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ORIGINAL

The application of music therapy in special groups: a positive impact on the quality of life

La aplicación de la musicoterapia en grupos especiales: un impacto positivo en la calidad de vida

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ABSTRACT

Music therapy is increasingly acknowledged as a non-pharmacological approach that fosters emotional, cognitive, and social development in individuals with special needs. However, existing research often faces limitations such as small sample sizes, short program durations, and limited participant diversity, which restrict the generalization of findings. To address these challenges, the present research evaluates the effectiveness of a structured ten-week music therapy program aimed at improving the overall quality of life in three participant groups: individuals with physical disabilities, cognitive impairments, and psychological disorders. The primary objective of this research is to determine how music therapy influences emotional well-being, cognitive stimulation, social interaction, and self-perception. A total of seventy-five participants (n = 75) were recruited from rehabilitation centers, community organizations, and mental health facilities The intervention included rhythmic exercises, singing, instrumental play, and guided improvisation. Data were collected through a five-point Likert-scale questionnaire and facilitator observations conducted before and after the program. Statistical analyses were performed using the SPSS, Version 29.0. Paired-sample t-tests and repeated measures analysis of variance were used to examine both within group and between-group differences. The results revealed significant improvements in emotional well-being ($p < 0,05$) and social engagement ($p < 0,01$), with moderate increases in cognitive stimulation. Participants reported a fifteen to twenty-five percent increase in life satisfaction, demonstrating the holistic effect of music therapy. In conclusion, the study confirms that structured music therapy programs are effective, inclusive, and evidence-based interventions that promote emotional expression, social connection, and overall life satisfaction among individuals with special needs.

Keywords: Music Therapy; Quality of Life; Special Groups; Emotional Well-being; Cognitive Enhancement; Social Participation; Therapeutic Intervention.

RESUMEN

La musicoterapia está ganando reconocimiento como un enfoque no farmacológico que mejora el desarrollo emocional, cognitivo y social de personas con necesidades especiales. Sin embargo, las investigaciones previas tienen limitaciones, como tamaños de muestra pequeños y duración de programas corta, lo que dificulta la generalización de resultados. Esta investigación evalúa un programa de musicoterapia de diez semanas para mejorar la calidad de vida en tres grupos: personas con discapacidades físicas, deterioro cognitivo y trastornos psicológicos. Se reclutaron 75 participantes de centros de rehabilitación y salud mental,

y se implementaron diversas actividades musicales. Los datos se recolectaron a través de un cuestionario Likert y observaciones de facilitadores antes y después del programa. Para el análisis de los datos, se utilizó el software SPSS, Versión 29.0, aplicándose pruebas t pareadas y análisis de varianza de medidas repetidas (ANOVA) para revisar las diferencias tanto dentro de los grupos como entre ellos. Los resultados mostraron cambios significativos en el bienestar emocional ($p < 0,05$) y en la interacción social ($p < 0,01$), además de aumentos moderados en la estimulación cognitiva. Los participantes reportaron un incremento en la satisfacción con la vida que varió entre el 15 y el 25 %, lo que evidencia el impacto positivo de la musicoterapia. En conclusión, este estudio valida que los programas estructurados de musicoterapia son intervenciones eficaces, inclusivas y basadas en evidencia, que fomentan la expresión emocional, la conexión social y una mayor satisfacción general con la vida para personas con necesidades especiales.

Palabras clave: Musicoterapia; Calidad de Vida; Grupos Especiales; Bienestar Emocional; Mejora Cognitiva; Participación Social; Intervención Terapéutica.

INTRODUCTION

Music therapy (MT) emphasizes the therapeutic relationship along with musical and verbal techniques, contrasting music listening interventions that do not require a trained therapist. Techniques, including creative, receptive, and combined methods, are customized to the individual's needs, such as instrument playing, musical life review, and song writing.[1] MT is a therapeutic approach that uses music and its parameters to stimulate social or emotional well-being, cognitive functions, and reduce anxiety, depression, and agitation. Instead than being the generic use of music, it emphasizes musical experiences through improvisation, listening, composition, and playing musical instruments, all of which can be used in ensemble or individually.[2]

In contrast, MT entails intentional, therapist-led interactions which encourage certain therapeutic objectives. It has achieved widespread recognition as a non-pharmacological treatment that works well for mental, emotional, and behavioral health issues. It has been shown to enhance mood control and psychological resilience in general.[3,4] Comparing published research to conventional in-person models, however, has shown limited results. Explain the similarities and differences between remote and in-person supervision while keeping in mind the topic of methods for clinical and educational distance MT supervision.[5,6]

