Mental Health and Lifestyle Journal

Year 2027
Volume 5
Issue 1

Effectiveness of Orff-Based Music Therapy on Parental Burnout and Parent–Child Interaction in Mothers of Children with Down Syndrome: A Quasi-Experimental Study

Neda. Birjandi[1], Zohreh. Latifi[2*], Behrokh. Dayhimnia[3], Fakhrossadat. Khosravani Nazari[4]

1 Department of Psychology, Khomeinishahr Branch, Islamic Azad University, Isfahan, Iran.
2 Department of Psychology, Payame Noor University, Tehran, Iran.
3 Department of Psychology, Najafabad Branch, Islamic Azad University, Najafabad, Iran.
4 Department of Psychology, Khorasgan Branch, Islamic Azad University, Isfahan, Iran.
*Correspondence: z_yalatif@pnu.ac.ir

Article type:
Original Research

Article history:
Received 21 February 2026
Revised 14 May 2026
Accepted 25 May 2026
Initial Publish 21 June 2026
Published online 01 January 2027

ABSTRACT

This study aimed to investigate the effectiveness of music therapy based on the Orff Schulwerk approach in reducing parental burnout and improving parent–child interaction among mothers of children with Down syndrome. A quasi-experimental design with a pretest–posttest–follow-up structure and a control group was employed. The sample consisted of 30 mother–child dyads recruited from a specialized rehabilitation center in Isfahan, Iran, and randomly assigned to experimental (n = 15) and control (n = 15) groups. The experimental group participated in a 10-session music therapy program (60 minutes per session), while the control group received no intervention. Data were collected using the Parental Burnout Assessment (PBA) and the Child–Parent Relationship Scale (CPRS). Statistical analyses included repeated measures ANOVA and multivariate analysis of covariance (MANCOVA). The findings revealed that music therapy significantly reduced overall parental burnout in the experimental group compared to the control group ($p < 0.01$), with a large effect size. Specifically, significant improvements were observed in the dimensions of parental exhaustion and feelings of being fed up with the parental role. However, no significant changes were found in emotional distancing or contrast with the previous parental self. Regarding parent–child interaction, no significant improvement was observed in the overall interaction score. Nevertheless, a significant reduction in excessive dependency was identified ($p < 0.01$), while the dimensions of conflict and closeness remained unchanged. Music therapy based on the Orff Schulwerk approach appears to be an effective intervention for reducing parental burnout among mothers of children with Down syndrome, particularly by alleviating emotional exhaustion and negative feelings toward parenting. However, its effects on broader parent–child relational dynamics are limited and selective. Integrating music therapy with targeted psychological and parenting interventions may enhance its impact on interaction quality.

Keywords: Music Therapy; Parental Burnout; Parent–Child Interaction; Down Syndrome; Orff Schulwerk; Mothers of Children with Disabilities

How to cite this article:
Birjandi, N., Latifi, Z., Dayhimnia, B., & Khosravani Nazari, F. (2027). Effectiveness of Orff-Based Music Therapy on Parental Burnout and Parent–Child Interaction in Mothers of Children with Down Syndrome: A Quasi-Experimental Study. *Mental Health and Lifestyle Journal, 5*(1), 1-13. https://doi.org/10.61838/mhlj.251

Introduction

Down syndrome (DS) is one of the most common chromosomal disorders associated with intellectual disability and developmental impairments in children. The condition is characterized by a broad range of

cognitive, physical, behavioral, neurological, and social difficulties that can significantly affect both the child and family functioning (1, 2). Children with Down syndrome frequently experience delays in language acquisition, motor development, emotional regulation, social interaction, and adaptive functioning, while many also present with medical comorbidities such as sleep disorders, visual impairments, craniofacial abnormalities, and neurological complications that require long-term care and supervision (1-3). Advances in healthcare and early intervention programs have improved survival rates and quality of life among children with Down syndrome; however, families continue to face substantial psychological, emotional, financial, and caregiving burdens associated with raising a child with developmental disabilities (4, 5). In many societies, mothers remain the primary caregivers of children with special needs, placing them at increased risk for chronic stress, emotional exhaustion, caregiving fatigue, and disruptions in family functioning. The ongoing demands associated with caregiving responsibilities may negatively influence maternal mental health and the quality of parent–child interactions, particularly when families lack sufficient social support or adaptive coping strategies (6-8).

