MUSIC THERAPY AND ITS CORRELATION WITH SPEECH DEVELOPMENT AMONG CHILDREN WITH SPEECH DISORDERS IN NAKURU HILLS SPECIAL SCHOOL IN NAKURU COUNTY, KENYA

BY

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DECLARATION

I affirm that this research project is solely my own original work and has not been submitted to any other academic institution for credit or certification. Properly cited sources have been utilized to enhance its originality. Any content, whether it is text, data, images, or tables, that has been borrowed from external sources, such as the internet, has been appropriately credited and referenced as per the guidelines of the current APA and in compliance with anti-plagiarism policies.

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Supervisors' declaration: This project has been submitted for appraisal with our/my approval as University Supervisor(s).

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DEDICATION

I dedicate this research to God and family (my Day Ones).To my beloved parents Mr. Samuel Maobe and Madam Rachel who have been immensely supportive during my research. My husband Job who has been a great pillar in my life and my children Janelle and Allen who have been a constant joy in my life. Thank you and May God bless you all abundantly.

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ABBREVIATIONS AND ACRONYMS

ANOVA	:	Analysis of variance
ASHA	:	American Speech-Language-Hearing Association
HBM	:	Health belief model
HBOT	:	Hyperbaric Oxygen Therapy
MTVP	:	Music Therapy Voice Protocol
NACOSTI	:	National Commission for Science, Technology and Innovation
SPSS	:	Statistical Package for Social Sciences
TST	:	Tomatis Sound Therapy
PRAAT	:	Patchogue Rotary Animal Assisted Therapy

ABSTRACT

Music has long been integrated into children's growth and development through phonics songs, play songs, and lullabies, which stimulate early language and speech development. For children with speech disorders, however, this natural progression is disrupted, resulting in difficulties in speech sound production and effective communication. These challenges negatively impact their social interactions, learning, and academic performance. This study aimed at examining the correlation between music therapy and speech Development in Children who have Speech Disorders in Nakuru Hills Special School, Nakuru, Kenya. The study focused on meeting the following objectives: To investigate how music therapy affects children's speech development in Nakuru Hills Special, Nakuru County, Kenya; examine the specific prosocial skills linked to speech development have been developed in children in Nakuru Hills Special School, Nakuru;and assess whether redesigning music therapy is necessary in remedying problems related to speech development among children in Nakuru Hills Special School, Nakuru. The theoretical framework of the study included cognitive behavior theory and social-pragmatic theory. A quasi-experimental design was used to group the participants into two groups: the comparison group and the experimental group. The comparison group of learners with speech development disorders or problems received standard care or intervention, while the experimental group of learners with speech development disorders or problems received music therapy. The research population included special education teachers, special schools' music teachers, and caregivers, as well as speech and language pathologists working at Nakuru Hills Special School and Kenyatta University. The sample consisted of 20 participants randomly selected from the sample population. The study utilized a mixed research approach to achieve and answer research objectives and questions, respectively. The qualitative and quantitative research approaches were applicable in the mixed methodology. Interview and survey instruments were used for data collection. Piloting of the research instruments was done to enhance the reliability and validity of the research instruments.. Descriptive and inferential statistical analysis, was conducted in IBM SPSS version 26 using particulars gathered during the survey. Thematic analysis was used to analyze the interview data. Pearson correlation tests showed that music therapy had a positive and significant impact on multiple aspects of speech development, including articulation, vocabulary, and overall communication skills. Data collected from caregivers and speech therapists showed that children demonstrated noticeable improvements in clarity of speech, increased vocabulary, and enhanced ability to construct sentences. Cooperation emerged as the most developed skill, with 60% of caregivers reporting positive changes. However, skills such as empathy and listening require further exploration to fully understand their relationship with the therapy modalities used. It was concluded that caregivers and therapists both advocate for a more tailored approach to therapy, suggesting that personalized sessions and increased frequency could lead to better developmental outcomes for children. The insights garnered from both quantitative and qualitative data point towards a clear need for adjustments in therapeutic practices to better align with the specific needs of children with speech disorders. The study recommended that policies should be established to incorporate music therapy into speech therapy programs within special schools. This approach can enhance speech development while providing a holistic, engaging learning environment.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.0 Introduction

The introduction chapter focused on the background information, as well as indicate the statement of the problem, the study's purpose, objectives, research questions, and significance. Other elements contained in the chapter include limitations, delimitations, research assumptions, theoretical framework, conceptual framework and operational definition of terms.

1.1 Background to Study

Speech and language development refers to the progressive process through which children acquire and refine communication skills, including understanding and using language effectively (Glaspey et al., 2022). This developmental process is crucial for overall growth as it supports cognitive, social, and emotional development. Language is closely tied to cognition, enhancing children's capacity for learning, problem-solving, and academic achievement. Effective communication also forms the foundation for building relationships and social participation, while language further supports empathy, cooperation, and emotional well-being (Kent, 2023).

Children with speech and language disorders, however, face significant challenges. Speech delays and impairments interfere with verbal communication, social interaction, and academic success, while also contributing to emotional and behavioural difficulties (Nthiga & Nyamasyo, 2022). Research highlights that delayed speech development can negatively affect school performance, occupational achievement, and social integration (Flipsen,

2016; Law, 2019). Without targeted interventions, these children remain at high risk of developing social-emotional difficulties that extend into later life (Fiveash et al., 2021; Justice, 2016; Wiens & Gordon, 2018).