The main concern of music therapists is on using music to assist clients in reaching their therapeutic objectives. For a variety of clinical populations, the benefits of music therapies are well established.[7,8] A brand-new field known as MT helps patients overcome psychological challenges and enhance or restore their physical and mental health by using a range of specifically designed musical activities. It is inspired by the unique physiological and psychological effects of music and is based on the ideas and practices of psychotherapy. Modern medicine's "biomedicine" idea has given way to the "biopsychosocial medicine" approach, which advocates using MT in more clinical settings.[9,10] However, the research's small sample size and brief intervention duration can limit the findings' generalizability.

To examine how the CMT affects the brain connectivity in MRI.[11] 82 newborns were randomly selected as either the standard care or CMT group, or the short time outcome of the CMT on the brain structure and functions were measured using resting-state functional MRI and diffusion tensor MRI. To examine whether CMT would be effective in alleviating or decreasing tension, anxiety, and hopelessness symptoms in parents and enhance their relationship with their children.[12] The parent-child pairs were chosen randomly and each pair included 16 participants in the MT group where the psychological questionnaires were provided to the participants to assess the state of anxiety and depression using three time points including postpartum, half-way through neonatal intensive care unit stay and two weeks after the discharge. The quantitative findings showed that depressive symptoms decreased significantly between T2 and T3 ($p = 0,022$) and that anxiety levels reduced significantly (T1 to T2: $p = 0,002$). Between 2000 and 2019, the CiteSpace program was utilized to conduct global research on MT.[13] The Web of Science database was searched for papers related to MT, and CiteSpace V software was used to examine author co-citations and create a network map of collaborations. Linear regression was used to evaluate publishing patterns. The research aimed to investigate how music therapists globally adapted their practice to the COVID-19 pandemic, focusing on technology as an alternative to face-to-face work. The research aimed to understand therapists' views on the benefits and limitations of technology-based and online MT.[14] The findings provided valuable insights into crisis management and improvement in MT provision. However, the survey-based design and regional representation limitations limited the scope of the findings as a comprehensive reflection of global mountain-tourism practices during the pandemic. A research on 24 volunteers' physiological responses to 12 musical pieces found that a neural network using these physiological features achieved a classification accuracy of 99,2 % for the three genres.[15] The model also correctly classified music based on participants' self-reported mood assessments with an accuracy of 98,5 %. However, the claimed

high classification accuracy and the results' generalizability were constrained by the tiny sample size. Examining to comprehend the relationship between social and physical death as a component of a range of oppressions that need to be addressed to achieve social justice.[16] The history of White European settler colonialism and the MT's profound cultural, historical, social, and sociostructurally roots are worldwide. The research's validity is limited due to its conceptual and descriptive nature, lacking empirical data to support its claims.

Research Objective

The purpose of this research is to assess structured MT's efficacy as a non-pharmacological intervention for people with special needs. It is centered on the effectiveness of structured activities that involve singing, rhythm play, playing an instrument, and guided improvisation in improving social connection, cognitive stimulation, emotional health and perception of oneself. The available studies on the use of MT with special needs individuals have had a number of methodological and empirical weaknesses. Some have not been able to be limited in terms of small sample sizes, brief intervention periods and limited selection of participants, and often with only one type of disability. The comparison of results has been hampered by the absence of standard protocols of intervention and irregularity of assessment instruments. In addition, the majority of the studies are based on the qualitative data or self-reported outcomes, employing inadequate quantitative/ statistical validation techniques, which decrease the reliability and generalizability. Moreover, the lack of longitudinal follow-up and cross-group and multi-site studies have impeded a broad-based view of the long-term and multidimensional impacts of MT.

METHOD

In this research, a quasi-experimental pretest-posttest research design was applied to determine the effectiveness of a ten-week structured MT program as a non-pharmacological intervention on people with special needs. The three groups of participants were people with disabilities, cognitive issues, and psychiatric issues based on their conditions. To promote the balance of representation, both groups were equally represented. The intervention was performed in the weekly sessions, guided by the therapists, comprising of rhythmic exercises, vocal expression, instrumental performance, and guided improvisation. The activities were aimed at addressing the main areas of well-being, such as emotional stability, social activity, cognitive stimulation, self-perception, and the overall quality of life. Data collection was carried out before and after intervention by a standardized questionnaire comprising of five-point Likert scale. Behavioral and emotional responses on a session were also recorded through systematic facilitator observations. The data collected was used in testing variations between and within groups in relation to the outcomes of participants.

