of standardized measures remain prevalent. For example, Assmus and Hassiotis (2017) reported no significant improvements in social responsiveness when improvisational music therapy (IMT) was

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

incorporated into standard care, emphasizing the need to refine intervention conditions and metrics. A notable area of exploration involves the neurological impact of MT, with studies like Sharda et al. (2018) revealing enhanced fronto-temporal connectivity and social communication abilities, suggesting a neurobiological basis for observed behavioral benefits. Similarly, research by Carpente and Gattino (2018) validates the use of tools like the IMCAP-ND in assessing therapeutic interactions, underscoring the importance of reliable evaluation methods.

The integration of family-centered approaches, as supported by K.S. and Gold (2014), amplifies MT's effectiveness by fostering supportive and interactive environments. Furthermore, differential responses to MT based on functional levels, as reported by Lim (2010), highlight the necessity for tailored interventions. Studies comparing MT with speech-based therapies, such as those by Lim and Draper (2011) and LaGasse (2017), advocate for complementary approaches rather than exclusivity in intervention strategies.

Conclusion

While the evidence supports the efficacy of music therapy in improving communication, emotional engagement, and neurological outcomes in children with ASD, challenges related to variability and methodological rigor necessitate further investigation. Future research should focus on standardizing protocols, exploring longitudinal effects, and leveraging innovative technologies to enhance the accessibility and customization of music therapy interventions. These efforts could solidify MT's role as a cornerstone of holistic autism care.

References

American Music Therapy Association (AMTA). Definition and Quotes about Music Therapy. Retrieved from http://www.musictherapy.org/

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, (DSM-5). Virginia: American Psychiatric Association; (2013).

Benenzon, R. O. (2000). Musicoterapia: delateoría alapráctica [Music therapy; From theory to practice]. Barcelona: Paidós Ibérica.

Bieleninik, Ł., Geretsegger, M., Mössler, K., Assmus, J., Thompson, G., Gattino, G., ... & Time-A Study Team. (2017). Effects of improvisational music therapy vs enhanced standard care on symptom severity among children with autism spectrum disorder: The TIME-A randomized clinical trial. Jama, 318(6), 525-535.

Boso, M., Emanuele, E., Minazzi, V., Abbamonte, M., & Politi, P. (2007). Effect of long-term interactive music therapy on behavior profile and music skills in young adults with severe autism. The Journal of Alternative and Complementary Medicine, 13(7), 709-712.

Brownell, M. D. (2002). Musically adapted social stories to modify behaviors in students with autism: Four case studies. Journal of Music Therapy, 39(2), 117-144.

Caria, A., Venuti, P., & de Falco, S. (2011). Functional and Dysfunctional Brain Circuits Underlying Emotional Processing of Music in Autism Spectrum Disorders, Cerebral Cortex, Volume 21, Issue 12, Pages 2838–2849, https://doi.org/10.1093/cercor/bhr084

Carpente, J. A., & Gattino, G. S. (2018). Inter-rater reliability on the Individual Music-Centered Assessment Profile for Neurodevelopmental Disorders (IMCAP-ND) for autism spectrum disorder. Nordic Journal of Music Therapy, 27(4), 297-311.

Crawford, M. J., Gold, C., Odell-Miller, H., Thana, L., Faber, S., Assmus, J., ... & Hassiotis, A. (2017). International multicentre randomised controlled trial of improvisational music therapy for children with autism spectrum disorder: TIME-A study. Health technology assessment, 21(59), 1-40.

Farner, K. J. (2003). The effect of music vs. non-music paired with gestures on spontaneous verbal and non-verbal communication skills of children with autism between the ages 1-5 (Doctoral dissertation, Florida State University).

Finnigan, E., & Starr, E. (2010). Increasing social responsiveness in a child with autism: A comparison of music and non-music interventions. Autism, 14(4), 321-348.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

Gaitino, G. S., Riesgo, R. D. S., Longo, D., Leite, J. C. L., & Faccini, L. S. (2011). Effects of relational music therapy on communication of children with autism: A randomized controlled study. Nordic Journal of Music Therapy, 20(2), 142-154.

