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IMPACT OF MUSIC THERAPY IN ENHANCING SPEECH AND LANGUAGE SKILLS IN CHILDREN WITH AUTISM SPECTRUM DISORDER: SLP AND OT PERSPECTIVES

Original Research

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ABSTRACT

BACKGROUND: Autism Spectrum Disorder (ASD) is characterized by persistent impairments in social communication, interaction, and adaptive functioning, requiring early and multidisciplinary interventions. Music therapy has emerged as a complementary approach due to its structured, rhythmic, and engaging nature, which may support communication, social participation, cognitive processing, and motor coordination in children with ASD. Despite growing clinical use, limited evidence exists regarding how rehabilitation professionals perceive its effectiveness within routine practice, particularly from speech-language pathology and occupational therapy perspectives.

OBJECTIVE: To examine the perceptions of speech-language pathologists (SLPs) and occupational therapists (OTs) regarding the effects of music therapy on communication, social interaction, cognitive abilities, and motor skills in children with ASD.

METHODOLOGY: A cross-sectional quantitative survey was conducted over six months in rehabilitation settings across Lahore, Pakistan. A total of 155 professionals participated, including 133 SLPs (85.8%) and 22 OTs (14.2). Data were collected using a modified Music Therapy Assessment Tool assessing five domains: communication, musical engagement, cognitive skills, social interaction, and motor abilities. Participants rated observed child responses during music therapy sessions using a frequency-based scale ranging from “never” to “always.” Descriptive statistics were analyzed using SPSS version 20.

RESULTS: Positive engagement was reported across multiple domains. Eye contact was observed sometimes by 48.4% of respondents and often by 22.6%. Expression of personal needs occurred sometimes in 51.0%, while direction following was reported sometimes by 53.5%. Musical engagement was notable, with singing in pitch occurring sometimes in 46.5% and often in 27.1%. Melody recall was reported often by 36.8%, and adaptation to volume changes occurred sometimes in 45.2%. Social participation improved, with group engagement reported often in 36.1% and sharing instruments sometimes in 38.1%. Motor participation, including clapping and movement imitation, was frequently observed.

CONCLUSION: Music therapy was perceived as an effective complementary intervention for enhancing social communication, rhythmic engagement, and motor participation in children with ASD. While complex verbal skills remained challenging, the findings supported the integration of music therapy within multidisciplinary rehabilitation programs involving SLPs and OTs.

KEY TERMS: Autism Spectrum Disorder, Child Development, Music Therapy, Occupational Therapy, Rehabilitation, Social Communication, Speech-Language Pathology

INTRODUCTION

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent difficulties in social interaction, verbal and nonverbal communication, and the presence of restricted and repetitive patterns of behavior, interests, and activities. Core features of ASD include early impairments in social communication alongside repetitive sensory–motor behaviors, with strong evidence supporting a substantial genetic contribution to its etiology (1). As a spectrum condition, ASD manifests with considerable variability in symptom severity, functional abilities, and adaptive outcomes, meaning that no two individuals present in the same way. The disorder typically emerges within the first three years of life and is diagnosed more frequently in males, with an approximate male-to-female ratio of 4:1. The heterogeneity of ASD extends beyond core symptoms to include marked differences in language abilities, intellectual functioning, and the presence of comorbid psychiatric and medical conditions (2). Many children with ASD experience delayed cognitive development, impaired expressive and receptive language skills, and motor coordination difficulties. Behavioral challenges such as hyperactivity, impulsivity, and inattention are common, while a subset of children also present with epilepsy or seizure disorders (3). Additional concerns often include atypical feeding

and sleeping patterns, gastrointestinal disturbances, emotional dysregulation, and reduced or absent eye contact. Early identification of these features is essential, as timely intervention can significantly influence developmental trajectories. Given the multifaceted nature of ASD, comprehensive management typically requires coordinated, multidisciplinary interventions, most commonly involving speech-language therapy, occupational therapy, and behavior-based approaches (4). Within this multidisciplinary framework, music therapy has emerged as a promising complementary intervention for children with ASD. Music therapy is defined as a clinical, evidence-based practice that uses structured music experiences and therapeutic relationships to address physical, emotional, cognitive, and social needs (5). Music engages multiple neural systems simultaneously and elicits robust emotional and attentional responses, making it particularly suitable for children with neurodevelopmental disorders who may struggle with conventional, language-dependent therapeutic approaches. The nonverbal and structured nature of music allows children with significant intellectual, communicative, or emotional impairments to participate meaningfully in therapy without relying solely on spoken language (6).