Globally, music therapy has gained recognition as an effective intervention for addressing such developmental challenges. Music therapy, defined as the clinical and evidence-based use of music interventions to achieve individualised goals, has shown positive outcomes for speech and language development (Steiner-Brett, 2023). It engages children in auditory discrimination, rhythmic activities, and expressive tasks that enhance speech perception, articulation, timing, fluency, and vocabulary (Pingle & Ragha, 2023). For example, activities like singing, clapping, and playing instruments can reinforce the rhythm and coordination required for speech production, while creative expression through songwriting or improvisation provides a safe space for practising language in a supportive environment.

The benefits of music therapy have been documented worldwide. In the United Kingdom, widespread awareness and institutional support have facilitated its integration into care, especially in dementia practice, demonstrating its therapeutic versatility (Schneider, 2023). In the United States, music therapy services are increasingly supported through insurance funding, enabling broader access in clinical and educational settings (Sena & Peebles, 2021). In South America, music therapy has been successfully applied in neonatal intensive care units, such as in Brazil, where it has supported the development of preterm infants and maternal well-being (Palazzi et al., 2023). Similarly, South Africa has incorporated music therapy within its healthcare system, complementing both traditional and Western medical approaches (Hess, 2023).

Despite these successes, there are significant regional disparities. In East Africa, there is a shortage of speech-language pathologists and educational programmes in speech-language therapy, leaving many children with limited access to specialised services (Alighieri et al., 2022). Professionals also encounter cultural and ethical barriers when applying Western-based therapeutic models in African contexts. In Kenya, interventions for children with speech and language disorders remain inadequate despite government and NGO efforts. The Ministry of Education, with support from partners such as DANIDA, has expanded Educational Assessment and Resource Centres to improve service delivery for children with special needs (MOEST, 2019). However, challenges persist due to limited trained personnel, lack of resources, and insufficient early intervention services, particularly for children with hearing and speech impairments.

Kenyan children experiencing delayed speech development are at greater risk of academic underperformance, social exclusion, and emotional challenges (Nthiga & Nyamasyo, 2022). Current interventions, including speech and language therapy, have shown benefits, but there is growing recognition of the need for complementary and innovative strategies. Music therapy has the potential to address these gaps by fostering speech development while also promoting prosocial skills such as active listening, turn-taking, and effective communication (Williams et al., 2021; Marcos et al., 2023). Its creative, engaging, and culturally adaptable nature makes it particularly suited to local contexts where conventional therapy resources are limited.

While studies in Europe, North America, and parts of South America have documented the effectiveness of music therapy in speech and communication development, there is limited

local research in Kenya exploring its role in supporting children with speech disorders. This gap justifies the current study, which seeks to examine the correlation between music therapy and speech development among children with speech disorders in Nakuru Hills Special School, Nakuru County, Kenya. By focusing on both speech outcomes and associated prosocial skills, the study aims to generate insights that can inform local interventions and policy frameworks for children with special needs.

1.2 Statement of the Problem

Music has long been integrated into children's growth and development through phonics songs, play songs, and lullabies, which stimulate early language and speech development. For children with speech disorders, however, this natural progression is disrupted, resulting in difficulties in speech sound production and effective communication. These challenges negatively impact their social interactions, learning, and academic performance. Globally, a significant proportion of children are diagnosed with speech and language disorders, creating an urgent need for targeted interventions to support their communication development. In Kenya, children with speech disorders face particular difficulties due to the limited number of speech-language pathologists, inadequate therapy resources, and lack of specialized programs. Families raising children with speech challenges often experience social, emotional, and financial strain. For instance, Osoro (2019) observed that caring for children with speech disorders can be overwhelming for family members, particularly when effective interventions are lacking. If unaddressed in the early developmental stages, speech disorders may lead to long-term effects on language acquisition, academic achievement, social integration, and emotional well-being.

Music therapy has emerged globally as a promising intervention to support speech development, offering benefits in rhythm, articulation, vocabulary, fluency, and prosocial skills such as communication, collaboration, and emotional expression. However, while studies in Europe, North America, and South America have documented positive outcomes of music therapy, little empirical research has been conducted in sub-Saharan Africa, and even less in Kenya. Most existing interventions for children with speech disorders in Kenya rely on conventional speech and language therapy, leaving a gap in knowledge on the potential benefits of music therapy as a complementary or alternative intervention. Nakuru Hills Special School in Nakuru County provides education for children with special needs, including those with speech disorders. Despite the prevalence of speech difficulties among its learners, the school has limited access to innovative interventions such as music therapy. This presents a unique opportunity to explore the role of music therapy in addressing speech development challenges in a local context where resources are constrained. Examining its effectiveness in this setting is therefore crucial for generating locally relevant evidence that can inform practice, enhance rehabilitation strategies, and support the integration of creative, low-cost approaches into existing special education and therapy frameworks.

1.3 Purpose Statement

The purpose of this study was to examine the correlation between music therapy and speech development among Children with Speech Disorders in Nakuru Hills Special School, Nakuru, Kenya.

1.4. Objectives of the Research

i. To explore the impacts of music therapy on speech development of children in Nakuru Hills Special School, Nakuru, Kenya.

ii. To examine the specific prosocial skills linked to speech development that have been developed in children after music therapy treatment in Nakuru Hills Special School, Nakuru, Kenya

iii. To assess the contribution of modified music interventions to speech development among children in Nakuru Hills Special School, Nakuru, Kenya.

1.5. Research Questions

i. How does music therapy affect speech development in children in Nakuru Hills Special School, Nakuru, Kenya?

ii. What specific prosocial skills linked to speech development that developed in children after music therapy treatment in Nakuru Hills Special School, Nakuru, Kenya?

iii. What is the contribution of modified music interventions to speech development among children in Nakuru Hills Special School, Nakuru, Kenya?

1.6. Significance of the Study

The findings of this study are significant in addressing critical challenges faced by children with speech disorders, particularly within special schools in Kenya. Speech disorders negatively affect communication, academic performance, and social integration, thereby undermining children's overall well-being. By investigating the role of music therapy in

enhancing speech development, this study provides practical insights that may contribute to improved interventions for children with communication difficulties.