Geretsegger, M., Elefant, C., Mössler, K. A., & Gold, C. (2014). Music therapy for people with autism spectrum disorder. Cochrane Database of Systematic Reviews, 6.

Gold, C., Wigram, T., & Elefant, C. (2006). Music therapy for autistic spectrum disorder (Review). Cochrane Database of Systematic Reviews, 2.

Jain, V. K., & Sharma, R. (2024). Investigate the impact of music on anxiety levels and wellbeing among undergraduate students. Swar Sindhu: National Peer-Reviewed/Refereed Journal of Music, 12(02), Special Issue. http://swarsindhu.pratibha-spandan.org

Jain, V. K. (2021). The impact of social media on the academic development of school students. Asian Journal of Multidimensional Research, 10(12), 644-648.

Jain, D. K., & Sharma, R. (2024). Examine The Trainee Teachers' Viewpoints Regarding Theater-Based Teaching (TBT). ShodhKosh: Journal of Visual and Performing Arts, 675-690.

JAIN, D. V. K. IMPACT OF MUSIC PREFERENCES ON THE PSYCHOLOGICAL WELL-BEING OF ADOLESCENTS.

Jain, V. K., & Sharma, R. (2024). Examine the viewpoints of preschool teachers toward music as pedagogical tools. Swar Sindhu: National Peer-Reviewed/Refereed Journal of Music, 12(01), January-June. http://swarsindhu.pratibhaspandan.org

Jain, V. K., & Sharma, R. (2023). Learners'perception Towards Audio–Visual (Av) Resources Used In Lecture Classes. ShodhKosh: Journal of Visual and Performing Arts, 4(2), 425-434.

Jain, V. K., Sharma, R., & Sharma, D. (2022). Women Empowerment Through Entrepreneurship (A Case Study of Moradabad Zone of UP. India). Central European Management Journal, 30(4), 469-475.

Sharma, D., Sharma, S., Jain, V. K., & Sharma, R. (2022). A Study Of The Attitude Of Female And Male Teacher Trainee Towards The Teaching Profession. Journal of Positive School Psychology, 6(11), 798-805.

Jain, V. K. (2021). The impact of social media on the academic development of school students. Asian Journal of Multidimensional Research, 10(12), 644-648.

Kaplan, R. S., & Steele, A. L. (2005). An analysis of music therapy program goals and outcomes for clients with diagnoses on the autism spectrum. Journal of Music Therapy, 42(1), 2-19.

Katagiri, J. (2009). The effect of background music and song texts on emotional understanding of children with autism. Journal of Music Therapy, 46(1), 15-31.

Kern, P., & Aldridge, D. (2006). Using embedded music therapy interventions to support outdoor play of young children with autism in an inclusive community-based childcare program. Journal of Music Therapy, 43(4), 270-294.

Kern, P., Wakeford, L., & Aldridge, D. (2007a). Improving the performance of a young child with autism during self-care tasks using embedded song interventions: A case study. Music Therapy Perspectives, 25(1), 43-51.

Kern, P., Wolery, M., & Aldridge, D. (2007b). Use of songs to promote independence in morning greeting routines for young children with autism. Journal of Autism and Developmental Disorders, 37(7), 1264¬1271.

Kim, J., Wigram, T., & Gold, C. (2008). The effects of improvisational music therapy on joint attention behaviors in autistic children: A randomized controlled study. Journal of Autism and Developmental Disorders, 38(9), 1758-1766.

Kim, J., Wigram, T., & Gold, C. (2009). Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. Autism, 13(4), 389-409.

LaGasse, A. B. (2014). Effects of a Music Therapy Group Intervention on Enhancing Social Skills in Children with Autism. Journal of Music Therapy, 51(3), 250-275.

LaGasse, A. B. (2017). Social outcomes in children with autism spectrum disorder: A review of music therapy outcomes. Patient Related Outcome Measures, 23-32.

Lim, H. A. (2010). Effect of "developmental speech and language training through music" on speech production in children with autism spectrum disorders. Journal of Music Therapy, 47(1), 2-26.