Evidence suggests that music therapy can positively influence several developmental domains relevant to ASD. Through singing, rhythm, and improvisation, music-based interventions have been shown to enhance both verbal and nonverbal communication, supporting skills such as turn-taking, joint attention, and expressive intent (7). Group-based music activities further promote social engagement by encouraging cooperation, shared attention, and peer interaction in an enjoyable and predictable context. Music also provides a safe medium for emotional expression, helping children recognize and regulate emotions while reducing anxiety and behavioral distress. Additionally, the structured auditory input inherent in music therapy may facilitate sensory integration, enabling children to better tolerate and process sensory stimuli (8,9). Despite growing empirical support for music therapy in ASD, an important gap remains regarding how this intervention is perceived and applied by key rehabilitation professionals, particularly speech-language pathologists (SLPs) and occupational therapists (OTs). These professionals play a central role in addressing communication, sensory processing, motor planning, and functional participation in children with ASD. From an SLP perspective, music-based activities can support prosody, articulation, vocabulary acquisition, and pragmatic language skills, while OTs may use music to enhance sensory modulation, self-regulation, motor coordination, and engagement in meaningful activities. However, limited evidence exists on how these professionals integrate music therapy principles into their routine practice or how interdisciplinary collaboration around music-based interventions can be optimized. Given the critical need for early, effective, and coordinated interventions in ASD, understanding the role of music therapy within speech-language and occupational therapy practice is essential. Therefore, the objective of the present study is to examine the perceptions and applications of music therapy among speech-language pathologists and occupational therapists working with children with ASD, with the aim of identifying how music-based approaches may be integrated to enhance communication, sensory regulation, and overall functional outcomes in this population.

METHODS

A cross-sectional descriptive research design was employed to explore the views of speech-language pathologists (SLPs) and occupational therapists (OTs) regarding the role of music therapy in the management of children with Autism Spectrum Disorder (ASD). The study was conducted over a six-month period, from June 2024 to December 2024, across multiple health and rehabilitation care settings in Lahore, Pakistan, including specialized autism care centers, rehabilitation facilities, private clinics, and individual professional practices. This design was considered appropriate to capture prevailing professional perceptions and practices at a single point in time within a real-world clinical context. The study population comprised practicing SLPs and OTs who were actively involved in the management of children with ASD. A convenience sampling technique was used to recruit a total of 155 participants, including 133 speech-language pathologists and 22 occupational therapists. Eligible participants were required to have 1–5 years of clinical experience and to routinely incorporate music-based activities or music therapy principles in their therapeutic work with children diagnosed with ASD. Undergraduate students, non-practicing professionals, and allied health professionals outside the fields of speech-language pathology and occupational therapy were excluded to ensure professional relevance and consistency of responses (7,10).

Data were collected using a modified version of the Music Therapy Assessment Tool, designed to capture clinicians' observational perspectives rather than direct child performance outcomes. The instrument assessed five core domains relevant to ASD intervention: communication skills (including eye contact, verbal output, and comprehension of instructions), musical engagement (such as singing in pitch, rhythm matching, and use of musical instruments), cognitive skills (including concept identification, memory for melodies, and adaptation to tempo changes), social interaction (eye contact with others, verbal interaction, and sharing of instruments), and motor skills (such as clapping, pointing to body parts, and imitation of movements) (11-13). Participants rated the frequency of observed behaviors during music therapy sessions using a Likert-type scale ranging from "never" to "always," based on their cumulative clinical experience with children with ASD. Collected data were entered and analyzed using the Statistical Package for Social Sciences (SPSS), version 20. Descriptive statistical methods were applied to summarize participant demographics and to calculate frequencies and percentages of responses across the assessed domains.

This analytical approach was chosen to provide a clear overview of professional perceptions and observed trends without inferring causality, which aligns with the descriptive nature of the study design. Ethical considerations were strictly observed throughout the research process. Written informed consent was obtained from all participants prior to data collection, and participation was entirely voluntary. Confidentiality and anonymity of responses were ensured, with no identifying information recorded or disclosed. Ethical approval for the study was granted by the Institutional Review Board (IRB) of the PSRD College of Rehabilitation Sciences. All study procedures were conducted in accordance with established ethical standards for research involving human participants.