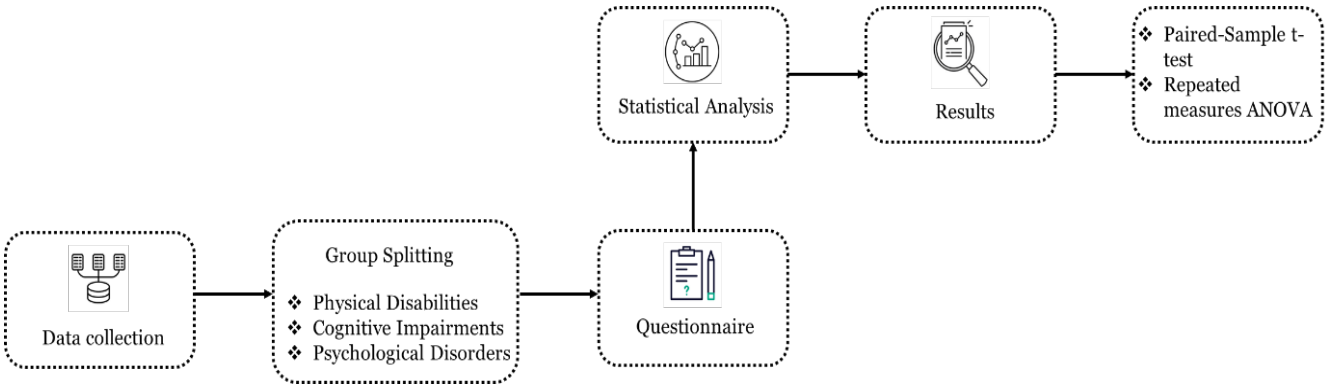

Figure 1. Methodological Framework of the Music Therapy research

Data Collection

Data was gathered from 75 participants who participated in a standardized 10-week MT program. Individuals with physical disabilities, cognitive impairments, and mental disorders were separated into three groups, and each group participated in weekly sessions that included singing, instrumental play, rhythmic exercises, and guided improvisation. A standardized five-point five point Likert-scale questionnaire consisting of 30 items was administered before and after the intervention through a digital survey platform. The questionnaire had five major domains including emotional well-being, social engagement, cognitive stimulation, self-perception, and quality of life and two items in each participant group. Besides, behavioral reactions and the degree of engagement during the sessions were recorded with the help of the facilitator observation checklists, which made the data collection accurate and complete to analyze.

Group Splitting

A total of 75 participants have been collected from community organizations, mental health clinics, and

rehabilitation facilities in the area. Participant or legal guardian informed consent was obtained. Three groups were formed from the participants:

- Group A – Physical Disabilities (n=25): individuals with motor impairments or physical limitations affecting daily activities.
- Group B – Cognitive Impairments (n=25): individuals with developmental delays, memory deficits, or other cognitive challenges.
- Group C – Psychological Disorders (n=25): mental health patients suffering from mood disorders, anxiety, or depression.

Questionnaire

Those with physical disabilities, cognitive impairments, and psychological disorders were the three groups whose responses to the questionnaire were intended to evaluate the impact of MT. Social interaction, emotional health, self-perception or satisfaction, cognitive stimulation, and general quality of life were the five main areas of focus. Participants' responses were measured using a Likert scale with five points, with 5 denoting strongly agree and 1 indicating strongly disagree, to ensure cross-group comparability. As the tool was created to be non-exclusive, clear, and easy to use, participants from varying levels of skill were able to participate meaningfully. This way, reliable quantitative data were captured for statistical analysis while also being inclusive of the lived experience of the participants, allowing for a comprehensive, neutral evaluation of the outcomes of MT. Questionnaire items for each factor are demonstrated in table 1.