The study established that music therapy has the potential to influence speech development positively by strengthening articulation, rhythm, and fluency, as well as fostering prosocial skills such as cooperation and emotional expression. These outcomes may support teachers, therapists, and carers in implementing innovative, child-friendly approaches that complement existing speech therapy methods. Conversely, where limited or no improvement was observed, the findings are equally important, as they highlight the boundaries of music therapy and the need for alternative or modified interventions.

For practitioners and educators, the findings provide evidence that may inform the integration of music-based strategies into special needs education and speech therapy programmes. This is likely to improve classroom engagement, support individualized learning, and enhance social participation among children with speech disorders. Careers may also benefit from the insights gained, particularly on the role of involving families in music-related activities. The findings suggest that when careers participate in therapy or support music-based practices at home, children's progress in speech development may be reinforced, promoting a family-centred approach to rehabilitation.

At the policy level, the results of this study highlight the potential of incorporating music therapy into Kenya's rehabilitation and inclusive education frameworks. Policymakers may use this evidence to expand intervention options for children with speech disorders, thereby improving access to diverse and effective therapies. Finally, the study contributes

to scholarly work by addressing an empirical gap in the Kenyan context, where little research exists on the link between music therapy and speech development. It provides a foundation for further studies on long-term effects, cross-cultural adaptations, and applicability to other developmental disorders. Whether outcomes are positive or negative, this contribution enriches the knowledge base and informs future research and practice.

1.7 Limitation & Delimitation of the research

The following were the research's limitations and delimitations:

1.7.1 Limitations

One limitation of this study is the concurrent use of music therapy alongside other speech therapy interventions, which may influence the expected outcomes of music therapy alone. This challenge arises because some speech therapists and teachers may lack adequate knowledge on how to effectively apply music therapy. To address this, training sessions were conducted for speech therapists and teachers at Nakuru Hills Special School to equip them with the necessary skills to integrate music therapy into speech development programs. Additionally, the availability of musical instruments required for therapy sessions affected the consistency and effectiveness of the approach. To mitigate this, the study worked with the school administration to ensure that the necessary instruments were accessible during the research period. Another limitation is that although Kenya has over 500 special schools across the 47 counties, this study focused on a small sample of children from one school—Nakuru Hills Special School. Consequently, the findings are specific to this institution and may not be fully generalizable to all special schools in Kenya. However,

the study provides valuable insights that can inform future research across multiple institutions.

1.7.2 Delimitations

Due to the scope of the research, the research study used a case of Nakuru Hills Special School as the delimitation to focus on a particular setting and region. Only the child with speech disorders at Nakuru Hills Special School, Nakuru County, was included in the study leaving out other schools and adult groups.

This study specifically dwelt on music therapy in speech development of children leaving other psychological interventions uncaptured. Additionally, due to time constraints, the research study was delimited to use only 60 participants selected from the project site. Moreover, this study particularly dealt with effects, pro-social skills and the need for modifying music therapy for its effectiveness in speech development among children in schools.

1.8 Assumptions

i. Teachers and therapists are well trained and professionally qualified.
ii. Early intervention among children with speech disorders is given adequate attention in the school.
iii. Respondents were available to volunteer information without fear or intimidation.

1.9 Theoretical & Conceptual Framework

Every research study is anchored in a theoretical and conceptual foundation that provides direction and coherence. Theoretical frameworks offer established models and perspectives that explain the phenomena under investigation, while conceptual frameworks illustrate the researcher's own understanding of how key variables are interrelated within the context of the study, as discussed under the following sub-sections:

1.9.1 Theoretical Framework

This study is guided by two complementary theories: Cognitive Behavioral Theory (CBT/Behaviorism) and the Social Pragmatic Theory (SPT). These frameworks are not applied in isolation; rather, they jointly provide a comprehensive lens through which the role of music therapy in speech development can be understood.

Cognitive Behavioral Theory (CBT) emphasizes that behavior, including speech, can be learnt, modified, and reinforced through stimulus–response associations and reinforcement. Applied to speech therapy, this theory explains how children can acquire fluent speech patterns through positive reinforcement, modelling, and shaping. For instance, when children engage in music therapy activities such as singing or rhythmic repetition, therapists may use reinforcement strategies to encourage accurate articulation and fluent speech (Skinner, 1991; Kalinowski & Sultukloragu, 2006). This highlights the structured and behaviour-modification aspect of music therapy.

On the other hand, the Social Pragmatic Theory (SPT) underscores that speech and language development occur primarily through purposeful social interactions. Children

learn not only vocabulary and articulation but also the functions of communication—such as turn-taking, joint attention, and adapting language to different social contexts (Bruner, 1983). In music therapy sessions, activities such as group singing or call-and-response exercises foster these social communication skills, enabling children to practice language in meaningful and interactive contexts.