RESULTS

A total of 155 respondents participated in the study, all of whom were female, comprising 133 speech-language pathologists and 22 occupational therapists. Most participants were young professionals, with 42.6% aged 20–23 years and 40.0% aged 24–27 years, while only 2.6% were above 30 years of age. In terms of academic qualification, 72.3% held bachelor's degrees and 27.7% held master's degrees. Professional experience analysis showed that 60.0% had 0–2 years of experience working with children with ASD, 30.3% had 2–4 years, 4.5% had 4–6 years, and 5.2% had 6–8 years of experience. Participants were employed across diverse clinical settings, including rehabilitation centers (31.6%), hospitals and clinics (24.5%), private practices (11.6%), and other service settings (7.7%), while some respondents reported working in multiple environments. Findings related to communication skills indicated variable yet generally positive engagement of children with ASD during music therapy sessions. Eye contact was reported as occurring sometimes by 48.4% of respondents, often by 22.6%, rarely by 16.8%, and always by 12.3%. Verbalization of preferences was frequently observed by approximately one-third of respondents, while occasional and consistent verbalization were reported less often. The ability to express personal needs was described as sometimes present by 51.0% of respondents, with 19.4% reporting frequent occurrence and smaller proportions reporting rare, constant, or absent expression. Listening to others during sessions was reported as sometimes by 35.5% and often by 19.4% of respondents. Language completion tasks showed occasional success in 46.5% of children, whereas correct use of gestures was reported sometimes by 47.1%. Following directions was most commonly rated as sometimes (53.5%), while question-answering and call-and-response activities were also primarily observed at occasional to frequent levels. Speech intelligibility was most often rated as sometimes (47.1%) or often (26.5%), with fewer children demonstrating consistently clear speech. Musical engagement outcomes demonstrated encouraging responses across several domains. Singing in pitch was reported as sometimes by 46.5% and often by 27.1% of respondents. Completion of musical phrases occurred occasionally in 44.5% and frequently in 28.4% of children. Recognition of musical structure and form was most commonly reported as occasional (41.3%) or frequent (24.5%). Rhythm matching and imitation showed greater variability, with rare or occasional engagement reported by most respondents, while adaptation to rhythmic changes and volume control showed stronger performance, with over one-third of children adapting often and nearly half adapting sometimes. Instrument selection and expressive use were generally rated as occasional to frequent, indicating moderate engagement with musical tools during therapy.

Cognitive abilities assessed through musical activities revealed favorable trends. Identification of basic concepts such as body parts, colors, and shapes was reported as sometimes by 44.5% and often by 40.6% of respondents, with 12.3% reporting consistent performance. Recognition of tempo and dynamic changes occurred sometimes in 48.4% and often in 27.7%. Repetition of simple and complex patterns was frequently observed in 38.1% and sometimes in 39.4% of children. Melody and theme recall was reported as regular or occasional in over 70% of cases. Repetition of simple melodies was reported as sometimes (41.3%) or often (34.2%), while memorization of lyrics emerged as a relative strength, with a substantial proportion of respondents indicating consistent or frequent recall. Social interaction outcomes showed meaningful engagement during music-based activities. Participation in group musical activities was reported as frequent by 36.1% and occasional by 35.5% of respondents. Maintenance of eye contact during social interaction was reported as occasional to frequent by most respondents, while greeting behaviors and use of gestures were commonly observed at occasional or frequent levels. Conversational interaction was rated as occasional by 47.7% and frequent by 20.6%. Sharing and passing instruments occurred sometimes in 38.1% and often in 29.7% of children. Response to name calling demonstrated strong outcomes, with 51.6% responding often and 10.3% always. Improvisational interaction and recognition of others were primarily observed at occasional to frequent levels. Motor skill engagement during music-based activities demonstrated notable participation. Multifinger playing was reported as sometimes by 36.1% and often by 29.7% of respondents. Singing activities showed high engagement, with 47.1% often and 32.9% sometimes participating. Clapping during songs showed particularly strong involvement, with 34.8% often and 21.9% always engaging. Identification of body parts through pointing was observed sometimes or often in over 70% of children. Imitation of simple upper and lower limb and trunk movements was most commonly reported as occasional (51.0%) or frequent (27.7%), indicating effective motor participation during musical activities. Overall, the results demonstrated that children with ASD showed heterogeneous yet broadly positive responses to music therapy across communication, musical engagement, cognitive functioning, social interaction, and motor participation. Rhythmic activities, group participation, and motor-based tasks elicited the highest levels of engagement,

while more complex skills such as intelligible speech and advanced musical discrimination showed comparatively lower but still meaningful involvement. These findings align with the study objective of examining professional perceptions of music therapy effectiveness from SLP and OT perspectives.