Table 1. Questionnaire Items by Group

Factor	Group A – Physical Disabilities	Group B – Cognitive Impairments	Group C – Psychological Disorders
Emotional Well-being	How often do you feel cheerful despite physical challenges? Did the session help you feel more relaxed?	Do you feel happy or frustrated when engaging in activities? Did the session lift your mood?	How often do you feel sad, anxious, or stressed? Did the session reduce feelings of worry?
Social Engagement	How satisfied are you with your ability to interact with others? Did you feel included in group activities?	Were you able to share or respond during the session? Did you feel connected to others while participating?	Do you feel comfortable socializing with others? Did the activity encourage you to interact more openly?
Cognitive Stimulation	Did the session help you stay attentive? How well were you able to follow instructions?	Were you able to concentrate on the tasks? Did you feel mentally stimulated during the session?	Did the activity help you think more clearly? How often do you feel mentally alert after sessions?
Self-Perception / Satisfaction	Do you feel satisfied with what you can achieve despite your physical limitations? How confident are you in managing your daily tasks?"	Do you feel capable of completing small tasks? How satisfied are you with your own progress?	Do you feel positive about yourself? How satisfied are you with your ability to handle emotions?
Quality of Life	Are you satisfied with your level of independence? How would you rate your overall quality of life?	How would you rate your daily life overall? Do you feel safe and supported in your environment?	How satisfied are you with your overall life situation? Do you feel hopeful about the future?

Demographic Characteristics

The research sample had 75 participants, with 25 participants having physical disabilities, 25 with psychological illnesses, and 25 with cognitive disabilities. The overall sample had a balanced gender distribution with 52 % males and 48 % females. Among participants aged 18 to 60 years, the two most populous age categories were 31 to 45 years (39 %) and 18 to 30 years (32 %), and 29 % of participants were aged 46 to 60 years. The education level in the sample varied, with 28 % having completed only primary school, 39 % finishing secondary education, and 33 % continuing their higher education. In terms of how long they had been affected by their condition, 41 % of participants stated less than five years, 36 % stated five to ten years, and 23 % stated over ten years. This demographic information ensures that the results will reflect a range of experiences among the special populations because it demonstrates a representative and diverse sample. Table 2 and figure 2 illustrates that the demographic distributions and characteristics were balanced between groups.

Table 2. Demographic Characteristics of Participants (N = 75)

Variable	Group A - Physical Disabilities (n = 25)	Group B - Cognitive Impairments (n = 25)	Group C - Psychological Disorders (n = 25)	Total (N = 75)
Gender				
Male	14 (56 %)	13 (52 %)	12 (48 %)	39 (52 %)
Female	11 (44 %)	12 (48 %)	13 (52 %)	36 (48 %)
Age (Years)				
18-30	8 (32 %)	7 (28 %)	9 (36 %)	24 (32 %)
31-45	10 (40 %)	11 (44 %)	8 (32 %)	29 (39 %)
46-60	7 (28 %)	7 (28 %)	8 (32 %)	22 (29 %)
Education Level				
Primary	6 (24 %)	8 (32 %)	7 (28 %)	21 (28 %)
Secondary	10 (40 %)	9 (36 %)	10 (40 %)	29 (39 %)
Higher (College/Above)	9 (36 %)	8 (32 %)	8 (32 %)	25 (33 %)
Duration of Condition				
< 5 years	12 (48 %)	10 (40 %)	9 (36 %)	31 (41 %)
5-10 years	8 (32 %)	9 (36 %)	10 (40 %)	27 (36 %)
> 10 years	5 (20 %)	6 (24 %)	6 (24 %)	17 (23 %)

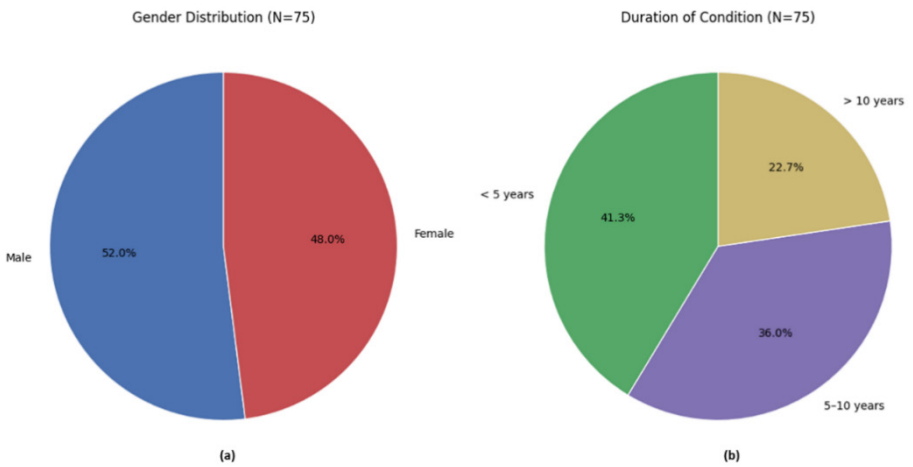

Figure 2. Demographic Characteristics of Participants (a) Gender Distribution and (b) Duration of Condition