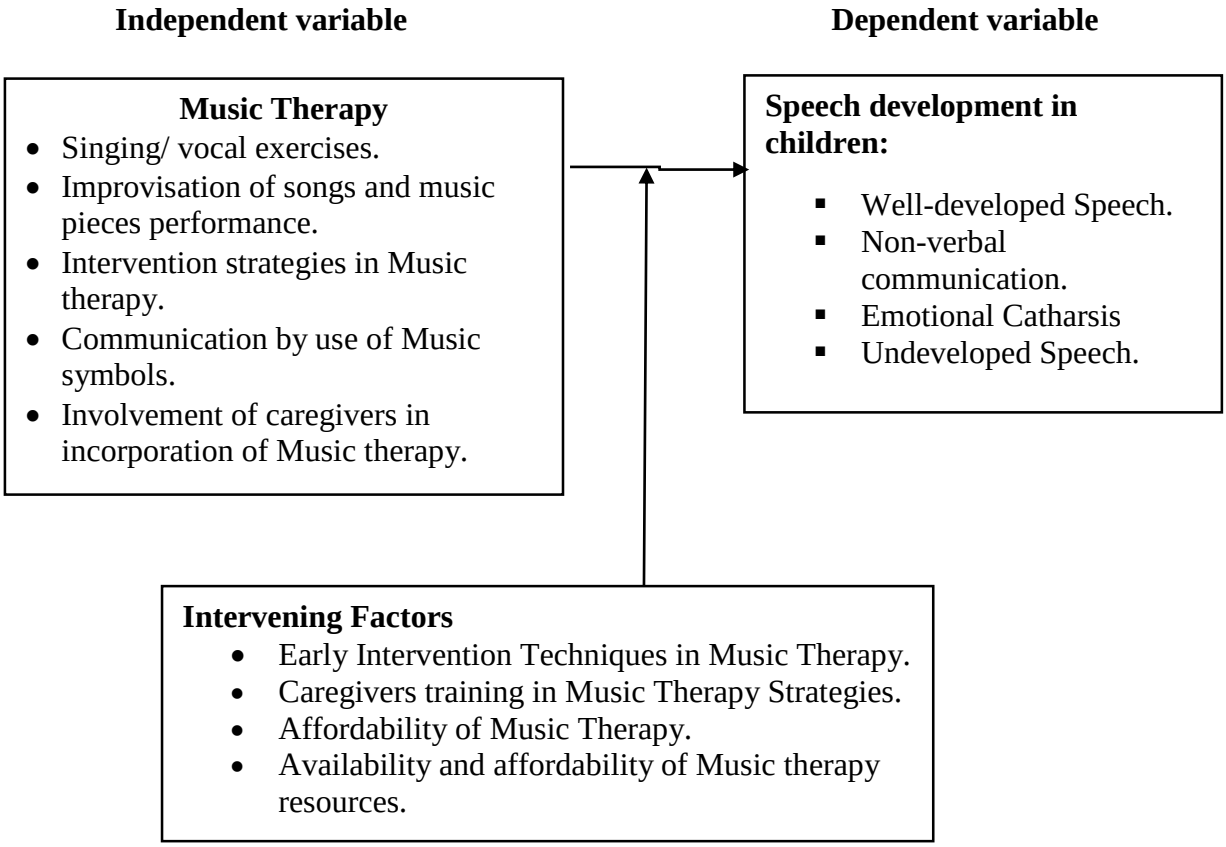
Together, the two theories complement one another. While CBT explains how music therapy shapes speech behaviors through reinforcement and conditioning, SPT explains why these behaviors matter in real-life communication and how they enhance prosocial skills such as cooperation and emotional expression. By integrating these perspectives, the study is able to capture both the mechanistic (behavioral) and the functional (social-communicative) dimensions of speech development. This dual-theory approach therefore provides a stronger foundation for analyzing how music therapy contributes to speech development among children with speech disorders in Nakuru Hills Special School.

1.9.2 Conceptual Framework

The conceptual framework accentuates and details the relationship between various variables of the research. The independent variable is music therapy in children. The dependent variable is speech development in children, which relies on intervening factors to be habilitated. If delayed speech development, speech development problems and speech disorders are not intervened early at the appropriate age a child's communication is interfered with. Failure for early intervention from healthcare professionals, caregivers and teachers means that children may not rehabilitate from these errors and thus, it will have an effect on speech development in children. Therefore, these factors mediate the

dependent variable, which is speech development. Thus, music therapy interventions at early intervention would facilitate speech development in children. Intervening variables like early intervention techniques, music therapy and healthcare workers or caregivers training are all necessary to aid in managing children with delayed speech development or speech development problems or speech disorders.

Figure 1.1: Conceptual framework



1.10 Operational Definition of Terms

Children: School-going persons yet to attain the legal age of maturity and making independent decisions.

Early Intervention: This is the support provided to children experiencing delays in their development to enable them overcome or find ways of adapting to be able to run their lives as normal as possible.

Language Development: The level of both expressive and receptive language of an individual with regards to their age**.**

Music Therapy: A clinical practice in which use of music interventions helps patients to attain individualized goals

Rehabilitation: Intervention strategies preferred towards an individual to enable them overcome limitations they may experience in their daily lives.

Speech intelligibility: It refers to clarity of spoken words or a measure of how spoken words are understood in given conditions.

Speech: As described by Ndung'u and Kinyua (2009), it is a system or process of creating and producing sounds to form language

Speech-language Pathologist/Speech therapist: According to ASHA (2022), it is a professionally trained person who assists in assessing, diagnosing, and treating speech deficiencies and disorders.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section covers related literature reviewed on the correlation between Music Therapy and Speech development of children with Speech disorders, and the theoretical framework that guides the study. The literature review chapter discusses the existing studies pertinent to the topic, research questions and objectives of the study. Also, the literature review chapter identified and discuss the existing literature gaps, which this project aims to fill.

2.2 Music Therapy and its impact on Speech Development

Engaging in activities that focus on auditory discrimination can enhance a child's ability to process and distinguish speech sounds, contributing to improved speech perception and language development (Mendes & Rossinol, 2022). It also emphasizes rhythmic activities such as clapping, tapping, or playing percussion instruments, while singing and vocalization encourage children to practice articulation and fluency (Gallagher et al., 2019; Torppa & Huotilainen, 2019). These studies highlight the general benefits of music therapy in speech development, but most were conducted in Western contexts, leaving a gap in understanding how these interventions work among children with speech disorders in African or Kenyan special schools.