Table 1: Demographic and Professional Characteristics of Participants (n = 155)

Variable	Category	n (%)
Profession	Speech-Language Pathologists	133 (85.8)
	Occupational Therapists	22 (14.2)
Gender	Female	155 (100)
Age (years)	20–23	66 (42.6)
	24–27	62 (40.0)
	≥30	4 (2.6)
Education Level	Bachelor's degree	112 (72.3)
	Master's degree	43 (27.7)
Professional Experience (years)	0–2	93 (60.0)
	2–4	47 (30.3)
	4–6	7 (4.5)
	6–8	8 (5.2)
Work Setting*	Rehabilitation centers	49 (31.6)
	Hospitals/Clinics	38 (24.5)
	Private practice	18 (11.6)
	Other settings	12 (7.7)

Table 2: Communication Skills Observed During Music Therapy Sessions

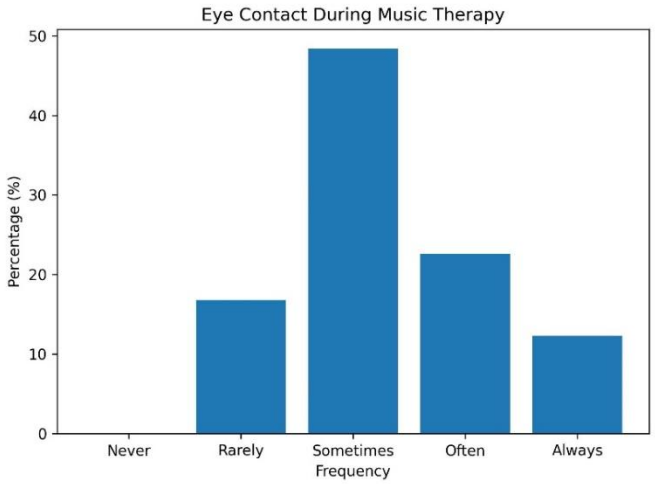
Communication Skill	Never %	Rarely %	Sometimes %	Often %	Always %
Eye contact	—	16.8	48.4	22.6	12.3
Verbalizes preferences	—	—	—	~34.0	—
Expresses personal needs	4.5	20.0	51.0	19.4	5.2
Listens to others	—	—	35.5	19.4	—
Completes language tasks	15.5	25.2	46.5	—	10.3
Uses correct gestures	12.3	23.9	47.1	—	14.2
Follows directions	—	25.2	53.5	18.1	2.6
Answers questions	—	30.3	43.2	21.3	2.6
Call-and-response	—	24.5	51.6	16.8	7.1
Speech intelligibility	5.2	15.5	47.1	26.5	4.5

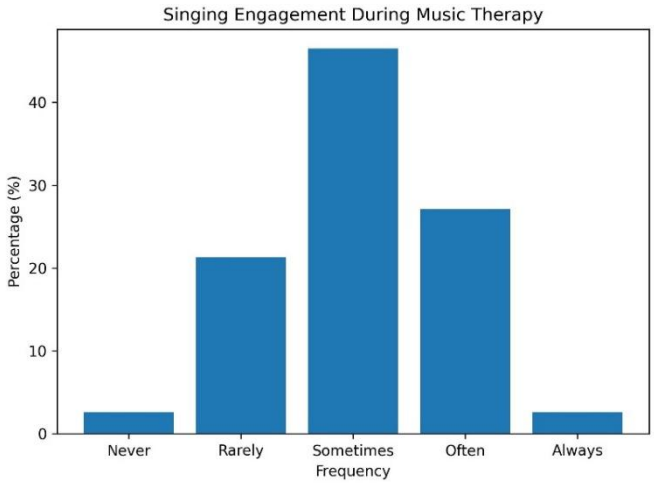
Table 3: Musical Engagement and Cognitive Skills During Music Therapy