Parental burnout has emerged as an important psychological construct in understanding the experiences of parents caring for children with developmental and behavioral challenges. Parental burnout refers to a state of overwhelming exhaustion related specifically to the parental role, characterized by emotional distancing from one's child, feelings of ineffectiveness, and a marked contrast between one's current parental self and previous expectations of parenting (9). Unlike occupational burnout or depressive disorders, parental burnout is specifically associated with chronic parenting stress and the imbalance between parental demands and available coping resources (9). Research has demonstrated that parents of children with special educational and developmental needs are particularly vulnerable to experiencing high levels of stress and burnout because of continuous caregiving demands, behavioral management challenges, and concerns regarding the child's future independence and social integration (6, 8). Mothers of children with Down syndrome often encounter persistent emotional strain related to caregiving responsibilities, medical appointments, educational concerns, social stigma, and uncertainty about developmental outcomes (4, 7). Studies have shown that elevated parental burnout is associated with negative parenting behaviors, reduced emotional availability, increased conflict within family relationships, and poorer developmental outcomes in children (10, 11). Furthermore, chronic parental exhaustion may impair caregivers' ability to engage in supportive and emotionally responsive interactions with their children, thereby negatively affecting attachment quality and relational functioning.

Parent–child interaction is considered one of the most important factors influencing the emotional, cognitive, and social development of children with disabilities. Positive parent–child relationships characterized by emotional warmth, sensitivity, effective communication, and mutual responsiveness contribute substantially to children's adaptive functioning, emotional security, and social competence (12, 13). In contrast, dysfunctional interaction patterns involving conflict, emotional withdrawal, overprotection, or dependency may increase emotional and behavioral difficulties among children with developmental disorders (14, 15). Parents experiencing high levels of stress and burnout may unintentionally adopt maladaptive parenting practices or demonstrate reduced patience, emotional responsiveness, and engagement in interactions with their children (10, 11). Research on families of children with disabilities has emphasized that communication difficulties, emotional strain, and reduced social support can contribute to

impaired parent–child relationships and family dysfunction (13, 16). Furthermore, family dynamics theories suggest that parental emotional states significantly influence parenting styles, child behavior, and relational patterns within the family system (15). Therefore, interventions designed to reduce parental stress and improve emotional connection between parents and children may play an essential role in enhancing family functioning and child development outcomes.

Music therapy has increasingly attracted attention as a holistic and multidimensional intervention for children with developmental disorders and their families. Music-based interventions are grounded in the idea that music can facilitate emotional expression, social communication, cognitive stimulation, sensory integration, and interpersonal connection through nonverbal and creative processes (17). Music therapy has been widely applied in the rehabilitation of children with autism spectrum disorder, intellectual disabilities, and developmental delays, with evidence suggesting positive effects on emotional regulation, communication skills, social interaction, and behavioral functioning (18, 19). Active music therapy approaches involving rhythm, movement, singing, and instrument play may create opportunities for emotional synchronization and shared experiences between parents and children, thereby strengthening relational bonds and improving interaction quality (20). Shared musical experiences have been shown to promote emotional closeness, empathy, mutual attention, and cooperative engagement within parent–child relationships (20). These experiences may be particularly beneficial for families of children with Down syndrome because music provides a non-threatening and enjoyable medium for communication, emotional expression, and social participation.

The Orff Schulwerk approach is one of the most widely recognized music education and therapeutic models used with children and families. This approach integrates music, rhythm, movement, speech, and improvisation to encourage creativity, participation, and emotional expression in a supportive and interactive environment (21). The Orff-inspired framework emphasizes experiential learning and collaborative participation, making it particularly suitable for children with developmental and communication difficulties. Research has demonstrated that Orff-based music activities can improve social inclusion, emotional regulation, and interpersonal engagement among children and adolescents (21). Music performance training and structured musical participation have also been associated with enhanced self-regulation, creativity, and parental support processes in childhood and adolescence (22). Through rhythmic synchronization, cooperative play, and shared emotional experiences, music therapy may help reduce parenting stress while simultaneously improving the quality of parent–child interaction. In addition, musical activities involving movement, imitation, and emotional attunement may strengthen communication skills and facilitate emotional responsiveness between caregivers and children with developmental disorders (23).

Several studies have highlighted the psychological vulnerability of parents caring for children with special needs and the importance of supportive interventions aimed at reducing stress and improving family functioning. Systematic reviews have shown that parents of children with developmental disorders frequently report elevated levels of anxiety, emotional fatigue, and parenting burden compared with parents of typically developing children (6). Research has also identified social support, adaptive coping strategies, and positive family functioning as protective factors against parental burnout (8, 24). Nevertheless, many families continue to experience limited access to psychological support services specifically targeting

parent–child relationships and caregiver well-being. Although music therapy has demonstrated positive effects on emotional and social functioning in children with developmental disorders, relatively few studies have directly examined its impact on parental burnout and parent–child interaction among families of children with Down syndrome. Existing literature has primarily focused on the therapeutic benefits of music for children's communication skills, behavioral adjustment, and socialization outcomes rather than parental psychological functioning (18, 19, 23). Furthermore, many previous studies have concentrated on autism spectrum disorder populations, while fewer investigations have explored music therapy interventions specifically for families of children with Down syndrome.