Music training is a potential therapy for treating children with speech sound disorders, such as phonological and articulation difficulties, because it encompasses vastly or greatly pertinent cognitive capabilities, which include auditory-motor interactions, hierarchical processing, and temporal predictions that are crucial in the development of language and

speech sound skills in children. Music training also improves sound production, speech sound processing (e.g., syllable processing), and language perception at diverse levels in young learners with speech sound disorders or language and speech development challenges (Pesnot Lerousseau, Hidalgo, & Schön, 2020). This present study addresses that gap by focusing on children in Nakuru Hills Special School, providing localized evidence.

In the United States, Lopez (2023) conducted a descriptive study on the methods board-certified music therapists use during practice. The findings showed that music therapy enhanced clients' cognitive, musical, and fine motor skills. While informative, the study was limited by its broad focus on multiple developmental outcomes rather than speech development specifically. Similarly, Johnson (2022) examined music-based interventions during speech therapy sessions and found that musical instruction improved motivation and treatment outcomes. However, the study concentrated on individual clients in clinical settings. The current research extends these findings by examining the specific link between music therapy and speech development in a school environment, thus addressing both the context and the population gap.

Vidal (2019) conducted a randomized study with preschool children in Europe and found that music classes enhanced phonological awareness more than visual arts classes. Although this suggests a direct link between music and language development, the study involved typically developing children and excluded those with speech disorders. Moreover, the curriculum focused on general music education rather than therapeutic interventions. The present study addresses these gaps by specifically targeting children

with speech disorders and by applying music therapy as a structured intervention rather than general classroom music education.

Mayer-Benarous et al. (2021) and Sammler & Elmer (2020) emphasized that educational music therapy enhances speech sound skills, phonological abilities, and prosodic development in children with delayed speech. Likewise, Fiveash et al. (2021), Wiens & Gordon (2018), and Bieleninik et al. (2017) found that music therapy supports articulation, prosody, and fluency. While these studies establish strong evidence for the role of music therapy in speech development, most were carried out in high-income countries with advanced clinical resources. This creates a contextual gap, as less is known about the effectiveness of music therapy in resource-constrained environments such as Kenyan special schools. The current study fills this gap by exploring music therapy interventions in Nakuru Hills Special School, where access to conventional speech-language therapy is limited.

In Kenya, Akombo (2000) reported that singing and dancing were used in refugee camps to support psychosocial development and help traumatized children regain speech. Although this shows the potential of music as a therapeutic tool, the focus was on trauma recovery rather than structured speech development. Similarly, the American Music Therapy Association (2005) recognized that music therapy promotes articulation and socialization, but the evidence was not specific to Kenyan children with speech disorders. The current study therefore addresses the local empirical gap by systematically examining how music therapy impacts speech development among children in a Kenyan special school setting, with an emphasis on both speech outcomes and prosocial skills.

In summary, existing literature demonstrates that music therapy positively influences aspects of speech development such as articulation, phonological awareness, fluency, and prosody. However, most prior studies have been conducted in Western or clinical contexts, have excluded children with speech disorders, or have focused broadly on psychosocial outcomes rather than speech specifically. This study addresses these gaps by examining the direct correlation between music therapy and speech development in Nakuru Hills Special School, providing locally grounded evidence that may inform educational and therapeutic practices in Kenya.

2.3 Music Therapy and Pro-Social Skills Associated with Speech Development

Prosocial skills associated with speech development also extend to non-verbal communication. Individuals with strong speech skills often have better control over their facial expressions, body language, and gestures, which contribute to effective communication and social understanding. Speech development involves not only mastering language but also understanding and respecting cultural differences in communication.

Bai (2019) conducted a rapid review that revealed music therapists in clinical practice often target altruistic behaviors such as effective communication, active listening, conflict resolution, and empathy when treating children with speech disabilities. While this study demonstrated the relevance of music therapy in promoting prosocial behavior, it was largely theoretical and based on literature rather than field-based empirical data. Furthermore, the review generalized across contexts without exploring specific populations such as children in special schools. The current study addresses this gap by providing

empirical evidence from Nakuru Hills Special School, thereby contextualizing how music therapy supports prosocial skills in children with speech disorders in a Kenyan setting.

Katagiri (2009) noted that music therapy interventions can improve complex outcomes such as emotional understanding. Similarly, Juslin and Västfjäll (2008) explained that music enhances emotional regulation through its influence on brain structures like the hippocampus and auditory cortex, while Koelsch (2020) supported this link to neurobiological processes. However, these studies focused primarily on the neurological and emotional dimensions of music therapy without connecting them explicitly to observable prosocial behaviors in children with speech disorders. The current study narrows this gap by examining how improved emotional regulation and expression, facilitated through music therapy, translates into tangible prosocial outcomes such as turn-taking, cooperation, and empathy among children in Nakuru Hills.

Peter et al. (2021) investigated the 'Papageno Music Therapy Program' for children with Autism Spectrum Disorder (ASD) and found significant improvements in social behaviors such as eye contact, cooperation, and verbal communication. While valuable, this study was limited to a European context, with a small sample size of ten children, and focused exclusively on ASD rather than children with diverse speech disorders. The present study extends these findings by focusing on a different population children with speech disorders in Kenya and by situating the intervention in a school environment rather than a controlled clinical program. This contextual expansion helps to validate whether similar prosocial benefits of music therapy can be observed in developing country settings.

Barlow (2021) synthesized eight studies exploring the role of group music therapy in improving prosocial behavior among children with ASD. Findings emphasized the benefits of shared play, peer interaction, and therapist-facilitated communication. However, Barlow's review also highlighted the need for further research using standardized methods and diverse populations. Most of the reviewed studies were limited to high-income countries and involved children with autism rather than broader categories of speech disorders. The present study responds to these recommendations by empirically examining how structured music therapy interventions foster prosocial behaviours such as cooperation, turn-taking, and peer interaction among Kenyan children with speech disorders, thus broadening the scope of existing evidence.