Skill Domain	Never %	Rarely %	Sometimes %	Often %	Always %
Singing in pitch	2.6	21.3	46.5	27.1	2.6
Completes musical phrases	—	19.4	44.5	28.4	7.7
Recognizes musical structure	7.7	23.9	41.3	24.5	2.6
Matches rhythm	20.0	36.8	28.4	28.4	14.8
Adapts to rhythmic change	—	9.7	43.9	35.8	9.7
Adjusts volume	—	9.7	41.9	38.7	9.7
Identifies concepts	—	2.6	44.5	40.6	12.3
Recognizes tempo/dynamics	—	18.1	48.4	27.7	5.2
Repeats patterns	—	15.5	39.4	38.1	7.1
Remembers melodies	—	20.0	35.5	36.8	7.7
Memorizes lyrics	—	20.0	31.0	—	41.9

Table 4: Social Interaction and Motor Skills During Music Therapy

Skill	Never %	Rarely %	Sometimes %	Often %	Always %
Group participation	—	12.9	35.5	36.1	15.5
Maintains eye contact socially	—	21.3	31.6	—	35.5
Greets/uses gestures	2.6	23.2	43.2	23.9	7.1
Converses with others	4.5	21.9	47.7	20.6	5.2
Shares instruments	4.5	21.3	38.1	29.7	6.5
Responds to name	0.3	16.1	21.9	51.6	10.3
Multi-finger playing	5.2	24.5	36.1	29.7	4.5
Singing participation	2.6	15.5	32.9	47.1	1.9
Claps with songs	2.6	7.7	32.9	34.8	21.9
Points to body parts	2.6	10.3	40.6	29.7	16.8
Imitates movements	2.6	4.5	51.0	27.7	14.2





DISCUSSION

This study explored the perspectives of speech-language pathologists and occupational therapists regarding the role of music therapy in supporting communication, social, cognitive, and motor skills in children with Autism Spectrum Disorder. The findings suggested that music-based interventions were perceived as broadly beneficial across multiple developmental domains, although the degree of impact varied according to the specific skill targeted. Overall, the results supported the growing view that music therapy functions most effectively as a complementary approach within a multidisciplinary intervention framework rather than as a standalone treatment modality. The demographic profile of the participants revealed a sample composed entirely of female clinicians, reflecting the well-documented gender distribution within the professions of speech-language pathology and occupational therapy. This trend has been consistently reported in previous workforce studies and may be influenced by sociocultural factors, professional norms, and training pathways within rehabilitation sciences (10,11). The predominance of young professionals aged 20–27 years with limited clinical experience also indicated an expanding entry of early-career clinicians into ASD services, likely driven by increased awareness, earlier diagnosis, and rising service demand. While this demographic shift may bring contemporary training perspectives and openness to innovative interventions such as music therapy, it may also influence perceptions due to relatively limited long-term clinical exposure. In relation to communication and social interaction outcomes, the findings demonstrated that core ASD-related challenges such as sustained eye contact, spontaneous verbalization, and consistent expression of needs were still observed at low to moderate frequencies during music therapy sessions. These results aligned with established literature describing persistent difficulties in social reciprocity, pragmatic language, and communicative initiation among children with ASD (12,13). However, the relatively stronger performance observed in direction following, engagement in structured activities, and call-and-response behaviors suggested that music therapy may facilitate specific aspects of communicative readiness. Prior research has emphasized that music provides an intrinsically motivating and emotionally engaging context, which can reduce social demands and anxiety while enhancing attention and participation (14). The present findings were consistent with this view, indicating that music may act as a catalyst for engagement rather than directly remediating higher-level language deficits.

A particularly notable finding was the high level of engagement in rhythmic and movement-based activities, including clapping, pattern repetition, and motor imitation. These outcomes echoed earlier experimental and clinical studies demonstrating that structured rhythmic input supports synchronization, timing, and motor planning in children with ASD (15). The repetitive and predictable nature of music appears to promote anticipation and joint attention, thereby facilitating coordinated action and reciprocal interaction (16). Unlike conventional speech-language interventions that rely heavily on verbal mediation, music therapy integrates auditory, visual, and kinesthetic cues, which may be especially advantageous for children with sensory processing differences and motor planning difficulties (17). Moderate gains were also perceived in symbolic and expressive behaviors, such as instrument use, improvisation, and call-and-response exchanges. These behaviors reflected emerging communicative intent and turn-taking within a structured temporal framework. Previous research has highlighted that rhythm provides an external organizational scaffold that supports sequencing and response timing, which are often impaired in ASD (18). The current findings reinforced the idea that predictability and temporal structure are key mechanisms through which music therapy may enhance functional communication, even when expressive language remains limited. Despite these positive trends, the study also highlighted persistent challenges in areas requiring higher-level processing, including intelligible speech production, discrimination of complex musical structures, and consistent modulation of volume and tempo. These findings underscored an important limitation of music therapy, namely that while it may enhance engagement, regulation, and foundational communicative behaviors, it does not fully address the core neurodevelopmental deficits underlying ASD. Similar conclusions have been reported in prior controlled studies, which noted that improvements associated with music-based interventions were more pronounced in social engagement and affective responsiveness than in advanced verbal communication outcomes (19,20). This supports the interpretation that music therapy is best positioned as an adjunctive intervention that augments, rather than replaces, evidence-based speech-language and occupational therapy approaches (21).