Statistical Analysis

The IBM Statistical Package of the Social Sciences (SPSS, Version 29.0) was used to carry out all the statistical analyses required to ensure that all data was processed consistently and reliably. A repeated measures ANOVA was used to test the differences between the three groups (psychological disorders, cognitive impairments, and physical limitations). The significance of results was determined by defining effect sizes to determine the practical significance of results; the significance threshold of $p < 0,05$ was taken. Data was evaluated using within group and between group evaluations to determine the effectiveness of the MT. Changes in emotional well-being, social engagement, cognitive stimulation, self-perception and overall quality of life across groups were compared using paired-sample t-tests and descriptive statistics were used to summarize responses of the participants.

Paired-Sample t-test

Each group's pre- and post-intervention scores were compared using the paired-sample t-test. This test is ideal since the same subjects were tested twice, enabling direct comparisons of enhancements in emotional well-being, social engagement, cognitive stimulation, self-perception, and overall quality of life. Given that the reported improvements were unlikely to be random, a significant t-value indicates that the MT program was effective. The test showed how the intervention benefited each group.

$$p = \frac{\bar{C}}{(SD_C)} \qquad (1)$$

In equation (1), $\bar{C}$ represents the mean of the difference scores (post-test – pre-test), SD_c denotes the standard deviation of the difference scores, and p is the test statistic.

Repeated measures ANOVA

Repeated Measures ANOVA was applied to examine differences across time and between groups simultaneously. This method is suitable because the same participants were measured at two points, and comparisons were required across the three groups: individuals with physical disabilities, cognitive impairments, and psychological disorders. The test statistic is calculated as the ratio of variance between conditions to the variance within conditions (error), as expressed in equation (2).

$$F = \frac{Variance\ between\ conditions}{\text{Variance within conditions (error)}} \quad (2)$$

The analysis tested three effects: the main effect of time (whether all participants improved overall), the main effect of group (whether one group scored higher than others), and the interaction effect (whether the level of improvement varied by group).

RESULTS

The results were compiled to evaluate the extent to which the organized MT program enhanced the social, emotional, and cognitive well-being of individuals with special needs. Significant changes in self-perception, social engagement, and emotional well-being were found when the pre- and post-intervention assessments for each group were compared using paired-sample t-tests. Measures that are implemented repeatedly ANOVA was used to examine three groups of people with physical disabilities, cognitive impairments, and psychiatric issues. The results showed consistent growth in all circumstances, albeit with different levels of responsiveness. There was a moderate change in cognitive stimulation, indicating that extended participation would yield better outcomes. Overall, the results confirm that the ten-week structured MT program was successful in achieving its aim of helping individuals with special needs be more emotionally stable, socially connected, and satisfied with their lives.

Paired-Sample t-tests

Utilized a paired-sample t-test to assess the direct impacts of MT on emotional well-being, social engagement, cognitive stimulation, self-perception, and overall quality of life by comparing scores before and after depending one each of the three groups. As the same participants were assessed twice in a paired-sample design, this test confident if the changes were statistically significant as opposed to chance. The analyses demonstrated that all three groups significantly improved in most of the domains, social engagement and emotional well-being being the greatest improvements. Cognitive stimulation had moderate improvement.

Table 3. The pre- and post-intervention paired-sample t-test results

Factor	Group	Mean (Pre)	Mean (Post)	Mean Difference	df	t	p-value
Emotional Well-being	A	3,10	3,85	0,75	24	4,21	0,001 **
	B	2,95	3,90	0,95	24	5,02	0,000 **
	C	3,05	3,70	0,65	24	3,88	0,001 **
Social Engagement	A	2,85	3,65	0,80	24	4,56	0,000 **
	B	2,70	3,95	1,25	24	6,12	0,000 **
	C	2,90	3,60	0,70	24	3,74	0,001 **
Cognitive Stimulation	A	3,00	3,45	0,45	24	2,32	0,028 *
	B	2,85	3,40	0,55	24	2,65	0,014 *
	C	2,95	3,35	0,40	24	2,11	0,045 *
Self-Perception	A	3,05	3,70	0,65	24	3,98	0,001 **
	B	2,90	3,80	0,90	24	4,76	0,000 **
	C	3,00	3,65	0,65	24	3,89	0,001 **
Quality of Life	A	3,00	3,80	0,80	24	4,55	0,000 **
	B	2,95	3,90	0,95	24	5,23	0,000 **
	C	3,05	3,75	0,70	24	4,01	0,001 **