Lim, H. A., & Draper, E. (2011). The effects of music therapy incorporated with applied behavior analysis verbal behavior approach for children with autism spectrum disorders. Journal of Music Therapy, 48(4), 532-550.

Mateos-Moreno, D., & Atencia-Doña, L. (2013). Effect of a combined dance/movement and music therapy on young adults diagnosed with severe autism. The Arts in Psychotherapy, 40(5), 465-472.

Mössler, K., Gold, C., Aßmus, J., Schumacher, K., Calvet, C., Reimer, S., ... & Schmid, W. (2019). The therapeutic relationship as predictor of change in music therapy with young children with autism spectrum disorder. Journal of Autism and Developmental Disorders, 49, 2795-2809.

SWAR SINDHU
(National Peer-Reviewed/Refereed Journal of Music)
A UGC CARE listed Journal
ISSN 2320–7175 (O) | Volume 13, Issue 01, January-June, 2025
http://swarsindhu.pratibha-spandan.org © The Author(s) 2025

O'Reilly, M. F., Lang, R., ... & Marschik, P. B. (2015). Music therapy for individuals with Autism Spectrum Disorder: A systematic review. Review Journal of Autism and Developmental Disorders, 2(1), 39-54.

Pasiali, V. (2004). The use of prescriptive therapeutic songs in a home-based environment to promote social skills acquisition by children with autism: Three case studies. Music Therapy Perspectives, 22(1), 11-20.

Schwartzberg, E. T., & Silverman, M. J. (2013). Effects of music-based social stories on comprehension and generalization of social skills in children with autism spectrum disorders: A randomized effectiveness study. The Arts in Psychotherapy, 40(3), 331-337.

Sharda, M., Tuerk, C., Chowdhury, R., Jamey, K., Foster, N., Custo-Blanch, M., ... & Hyde, K. (2018). Music improves social communication and auditory–motor connectivity in children with autism. Translational Psychiatry, 8(1), 231.

Sharma, D. R.(2024) Effect Of Music As A Pedagogical Tool On Students'academic Performance At The Foundational Stage. Swar Sindhu: National Peer-Reviewed/Refereed Journal of Music, 12(03), December. http://swarsindhu.pratibhaspandan.org

Solanki, M. S., Zafar, M., & Rastogi, R. (2013). Music as a therapy: Role in psychiatry. Asian Journal of Psychiatry, 6(3), 193-199.

Sharma, D. R. Effect Of Music As A Pedagogical Tool On Students'academic Performance At The Foundational Stage.

Stegemann, T., Geretsegger, M., Phan Quoc, E., Riedl, H., & Smetana, M. (2019). Music therapy and other music-based interventions in pediatric health care: An overview. Medicines, 6(1), 25.

Thompson, G. A., McFerran, K. S., & Gold, C. (2014). Family-centred music therapy to promote social engagement in young children with severe autism spectrum disorder: A randomized controlled study. Child: Care, Health and Development, 40(6), 840-852.

Verma, M., & Sharma, R. (2021). Education and youth crime: a review of the empirical literature. ACADEMICIA: An International Multidisciplinary Research Journal, 11(12), 581-586.

Verma, M., & Sharma, R. (2021). A review on women's empowerment via women's network learning. *Asian Journal of Multidimensional Research, 10*(12), 604–610.

Verma, M., & Sharma, R. (2021). A brief review on the ancient close eastern culture. *ACADEMICIA: An International Multidisciplinary Research Journal, 11*(11), 950–956.

Witusik, A., & Pietras, T. (2019). Music therapy as a complementary form of therapy for mental disorders. Polski Merkuriusz Lekarski: Organ Polskiego Towarzystwa Lekarskiego, 47(282), 240-243.

World Federation of Music Therapy (WFMT). What is music therapy? Retrieved from http://www.wfmt.info/wfmt-new-home/about-wfmt/.

Whipple, J. (2004). Music in intervention for children and adolescents with autism: A meta-analysis. Journal of Music Therapy, 41(2), 90-106.