Differences in perceived effectiveness across work settings further suggested that contextual factors influenced the implementation and outcomes of music therapy. Clinicians working in rehabilitation centers and hospital-based settings reported higher levels of engagement compared with those in private practice. This variation may reflect differences in available resources, interdisciplinary collaboration, session structure, and client caseload complexity. Structured environments with access to multidisciplinary teams may facilitate more consistent and goal-directed use of music-based strategies, thereby enhancing their perceived effectiveness (22). These findings highlighted the importance of organizational support and interprofessional collaboration in maximizing the benefits of complementary interventions. The cognitive domain findings indicated moderate improvements in concept recognition, melodic memory, and adaptation to tempo and dynamic changes, suggesting that music therapy may also support cognitive processing and learning. Music-based activities inherently engage attention, memory, and sequencing, which may generalize to non-musical cognitive tasks. Earlier investigations have similarly reported improvements

in auditory processing, attention, and hand–eye coordination following structured music interventions (23,24). These cognitive benefits may indirectly support communication and functional participation, reinforcing the holistic value of music therapy within developmental intervention programs. Motor outcomes represented another relative strength of music therapy, with frequent engagement observed in clapping, body-part identification, and imitation of movements. The integration of rhythm and movement appeared to facilitate motor coordination and body awareness, areas commonly affected in children with ASD. The multisensory nature of music therapy may therefore offer a unique platform for addressing motor and sensory integration challenges concurrently, which is consistent with broader rehabilitation literature emphasizing embodied and participatory learning approaches.

Several strengths of this study were evident, including the inclusion of both speech-language pathologists and occupational therapists, the use of a multidimensional assessment framework, and data collection across diverse clinical settings. However, important limitations should be acknowledged. The cross-sectional design limited causal inference and prevented evaluation of longitudinal change. The reliance on clinician-reported observations introduced the potential for subjective bias, particularly given the predominance of early-career professionals. Additionally, the absence of comparative analyses between professional groups and the lack of inferential statistics restricted deeper examination of factors influencing perceptions. The exclusive inclusion of female participants also limited generalizability. Future research would benefit from longitudinal and mixed-method designs incorporating objective outcome measures, stratified analyses by profession and experience level, and inclusion of caregiver or child-reported outcomes. Standardization and psychometric validation of assessment tools specific to music therapy contexts are also warranted. Overall, the findings supported the role of music therapy as a valuable complementary intervention that enhances engagement, social participation, and foundational communication skills in children with ASD when integrated thoughtfully within multidisciplinary care models.

CONCLUSION

This study concluded that music therapy serves as a meaningful complementary intervention for children with Autism Spectrum Disorder, particularly in enhancing social communication, rhythmic engagement, and expressive interaction. While complex verbal communication challenges remained evident, consistent improvements in participation, responsiveness, and shared interaction highlighted the value of music-based approaches in clinical practice. These findings emphasized that music therapy is most effective when integrated with conventional speech-language and occupational therapy, reinforcing the importance of coordinated multidisciplinary collaboration. Overall, the study underscored the practical significance of incorporating structured music interventions to support holistic developmental outcomes in children with ASD.

AUTHOR's CONTRIBUTION:

Author	Contribution
Syeda Khushbakht Hashmi	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Masooma Rubab	Methodology, Investigation, Data Curation, Writing - Review & Editing
Madiha Maqsud	Investigation, Data Curation, Formal Analysis, Software
Emaan Khadim	Software, Validation, Writing - Original Draft
Maha Ilahi	Formal Analysis, Writing - Review & Editing

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