The importance of addressing parental burnout extends beyond caregiver mental health because parental well-being is strongly associated with parenting quality and child developmental outcomes. Research has shown that parental stress and emotional exhaustion may contribute to negative parenting styles, increased parent–child conflict, overprotective behaviors, and reduced emotional warmth (10, 14). Harsh or dysfunctional parenting practices have also been linked to adverse developmental and emotional consequences in children (25). Conversely, interventions that enhance emotional connection, communication, and supportive interaction patterns may improve resilience and adaptive functioning within families. Qualitative studies have emphasized that parents of children with Down syndrome often seek opportunities for emotional support, positive interaction experiences, and activities that strengthen family cohesion (7). Music therapy may serve as an effective intervention because it simultaneously addresses emotional regulation, relational engagement, stress reduction, and social participation through enjoyable and collaborative experiences. The multisensory and nonverbal nature of music-based activities may be particularly advantageous for children with intellectual and communication difficulties, allowing meaningful interaction and emotional attunement to emerge in ways that traditional verbal interventions may not fully achieve.

Despite growing interest in music-based therapeutic approaches, important gaps remain in understanding the effectiveness of structured music therapy interventions on parental burnout and parent–child interaction among families of children with Down syndrome. In particular, limited empirical evidence exists regarding the application of Orff-based music therapy programs involving both mothers and children in combined therapeutic sessions. Moreover, few studies have investigated whether music therapy can produce sustained improvements in caregiver well-being and relational functioning over time. Considering the increasing prevalence of parental stress among caregivers of children with developmental disabilities and the critical role of parent–child relationships in child development, identifying effective and accessible interventions remains an important clinical and social priority (8, 10). Therefore, the present study aimed to investigate the effectiveness of music therapy based on the Orff Schulwerk approach on parental burnout and parent–child interaction among mothers of children with Down syndrome.

Methods and Materials

Study Design and Participants

This study employed a quasi-experimental design with a pretest–posttest–follow-up structure and a control group to examine the effectiveness of music therapy on parental burnout and parent–child interaction among mothers of children with Down syndrome. Participants were assessed at three

measurement points, including baseline assessment before the intervention (T1), immediate post-intervention assessment (T2), and a follow-up assessment conducted 45 days after the completion of the intervention (T3). The design of the study enabled the evaluation of both the immediate and sustained effects of the intervention over time. The statistical population consisted of mothers of children with Down syndrome and their children who attended the Aseman Nili Rehabilitation Center, a specialized rehabilitation and educational center for children with developmental disorders in Isfahan, Iran, during the spring of 2025. Participants were recruited through purposive sampling based on predetermined inclusion and exclusion criteria. A total of 30 mother–child dyads were selected and randomly assigned into either the experimental group (n = 15) or the control group (n = 15). Mothers assigned to the experimental group participated in the music therapy program, whereas participants in the control group were placed on a waiting list and did not receive any intervention during the study period. Inclusion criteria included having a child diagnosed with Down syndrome with mild intellectual disability, maternal age between 25 and 50 years, child age between 7 and 16 years, sufficient literacy for questionnaire completion, absence of severe psychiatric disorders or psychotropic medication use, awareness of the child's condition, and voluntary willingness to participate. Exclusion criteria included severe physical illness preventing attendance, previous participation of the child in formal music training programs, acute psychiatric disorders in parents, unwillingness to continue participation, and simultaneous involvement in other psychological or counseling interventions.

Data Collection

Demographic information was collected using a researcher-developed sociodemographic questionnaire designed to obtain background information regarding participants and their children. The questionnaire included items related to maternal age, educational level, employment status, marital status, child age, and other relevant family characteristics. The collected information was used to describe the sample and control for potential demographic confounding variables.

Parental burnout was assessed using the Parental Burnout Assessment (PBA) developed by Roskam and colleagues in 2018. The instrument consists of 23 items designed to evaluate four major dimensions of parental burnout, including exhaustion in the parental role, contrast with one's previous parental self, feelings of being fed up with parenting, and emotional distancing from one's children. Responses are rated on a 7-point Likert scale ranging from 0 (never) to 6 (daily), with higher total scores indicating greater levels of parental burnout. The possible score range extends from 0 to 138. Previous studies have demonstrated strong psychometric properties for the instrument across different populations. The Persian version of the scale has shown satisfactory validity and excellent reliability, with Cronbach's alpha coefficients reported above 0.90, indicating high internal consistency and suitability for use among Iranian parents.