In summary, previous research has established that music therapy enhances prosocial skills such as empathy, cooperation, and communication. However, most studies have been conducted in Western or clinical contexts, often focusing on children with autism, and have not adequately examined children with speech disorders in African educational environments. The current study fills this gap by exploring the specific prosocial skills linked to speech development among children with speech disorders in Nakuru Hills Special School, thereby offering localized and context-specific insights.

2.4 Modified Music Interventions and Speech Development

Modifying music therapy to address problems associated with speech development among children has been considered an effective approach. While music therapy in its conventional form has demonstrated positive effects on speech development, tailoring interventions to meet children's specific needs and integrating them into comprehensive

treatment plans may enhance therapeutic outcomes. Therapy approaches such as metaphor therapy and distinctive feature therapy have been commonly applied in treating phonological errors and disorders in children (ASHA, 2022). For example, metaphor therapy helps children acquire consonants and phonemes by creating awareness of sound properties, thereby addressing issues related to voicing and speech sound production (McLeod & Crowe, 2018; Roth & Worthington, 2018). Distinctive feature therapy, on the other hand, enables children with phonological disorders to understand phonological rules and correct error patterns in articulation, voicing, or nasality by targeting sound features and substitutions (Storkel, 2018).

Although these approaches highlight useful strategies for speech sound correction, they are primarily focused on clinical linguistic interventions and do not integrate music therapy explicitly. Furthermore, most of the studies cited (ASHA, 2022; McLeod & Crowe, 2018) are grounded in Western contexts, where clinical resources are more readily available. The current study fills this gap by examining how music therapy interventions can be modified and contextualized to fit children with speech disorders in a Kenyan special school setting, particularly where access to specialized clinical services may be limited.

Pitt (2020) emphasized the value of interdisciplinary collaboration between speech-language therapists and music practitioners. His findings revealed that children's communication improved when they engaged in music-making with their careers, which helped them relieve anxiety and build confidence. While Pitt's work is insightful, it focused largely on career-child interactions in Western cultural contexts. The current study builds upon this by extending the idea of modified interventions into a school environment in

Kenya, where peer interaction and structured group music sessions complement career involvement. This makes the intervention more community-based and adaptable to the realities of Nakuru Hills Special School.

Giusto et al. (2023) demonstrated the successful modification of problem-solving therapy (PST) for Kenyan adolescents, showing that tailoring interventions to cultural and linguistic contexts enhances their effectiveness. Their study underscores the importance of adapting therapeutic content to local needs, including using metaphors, illustrations, and peer delivery. However, Giusto et al. focused on mental health interventions among adolescents rather than speech development in children. The present study responds to this gap by modifying music-based interventions to suit the cultural and developmental needs of children with speech disorders in Kenya. By incorporating familiar songs, rhythms, and culturally relevant activities, the interventions aim to enhance speech development while remaining relatable and engaging for the children.

In summary, previous studies demonstrate the potential of tailoring therapeutic interventions, yet they have largely emphasized clinical phonological therapies, career-based interactions, or non-speech-related modifications. None have directly examined how modified music interventions contribute to speech development among children with speech disorders in a Kenyan school context. The current study therefore bridges this gap by empirically investigating the role of modified music therapy in enhancing speech outcomes at Nakuru Hills Special School, offering a localized, culturally sensitive, and school-based approach to intervention.

2.5 Literature Review and Research Gaps Summary

The reviewed literature establishes that music therapy contributes positively to speech development in children. However, most studies have been conducted in Western contexts, with limited focus on children with speech disorders in African settings. No study has specifically examined how music therapy affects speech development in Nakuru Hills Special School, thus creating a contextual gap that the current research addressed. While existing studies link music therapy to the development of prosocial skills such as empathy, cooperation, and emotional expression, they often emphasize children with Autism Spectrum Disorder (ASD) rather than children with broader speech disorders. This creates a population gap, which the present study filled by investigating prosocial skills associated with speech development among children with speech disorders in a Kenyan special school context.

Finally, literature on modified therapeutic interventions shows that tailoring therapy to cultural and developmental needs enhances effectiveness. However, little is known about how modified music interventions contribute specifically to speech development in children with speech disorders. The current study bridged this gap by evaluating the contribution of adapted music therapy approaches within the local setting of Nakuru Hills Special School. In summary, the study addressed three gaps: the lack of localized evidence on music therapy and speech development; limited focus on prosocial skills among children with speech disorders; and the absence of research on modified music interventions in Kenyan school contexts.

CHAPTER THREE

RESEARCH DESIGN & METHODOLOGY

3.1 Introduction

The chapter outlines and deliberates on the methodology of the study, the design of the research, the approach of the research, the target population, and the procedures for sampling, as well as the instruments, techniques, and methods used for data collection and analysis, taking into account both logical and ethical considerations.

3.2 Research Design

The study was conducted using a quasi-experimental research design with the aim of achieving the study purpose, which is to evaluate the correlation of music therapy in speech development of children with speech disorders in Nakuru Hills Special School, Nakuru County, Kenya. The rationale for using quasi-experimental design is because they are well-suited for comparing these pre-existing groups and examining the impact of an intervention without manipulating group assignment (Creswell & Creswell, 2018). Therefore, the primary aim of using quasi-experimental designs be to answer the research question and accomplish the objectives of research study. Also, the rationale for choosing the design is that the researcher may follow the same group of participants over an extended period, measuring outcomes at different points, and examining the effects of an intervention or exposure.