Note: p < 0,05 = significant (*), p < 0,01 = highly significant (**)

Once again, the positive mean differences along with significant t-values ($p < 0,05$) showed that MT sessions substantially impacted the social and psychological functioning of the participants. The data provides evidence of MT's value as a non-pharmacological intervention for specific groups by showing both individual and group benefit. The paired-sample t-tests demonstrated a statistically significant ($p < 0,05$) difference between the pre-test and post-test measure among the three groups as is demonstrated through table 3 and figure 3.

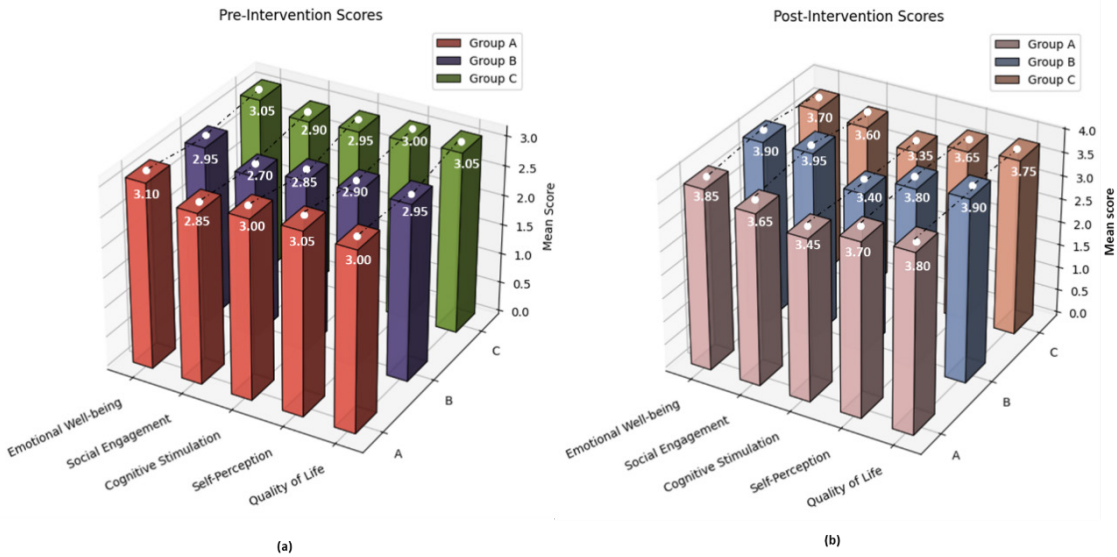

Figure 3. Group-wise Outcomes Pre- (a) and Post- (b) Intervention

Repeated Measures ANOVA

In a repeated measures design, the same individuals are assessed more than once for different groups or with different conditions. When mean differences need to be evaluated, the statistical procedure refers to ANOVA, rather than a simple t-test, which only considers two sets of scores or a repeated measures (repeated measurements) comparison. ANOVA is a valuable statistical tool in experimental or intervention-based research because it allows comparisons across three or more relevant conditions. Like the t-test, the repeated measures design partitions the variance between groups (differences among groups such as participants with a psychological disorder, cognitive impairments, and physical disabilities) and within the same group (or differences within the same concept involving the same participants across repeated measures). As a result, how the groups change is able to be assessed, as well as whether the change is consistent across participants. A significant result shows the intervention caused a change, different for group membership, while an effect size statistic assesses the strength of this change. Group differences, confirmed in this outcome through repeated measures ANOVA, are presented in table 4 and figure 4.