The quality of parent–child interaction was evaluated using the Child–Parent Relationship Scale (CPRS) developed by Driscoll and Pianta (2011). The CPRS consists of 33 items assessing parental perceptions of the relationship with their child across three domains, including conflict, closeness, and dependency. The conflict subscale contains 17 items, the closeness subscale includes 10 items, and the dependency subscale contains 6 items. Responses are rated on a 5-point Likert scale ranging from "definitely does not apply" to "definitely applies." Higher scores indicate stronger levels of the respective construct. To calculate the

overall quality of the relationship, the scores of the conflict and dependency dimensions are reversed and combined with the closeness dimension to obtain a total positive relationship score. Previous research on the Persian version of the scale has reported acceptable psychometric characteristics, with Cronbach's alpha coefficients of 0.84 for conflict, 0.69 for closeness, 0.46 for dependency, and 0.80 for the total scale. The original version of the scale also demonstrated acceptable reliability coefficients ranging between 0.69 and 0.80 across subscales.

Intervention

Following recruitment and baseline assessment, participants in the experimental group received a structured music therapy intervention based on the Orff Schulwerk approach, while the control group did not receive any intervention during the same period. The intervention program consisted of 10 weekly sessions lasting approximately 60 minutes each and was conducted in multiple formats, including parent-only sessions, parent–child dyadic sessions, and combined group sessions involving several mother–child dyads. Parent-only sessions focused on stress reduction and modification of maladaptive parental attitudes through activities such as listening to calming music, guided group discussions accompanied by background music, breathing exercises, and mindfulness practices integrated with rhythmic and melodic components. Parent–child dyadic sessions emphasized improving the quality of interaction and emotional connection between mothers and children through shared musical activities, including singing simple songs, rhythmic movement exercises, instrument playing using accessible instruments such as drums, xylophones, and metallophones, and cooperative musical games designed to enhance empathy, communication, coordination, and emotional responsiveness. Combined group sessions aimed to strengthen social support and interpersonal relationships among participants through collaborative music-making, group singing, and brief musical performances at the conclusion of sessions. These collective experiences were intended to foster social belonging, increase self-confidence, and promote positive social engagement among mothers and children. After completion of the intervention, both groups completed the posttest assessments, and a follow-up evaluation was conducted 45 days later to examine the durability of treatment effects.

Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software, version 26. Descriptive statistics, including means and standard deviations, were calculated to summarize demographic characteristics and study variables across groups and assessment phases. Prior to conducting inferential analyses, statistical assumptions were evaluated using the Kolmogorov–Smirnov test to assess normality of data distribution, Levene's test to examine homogeneity of variances, Box's M test to evaluate equality of covariance matrices, and Mauchly's test to determine the assumption of sphericity. To investigate the effectiveness of the music therapy intervention across time and between groups, repeated measures analysis of variance (RM-ANOVA) was employed. This analytical approach enabled the examination of within-group changes across the three measurement stages as well as between-group differences in parental burnout and parent–child interaction. Statistical significance was evaluated using an appropriate alpha level, and effect sizes were calculated to determine the magnitude and practical significance of the intervention outcomes.

Findings and Results

The study sample consisted of 30 mother–child dyads, with 15 participants assigned to the experimental group and 15 participants assigned to the control group. The mean age of mothers in the experimental group was 36.87 years (SD = 5.42), while the mean age in the control group was 37.21 years (SD = 5.76). Most mothers in both groups had completed at least a high school diploma, and the majority were married and unemployed or homemakers. The mean age of children with Down syndrome in the experimental group was 10.14 years (SD = 2.41), whereas the mean age in the control group was 10.36 years (SD = 2.58). There were no statistically significant demographic differences between the two groups at baseline, indicating relative equivalence prior to the intervention.

Table 1. Descriptive Statistics of Study Variables Across Measurement Stages

Variables and Components	Group	Pretest Mean (SD)	Posttest Mean (SD)	Follow-up Mean (SD)
Parental Burnout	Experimental	84.73 (10.28)	52.11 (8.34)	55.06 (8.91)
	Control	82.94 (9.85)	80.67 (10.11)	79.85 (9.76)
Exhaustion in Parental Role	Experimental	24.87 (4.21)	13.26 (3.18)	14.01 (3.36)
	Control	24.14 (4.05)	23.88 (4.17)	23.51 (4.11)
Contrast with Previous Parental Self	Experimental	21.46 (3.75)	12.53 (2.97)	13.04 (3.12)
	Control	21.02 (3.69)	20.71 (3.54)	20.36 (3.48)
Feelings of Being Fed Up	Experimental	19.74 (3.56)	12.08 (2.71)	12.54 (2.93)
	Control	19.31 (3.41)	18.94 (3.38)	18.63 (3.22)
Emotional Distancing	Experimental	18.66 (3.09)	14.24 (2.63)	15.47 (2.81)
	Control	18.47 (3.14)	18.11 (3.06)	17.98 (2.94)
Parent–Child Relationship Total	Experimental	87.53 (8.42)	112.28 (9.11)	109.67 (8.88)
	Control	88.11 (8.76)	89.06 (8.31)	88.54 (8.47)
Conflict	Experimental	41.21 (5.17)	26.33 (4.46)	27.11 (4.73)
	Control	40.84 (5.02)	40.13 (4.91)	39.87 (4.84)
Closeness	Experimental	28.46 (4.03)	41.07 (4.68)	39.84 (4.31)
	Control	28.72 (4.15)	29.16 (4.08)	29.01 (4.11)
Dependency	Experimental	17.86 (3.12)	11.02 (2.54)	11.74 (2.61)
	Control	18.55 (3.06)	18.21 (2.94)	18.08 (2.86)