3.3 Study Variables

The independent variable was music therapy, operationalized in terms of: Singing and vocal exercises, Improvising on songs and music pieces, and Exchanging information/words through music Since these were categorical descriptions of the types of interventions applied, the independent variable was measured at the nominal level of measurement (i.e., presence or absence of a particular intervention strategy). The dependent variable was speech development among children with speech disorders. This was assessed through the following indicators: Effective communication (vocabulary and clarity); Active listening; Non-verbal communication; Appropriate use of language; and Emotional expression Each indicator was measured using a 5-point Likert scale ranging from 1 = “Strongly Disagree” to 5 = “Strongly Agree.” A Likert scale generates ordinal

level data, as it reflects ordered categories of agreement. However, for purposes of statistical analysis (e.g., correlation and regression), the Likert-scale data were treated as approximating interval level measurement, a common practice in social sciences.

3.4 Location of the Study

The study was conducted at Nakuru Hills Special School in Nakuru County, Kenya. Established in 1978, the institution provides rehabilitative and educational services to children with diverse special needs, including a significant proportion with speech disorders. The school is well recognized for integrating music-related activities such as singing and rhythm in its programs, making it a suitable environment to explore the role of music therapy in enhancing speech development. Its long-standing reputation and broad learner population with varied speech challenges made it both relevant and representative for the study objectives. Nakuru Hills Special School was also selected due to its accessibility and willingness of administrators and caregivers to support research activities, which ensured feasibility of data collection. Unlike many other special schools in the region, it has established therapeutic interventions and a diverse population that allowed for a comprehensive examination of music therapy's impact on speech development. These attributes justified its selection as the most appropriate setting to generate findings that could provide insights applicable to similar institutions in Kenya.

3.5 Target Population

The target population for this study comprised children with diagnosed speech disorders enrolled at Nakuru Hills Special School and the teachers directly involved in their instruction. Specifically, the study focused on approximately 30 children with varying

levels of speech difficulties and the teachers who support them in classroom and rehabilitative activities. This group was considered appropriate because the children formed the direct beneficiaries of music therapy interventions, while the teachers provided critical insights into observable changes in speech development and related communication skills. Although the school has staff members trained in special needs education, specialized services such as speech therapy were provided either by teachers with additional training in speech and language support or through external partnerships with visiting speech therapists. These personnel, together with the teachers, were key informants for this study, as they offered professional and practical perspectives on the effectiveness of music-based interventions in supporting speech development.

3.6 Sampling Techniques and Sample Size

This study employed purposive sampling to select participants who were most directly involved with music therapy and speech development interventions at Nakuru Hills Special School. Purposive sampling was preferred because the research required respondents with specific knowledge, experience, and characteristics relevant to the study objectives. According to Kumar (2014), this technique enables the researcher to deliberately choose participants who can provide the most reliable and meaningful data, particularly where the target population is specialized and relatively small, as was the case in this study. The sample consisted of three categories of respondents: (i) thirty children with diagnosed speech disorders enrolled at the school, who were the primary focus of the intervention; (ii) ten teachers trained in special needs education and directly responsible for implementing or supporting music therapy activities; and (iii) one speech and language pathologist affiliated with the school, who provided expert input on therapeutic outcomes.

This combination of participants ensured that both the direct experiences of children and the professional perspectives of their instructors and therapist were adequately captured to provide a comprehensive understanding of the impact of music therapy on speech development.

3.7 Research Instruments

The study employed multiple instruments to collect both quantitative and qualitative data. These included a standardized articulation test, an observation checklist, and structured interviews with key informants.

3.7.1 Test tool

Goldman-Fristoe Test of Articulation (GFTA). The GFTA is designed to assess articulation skills and identify speech sound disorders in children. The GFTA is designed to assess the articulation of consonant sounds in words and sentences in children aged 2 years, 0 months to 21 years, 11 months.

3.7.2 Observation Checklist

As stated by Kumar (2014), observation is a deliberate, organized, and selective method of observing and participating an interaction process. The researcher engaged in verbal conversations with children experiencing language development disorders, subsequently documenting their speech behaviors. The investigator determined the percentage of unclear syllables (%SS), speaking rate (in syllables per minute, SPM), and articulatory rate (in syllables per minute, SPM). This process was conducted again two months after the treatment. The researcher then documented the observed post-treatment behavior in a

descriptive manner, which was later organized into categories following analysis and classification.

3.7.3 Interviews

Structured interviews were conducted with speech and language pathologist working with children at Nakuru Hills Special School with the help of teachers. The interviews sought to capture professional insights on the role of music therapy in enhancing speech development and the challenges experienced in its implementation. The interview schedule included open-ended questions that explored the nature of music therapy programs, the observed effects on children's speech, the development of prosocial skills linked to communication, and recommendations for improving therapy practices. Responses from these key informants complemented the quantitative data by providing contextual and experiential perspectives that enriched the study findings.

3.8 Pilot study

A pilot study was conducted at Njoro Special School, located in Njoro Sub-County, which was selected because it shares similar characteristics with Nakuru Hills Special School in terms of student population, types of speech disorders, and availability of rehabilitative programs. Conducting the pilot at this school provided the researcher with an opportunity to pre-test the instruments in a comparable environment while at the same time avoiding disruption or contamination of the main study site. By piloting in a different school, the participants at Nakuru Hills Special School remained naïve to the study instruments and procedures, ensuring the integrity of the main research.