Table 4. Repeated Measures ANOVA (Between, Within, and Total Effects)

Source	Sum of Squares (SS)	df	Mean Square (MS)	Partial η^2	F	p-value
Between Groups	9,70	2	4,85	0,23	6,27	0,003
Within Groups	55,44	72	0,77	-	-	-
Total	65,14	74	-	-	-	-

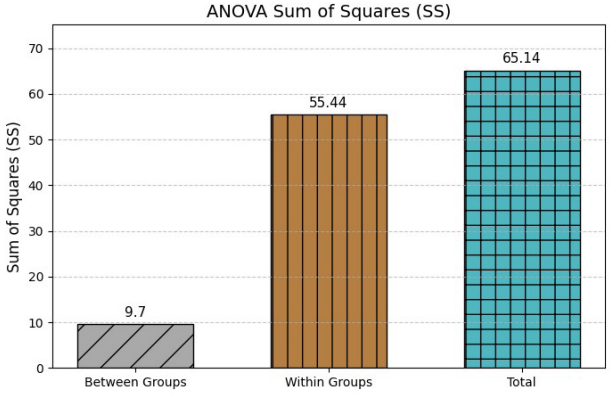

Figure 4. Partitioning of Variance in ANOVA

DISCUSSION

The previous research [11] which discovered that creative MT improved infants' emotional growth and brain connectivity. The results that guided musical activities generate quantifiable emotional and social benefits is supported by these connections. The moderate improvement in cognitive stimulation offers the possibility that higher cognitive effects could be obtained with longer program durations and follow-up evaluations. The benefits of in-person therapies are highlighted in the research in contrast to [14] to examined virtual MT during the COVID-19 epidemic. In contrast to distance or technology-assisted sessions, direct therapist-participant contact allowed for a deeper emotional connection and quicker reaction. In addition, conceptual analyses,[16] which delved on sociocultural and systemic issues in the field of MT, point to the need of more extensive empirical data. Based on this, future research must be cross-cultural and longitudinal studies to investigate longer emotionally, socially, and cognitively sustained impacts. Overall, the results confirm that MT is an inclusive and evidence-based as well as holistic model of therapy that contributes significantly to well-being of people with special needs.

Some of the issues identified in the past studies are overcome and addressed in the present investigation. The findings of the previous researches were not as general as they were due to their small sample size, certain demographics of the participants, or limited interventions. This study, conversely, enabled comparative analysis under varying situations as it included a larger and heterogeneous sample of individuals belonging to three distinct special groups that include people with psychological disorders, intellectual and physical disabilities. To ensure the continuous exposure and proper measurement of change in emotional, cognitive and social dimensions, a systematic pretest- posttest design and a scheduled ten week intervention were utilized. In addition, the results of the study provided a better picture of the outcomes of the therapy by integrating the self-reported and the observational data. In this way of this methodological rigor and the representation of a wider group of participants, this research adds more empirical evidence to the idea of the effectiveness of MT as an inclusive, effective, and sustainable intervention to improve the overall well-being of individuals with special needs.

CONCLUSIONS

The goals of the research was to examine the effectiveness of a structured program of MT as a non-pharmacological means of enabling individuals with special needs to live a better life in general. There were guided improvisation, singing, rhythmic exercises and instrumental performance in these activities. The quasi-experimental pre-test-post-test design was applied in administering a 10 week intervention period to 75 participants who were divided equally into three groups, namely: those with psychological problems, cognitive impairments and those with physical disabilities. Data were collected through facilitator observations and analysed using the SPSS, (Version 29,0). The outcomes of the paired-sample tests of t-tests showed that there were significant gains that include emotional well-being in the range of 0,65 to 0,95 points ($t = 3,88$-$5,02$, $p < 0,05$), social engagement in the range of 0,70 to 1,25 points ($t = 3,74$-$6,12$, $p < 0,01$), and self-perception in the range of 0,65 to 0,90 points (t = There was moderate improvement of 0,40 to 0,55 points ($t = 2,11$- $2,65$, $p = 0,05$) in cognitive stimulation. The repeated measures ANOVA found statistically significant between-group effects ($F = 6,27$, $p = 0,003$, $\eta\ 2 = 0,23$), indicating statistically significant improvement of every category of participants. Overall, participants cited that they improved perceived life satisfaction by 1525 percent after the program. The effectiveness of structured MT was discovered, and the research sample, the single-site implementation, and the short-term observation preclude the generalization and the long-term applicability of the findings. To validate these findings, future research ought to incorporate bigger and heterogeneous samples and multi-site longitudinal forms of research. The combination of neurophysiological and digital measurements can be used to assess the long-term effects whereas the cross-cultural study will enhance the universality of using the MT in promoting the overall well-being.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Data curation: Qingru Yu.
Formal analysis: Marzelan Bin Salleh.
Research: Liying Wu.
Methodology: Qingru Yu.
Project management: Marzelan Bin Salleh.
Resources: Liying Wu.
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