The descriptive findings demonstrated that the experimental group experienced substantial improvements in both primary study outcomes following the music therapy intervention. Mean parental burnout scores decreased markedly from pretest to posttest and remained relatively stable at follow-up, whereas the control group showed minimal changes across measurement stages. Similar patterns were observed across all burnout subcomponents, including exhaustion in the parental role, contrast with previous parental self, feelings of being fed up, and emotional distancing. Regarding parent–child interaction, the experimental group demonstrated notable increases in total relationship quality and closeness scores, alongside significant reductions in conflict and dependency scores following the intervention. In contrast, the control group showed relatively stable scores over time, indicating no meaningful changes in parent–child interaction during the study period.

Before conducting inferential analyses, the assumptions underlying repeated measures ANCOVA were examined. Results of the Kolmogorov–Smirnov test indicated that the distribution of all dependent variables was normal across groups and measurement stages ($p > .05$). Levene's test confirmed homogeneity of variances for all variables, suggesting equality of error variances between groups ($p > .05$). Box's M test demonstrated equality of covariance matrices across groups ($p > .05$), indicating that multivariate assumptions were satisfied. In addition, Mauchly's test of sphericity was nonsignificant for the majority of

variables ($p > .05$), supporting the assumption of sphericity. For variables in which sphericity was violated, the Greenhouse–Geisser correction was applied. Overall, the findings indicated that the data met the required assumptions for repeated measures ANCOVA.

Table 2. Repeated Measures ANCOVA Results for Study Variables and Components

Variables and Components	Source	SS	df	MS	F	p	η^2
Parental Burnout	Group × Time	7241.38	2	3620.69	41.87	.001	.61
Exhaustion in Parental Role	Group × Time	1184.22	2	592.11	29.44	.001	.52
Contrast with Previous Parental Self	Group × Time	864.47	2	432.23	24.16	.001	.47
Feelings of Being Fed Up	Group × Time	703.85	2	351.92	21.38	.001	.43
Emotional Distancing	Group × Time	391.67	2	195.83	16.74	.001	.37
Parent–Child Relationship Total	Group × Time	5326.49	2	2663.24	38.61	.001	.58
Conflict	Group × Time	1574.31	2	787.15	31.72	.001	.54
Closeness	Group × Time	1398.56	2	699.28	28.93	.001	.51
Dependency	Group × Time	462.74	2	231.37	17.86	.001	.39

The results of repeated measures ANCOVA demonstrated significant interaction effects between group membership and time for all primary variables and subcomponents. The findings indicated that the music therapy intervention significantly reduced parental burnout and its dimensions, including exhaustion in the parental role, contrast with previous parental self, feelings of being fed up, and emotional distancing, in the experimental group compared with the control group. Furthermore, significant improvements were observed in the quality of parent–child interaction among participants receiving the intervention, reflected by increased closeness and total relationship scores alongside reduced conflict and dependency scores. The effect sizes for the intervention ranged from moderate to large, indicating that music therapy produced substantial and clinically meaningful changes in parental functioning and parent–child relational quality over time.

Discussion and Conclusion

The present study aimed to investigate the effectiveness of music therapy based on the Orff Schulwerk approach on parental burnout and parent–child interaction among mothers of children with Down syndrome. The findings demonstrated that participation in the music therapy intervention significantly reduced parental burnout and improved the quality of parent–child interaction in the experimental group compared with the control group. The observed improvements were maintained during the follow-up stage, indicating the relative stability of intervention effects over time. Specifically, significant reductions were found in all dimensions of parental burnout, including exhaustion in the parental role, contrast with previous parental self, feelings of being fed up with parenting, and emotional distancing from the child. Simultaneously, the intervention produced meaningful improvements in parent–child relationship quality through increased emotional closeness and reductions in conflict and dependency. These findings suggest that structured music therapy may function as an effective psychosocial intervention for enhancing both parental psychological well-being and relational functioning in families raising children with Down syndrome.

The reduction in parental burnout observed in the present study is consistent with previous literature emphasizing the psychological burden experienced by parents of children with developmental disorders. Research has shown that mothers of children with special needs often experience chronic stress, emotional fatigue, caregiving overload, and psychological exhaustion because of persistent caregiving responsibilities

and concerns regarding their child's developmental trajectory (6, 8). The findings of the current study support the conceptualization of parental burnout proposed by Mikolajczak and colleagues, who described parental burnout as a syndrome emerging from chronic imbalance between parenting demands and available coping resources (9). Music therapy may have reduced this imbalance by providing mothers with opportunities for emotional expression, stress reduction, social support, and positive interaction experiences with their children. Participating in enjoyable and emotionally engaging musical activities may have facilitated emotional release and reduced psychological tension, thereby decreasing feelings of exhaustion and emotional distancing. These findings align with studies demonstrating that supportive interventions and positive family functioning are associated with lower levels of parental stress and burnout among caregivers of children with developmental disorders (8, 24).

The effectiveness of music therapy in reducing parental exhaustion may also be explained through the emotional and neurophysiological properties of music. Music-based interventions have been associated with relaxation responses, emotional regulation, reduced physiological stress, and improved mood states across clinical populations (17). The rhythmic and repetitive nature of musical activities can promote psychological calmness and facilitate emotional synchronization between individuals. In the present study, mothers participated in relaxation exercises, guided breathing, rhythmic movement, and musical engagement activities that likely reduced anxiety and emotional overload. Previous studies have shown that music therapy can positively affect emotional functioning and adaptive behavior among children with developmental conditions (18, 19). Extending these findings to caregivers, the current study suggests that music therapy may also provide psychological benefits for parents by enhancing coping capacity and reducing emotional fatigue associated with caregiving responsibilities. Shared musical experiences may have allowed mothers to temporarily shift attention away from caregiving stressors and experience moments of enjoyment, creativity, and emotional connection with their children.

Another important finding of the present study was the significant improvement in parent–child interaction following participation in the music therapy program. Mothers in the experimental group demonstrated increased emotional closeness and reduced levels of conflict and dependency in their relationships with their children. This finding is consistent with theoretical perspectives emphasizing the central role of positive interaction patterns in promoting emotional security and adaptive development among children with disabilities (12, 13). Children with Down syndrome often experience communication difficulties, emotional regulation challenges, and social interaction limitations that may place strain on parent–child relationships (7, 16). Music therapy may have improved relational quality by creating a shared emotional and communicative space in which mothers and children could interact through nonverbal and enjoyable activities. Musical interactions involving rhythm, movement, imitation, singing, and cooperative play likely enhanced mutual attention, emotional responsiveness, and interpersonal attunement between mothers and children.

The findings regarding improved parent–child interaction are also consistent with previous studies highlighting the role of shared musical experiences in strengthening family relationships. Koopsen emphasized that musical engagement within families can foster emotional closeness, empathy, synchronization, and social bonding between parents and children (20). Through collaborative musical participation, parents and children may experience increased emotional attunement and communication

without relying solely on verbal interaction. This process may be particularly beneficial for children with intellectual and developmental disabilities, who often face challenges in verbal communication and social expression. Similarly, Zhang reported that active music therapy promotes socialization development among children with Down syndrome by enhancing interpersonal engagement and emotional participation (23). The current study extends these findings by demonstrating that music therapy not only benefits children's social functioning but also positively influences parental emotional experiences and the overall quality of parent–child relationships.

The Orff Schulwerk approach used in the present study may have contributed substantially to the effectiveness of the intervention. The Orff approach emphasizes active participation, creativity, improvisation, movement, rhythm, and collaborative engagement, making it particularly suitable for children with developmental and communication difficulties (21). Unlike passive therapeutic approaches, Orff-based activities encourage shared participation and emotional involvement between caregivers and children. The multisensory nature of these activities may enhance emotional expression, sensory integration, and interpersonal coordination. Furthermore, musical synchronization and rhythmic coordination may stimulate positive emotional experiences and strengthen feelings of connection between mothers and children. Kakaziani and colleagues emphasized that music-related activities during childhood can facilitate self-regulation and strengthen parental support processes through collaborative engagement and emotional interaction (22). In the present study, mothers and children engaged together in rhythmic games, singing activities, instrument playing, and movement exercises that likely enhanced relational reciprocity and emotional responsiveness.

The improvement in parent–child relationship quality observed in this study may also be interpreted within the broader framework of family dynamics theory. Family systems perspectives suggest that parental emotional functioning significantly influences parenting behaviors, communication patterns, and child adjustment outcomes (15). Parents experiencing burnout may demonstrate emotional withdrawal, irritability, overprotectiveness, or inconsistent parenting behaviors that negatively affect children's emotional security and developmental functioning (10, 14). By reducing maternal stress and emotional exhaustion, music therapy may indirectly improve parenting behaviors and communication quality. Mothers who experience lower levels of emotional distress may become more emotionally available, patient, and responsive during interactions with their children. Consequently, children may respond more positively, leading to reciprocal improvements in relational functioning. This interpretation is consistent with research demonstrating that parental burnout is associated with negative parenting styles and adverse developmental outcomes in children (10, 11).

The sustained effectiveness of the intervention during the follow-up stage is another noteworthy finding of the study. Although some reduction in treatment gains was observed at follow-up, the experimental group continued to demonstrate significantly better outcomes than the control group in both parental burnout and parent–child interaction. This finding suggests that the benefits of music therapy may extend beyond the immediate intervention period. One possible explanation is that mothers continued to apply learned interaction patterns and musical activities within the home environment after the completion of formal sessions. Positive emotional experiences during therapy may also have strengthened family cohesion and promoted ongoing relational engagement. Previous qualitative studies have shown that parents of children

with Down syndrome highly value interventions that provide opportunities for positive emotional connection and social participation (7). The enjoyable and non-threatening nature of music therapy may increase participant motivation and facilitate continued engagement in emotionally supportive interactions outside the therapeutic setting.

The findings of the present study are also important from a broader psychosocial and rehabilitative perspective. Children with Down syndrome often require long-term educational, medical, and emotional support, placing families at increased risk for psychological strain and relational difficulties (4, 5). Interventions that simultaneously address parental well-being and parent–child relationships may therefore play a critical role in promoting adaptive family functioning. Music therapy appears particularly valuable because it integrates emotional, cognitive, social, and relational components within an accessible and engaging framework. Unlike interventions focused solely on symptom reduction, music therapy provides opportunities for enjoyment, creativity, communication, and social connection, which may contribute to long-term family resilience and emotional well-being. The present findings support previous evidence suggesting that holistic and family-centered interventions can enhance psychological functioning and interpersonal relationships among families of children with developmental disorders (17, 18).

Despite the significant findings of the present study, several limitations should be acknowledged. The study was conducted using a relatively small sample size drawn from a single rehabilitation center, which may limit the generalizability of the findings to broader populations of families with children with Down syndrome. In addition, only mothers participated in the intervention, while fathers and other family members were not included. The use of self-report measures may also have introduced response bias or social desirability effects. Furthermore, the follow-up period was relatively short, making it difficult to determine the long-term stability of intervention outcomes over extended periods.

Future research should examine the effectiveness of music therapy interventions using larger and more diverse samples across multiple rehabilitation and educational settings. Studies involving fathers, siblings, and entire family systems may provide a more comprehensive understanding of how music therapy influences family functioning. Researchers are also encouraged to compare different music therapy approaches and investigate the relative effectiveness of individual versus group-based interventions. Longitudinal studies with extended follow-up periods are needed to evaluate the durability of treatment effects and identify factors contributing to sustained improvements in parental well-being and parent–child relationships. In addition, future studies may explore mediating variables such as emotional regulation, social support, resilience, and coping strategies in explaining the relationship between music therapy and parental functioning.

From a practical perspective, the findings of the present study suggest that music therapy may serve as a valuable complementary intervention within rehabilitation and family support programs for children with Down syndrome. Rehabilitation centers, counseling clinics, and special education institutions may benefit from integrating structured music therapy programs into their existing services for families of children with developmental disabilities. Training parents to use simple musical activities at home may also strengthen emotional bonding and reduce caregiving stress. Mental health professionals, music therapists, psychologists, and educators should consider collaborative and family-centered approaches that address both parental well-being and child development simultaneously. Providing accessible and supportive

interventions focused on positive interaction experiences may ultimately improve family resilience, emotional functioning, and quality of life among families raising children with Down syndrome.

Acknowledgments

The authors express their deep gratitude to all participants who contributed to this study.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

References

1. Kaczorowska N, Kaczorowski K, Laskowska J, Mikulewicz M. Down syndrome as a cause of abnormalities in the craniofacial region: A systematic literature review. Advances in Clinical and Experimental Medicine. 2019;28(11):1587-92. doi: 10.17219/acem/112785.

2. Jain A, Boyd NK, Paulsen KC, Vogel BN, Nguyen L, Santoro JD. Ophthalmologic and neuro-ophthalmologic findings in children with Down syndrome. American Journal of Medical Genetics Part C, Seminars in Medical Genetics. 2023;193(4). doi: 10.1002/ajmg.c.32068.

3. Horne RSC, Shetty M, Davey MJ, Walter LM, Nixon GM. Follow-up of children with Down syndrome and sleep disordered breathing and the effects of treatment on actigraphically recorded sleep, quality of life, behaviour, and daytime functioning. Journal of Sleep Research. 2023;33(1).

4. Alrayes N, Issa NM, Alghubayshi OY, Al-Amaa JY, Alsabban AH, Al Shaer DS, et al. Quality of life in children with Down syndrome and its association with parent and child demographic characteristics: Parent-reported measures. Molecular Genetics & Genomic Medicine. 2023;12(1). doi: 10.1002/mgg3.2337.

5. Rezaei M, Nojomi M, Darvishi A, MohamadiParsa N. Cost-benefit analysis of Down syndrome screening in Iran. 2021.

6. Cheng AWY, Lai CYY. Parental stress in families of children with special educational needs: A systematic review. Frontiers in Psychiatry. 2023;14:1198302. doi: 10.3389/fpsyt.2023.1198302.

7. Desimpelaere EN, De Clercq LE, Soenens B, Prinzie P, De Pauw SS. Parenting a child with Down syndrome: A qualitative study on parents' experiences and behaviors from a self-determination theory perspective. Journal of Pediatric Nursing. 2024;74:e14-e27. doi: 10.1016/j.pedn.2023.10.021.

8. Findling Y, Itzhaki M, Barnoy S. Parental burnout: A model of risk factors and protective resources among mothers of children with/without special needs. European Journal of Investigation in Health, Psychology and Education. 2024;14(11):2883-900. doi: 10.3390/ejihpe14110189.

9. Mikolajczak M, Gross JJ, Stinglhamber F, Norberg AL, Roskam I. Is parental burnout distinct from job burnout and depressive symptoms? Clinical Psychological Science. 2020;8(4):673-89. doi: 10.1177/2167702620917447.

10. Guo X, Li Y, Hao C, Wang W. Parental burnout, negative parenting style, and adolescents' development. Behavioral Sciences. 2024;14(3):161. doi: 10.3390/bs14030161.

11. Wu K, Wang F, Wang W, Li Y. Parents' education anxiety and children's academic burnout: The role of parental burnout and family function. Frontiers in Psychology. 2022;12. doi: 10.3389/fpsyg.2021.764824.

12. Karimi E, Dashtbozorgi Z. Effectiveness of parent-child interaction group training on behavioral problems and mother-child relationship in mentally retarded children. Journal of Psychiatric Nursing. 2019;7(5):36-43.

13. Oteva NI, Malyarchuk NN, Pashchenko LP, Pashchenko EV, editors. Relations in the mother-child dyad in a family raising a child with disabilities. Proceedings of the International Scientific and Practical Conference on Education, Health and Human Wellbeing (ICEDER 2019); 2020.

14. Leung JTY, Fung ALC, Shek DTL, Leung GSM. Perceived overparenting and developmental outcomes among Chinese adolescents: Do family structure and conflicts matter? Journal of Social and Personal Relationships. 2020;38(2):742-64. doi: 10.1177/0265407520971713.

15. Zhang J, Cao T, Guo C. A family dynamics theory perspective on parenting styles and children's aggressive behavior. BMC Psychology. 2024;12(1). doi: 10.1186/s40359-024-02217-3.

16. Hisan K, Muzakkir M, Fitriyani F. Parents' communication patterns towards children with mental disorders. Jurnal Sosiologi Dialektika Sosial. 2024;10(2):135. doi: 10.29103/jsds.v10i2.17256.

17. Tzoka V, Evgenieva E. Music therapy as a holistic approach. Annual of Arts. 2024;117:377-93. doi: 10.60059/GSU.FNOI.Iz.117.377-393.

18. Belousova MV, Utkuzova MA, Futin EV. Music therapy in the integrated neurorehabilitation of children with autism spectrum disorder. Practical Medicine. 2022;20(3):34-9. doi: 10.32000/2072-1757-2022-3-34-39.

19. Zou H, He Y. Analysis of the moderating effect of music therapy on autism in the context of big data. Applied Mathematics and Nonlinear Sciences. 2024;9(1). doi: 10.2478/amns-2024-0153.

20. Koopsen C. The role of shared musical experiences in parent-child relationships. Music and Science. 2020;3(1):1-13.

21. Wang L, Odena O. Improving classroom inclusion through Orff-inspired music education: A study from a secondary school in Fujian, China. Music Education Research. 2025;27(2):191-202. doi: 10.1080/14613808.2025.2465238.

22. Kakaziani TE, Rooij Ad, Bakel HJAv. A Perspective on How Music Performance Training in Childhood and Adolescence Transfers Across Creative Domains Through Self-Regulation and Parental Support. Music & Science. 2025;8. doi: 10.1177/20592043251364627.

23. Zhang X. Music as a language: Assessing the extent to which active music therapy promotes socialization development for children under 12 with Down syndrome. Scholarly Review Journal. 2023;Fall 2023(6). doi: 10.70121/001c.121698.

24. Lin Y, Wang Y, Lin C, Ni Q, Jia R, Chang Y, et al. The mediating role of perceived social support: Alexithymia and parental burnout in parents of children with autism spectrum disorder. Frontiers in Psychology. 2023;14. doi: 10.3389/fpsyg.2023.1139618.

25. Avezum MDMDM, Linhares MBM, Altafim ERP. Spanking and corporal punishment parenting practices and child development: A systematic review. Trauma, Violence, & Abuse. 2022;24(5):3094-111. doi: 10.1177/15248380221124243.