During the pilot, four children with speech disorders were purposively sampled, and their speech was recorded and observed before and after undergoing one month of music therapy treatment. The process enabled the researcher to test the clarity, validity, and practicality of the observation checklist, the Goldman-Fristoe Test of Articulation, and the interview schedule. Feedback was also sought from supervisors, colleagues, and speech and language therapists to further strengthen content validity. Reliability of the instruments was established using the test-retest method, where the same tools were administered to the sampled children at two different intervals. The resulting scores were correlated using Pearson's product moment formula, and the consistency of results confirmed the dependability of the instruments for use in the main study.

3.9 Data Collection

Data collection commenced after the researcher obtained an official research permit from the National Commission for Science, Technology and Innovation (NACOSTI), as well as authorization from the Nakuru County Director of Education and the school administration at Nakuru Hills Special School. Once the necessary approvals were granted, the researcher scheduled sessions with teachers, the speech and language pathologist, and the participating children. The process of data collection followed three main stages: pretest, intervention, and posttest, using three instruments—the Goldman-Fristoe Test of Articulation (GFTA), an observation checklist, and interviews.

The Goldman-Fristoe Test of Articulation (GFTA) was administered to all children with speech disorders at the pretest stage. Using the standardized stimulus book, the children were presented with target sounds embedded in words and sentences accompanied by

pictures. Their responses were recorded on the official GFTA forms, and the scoring rubric in the manual was applied to determine accuracy of sound production. This process established the baseline level of articulation and severity of speech difficulties for each child. The same procedure was repeated after the intervention (posttest) to identify any changes in speech articulation.

The observation checklist was used concurrently to document natural speech and communication behaviours during class and therapy sessions. Before the intervention, the researcher observed and recorded indicators such as the percentage of unclear syllables (%SS), speaking rate (syllables per minute), articulatory rate, non-verbal expressions, and use of vocabulary. These observations were systematically categorized and quantified. After the music therapy intervention, the same children were observed again, and changes in their communicative behaviours were compared with baseline data.

The music therapy intervention was carried out over a period of two months. It was facilitated collaboratively by the school's music teacher and the speech and language pathologist. Activities included guided singing, vocal exercises, rhythmic chanting, and structured opportunities for children to exchange words or short phrases through music. The sessions were conducted two to three times per week, each lasting about 30–40 minutes. The structured therapy provided consistent exposure to music-based communication exercises aimed at stimulating speech development. Lastly, interviews were conducted with the speech and language pathologist and ten teachers who directly worked with the children. These interviews were scheduled after the posttest stage to allow participants to reflect on both the pre-intervention and post-intervention periods. The questions explored perceptions of the effectiveness of music therapy, the prosocial

communication skills developed by children, and recommendations for improving the intervention.

3.10 Data Analysis

Quantitative data processing and analysis. Quantitative data (GFTA scores, observation checklist measures such as % unclear syllables [%SS], speaking rate and articulatory rate in syllables per minute, and Likert-scale responses) were first entered into Microsoft Excel and cleaned for entry errors, outliers and missing values. Missing data were handled by listwise deletion where missingness was negligible (<5%); if larger patterns of missingness were detected, multiple imputation procedures were planned. Scores from the Goldman–Fristoe Test of Articulation were computed according to the manual and converted into the indicators used in analysis (e.g., percent consonants correct or scaled articulation scores). Likert-scale items were inspected for internal consistency (Cronbach's alpha) prior to aggregation into composite scales; the observation checklist was checked for inter-rater reliability on a double-coded subsample (Cohen's kappa), and test–retest reliability was assessed from the pilot using Pearson's r. All quantitative analyses were performed in SPSS (version 28.0).

Descriptive statistics (means, standard deviations, medians and interquartile ranges for continuous measures; frequencies and percentages for categorical measures) were produced to summarize baseline characteristics and pre-intervention scores. Where assumptions for parametric tests were met, paired-samples t-tests were used to compare pre- and post-intervention continuous outcomes.

Qualitative data analysis. Audio recordings from interviews were transcribed verbatim, and the transcripts were checked against the recordings for accuracy. Qualitative data were analyzed using thematic analysis following a systematic coding process: (1) familiarization with transcripts, (2) generation of initial codes, (3) development and refinement of a codebook, (4) grouping codes into candidate themes, and (5) reviewing and naming final themes. Coding was conducted manually (or using qualitative software if available), and a sample of transcripts was double-coded to assess inter-coder agreement; discrepancies were resolved through discussion and consensus. Content analysis procedures were used where quantification of particular words, behaviours or themes added value (for example, frequency of teachers reporting specific prosocial skills). Themes and subthemes were used to answer the research questions concerning prosocial skills and practical aspects of modified interventions; illustrative verbatim quotations were included in the results to preserve participant voice and provide contextual evidence, Integration and presentation. Findings from quantitative and qualitative strands were triangulated to provide a comprehensive answer to each research question.

3.11 Logistical and Ethical Considerations

Research involving human participants requires careful attention to both logistical arrangements and ethical responsibilities. This section outlines the measures taken to ensure smooth data collection and adherence to ethical standards.

3.11.1 Logistical Considerations

The researcher obtained formal approval from Kenyatta University before commencing the study. Additionally, a research permit was secured from the National Commission for

Science, Technology and Innovation (NACOSTI), which authorized the study to be conducted in Nakuru County. Permission was sought from the management of Nakuru Hills Special School to conduct the study on their premises. The school administration was fully briefed on the study objectives, research procedures, and the type of data to be collected. The researcher ensured that all research materials, including the Goldman-Fristoe Test of Articulation (GFTA), observation checklists, interview guides, and recording equipment, were prepared and tested prior to data collection. Data collection schedules were coordinated with the school's timetable to minimize disruption to children's learning activities. The music therapy intervention sessions were also scheduled to align with the school's daily routines.

3.11.2 Ethical Considerations

Participation in the study was entirely voluntary. Written consent was obtained from the carers of the children, as well as from the speech and language pathologist involved in the therapy sessions. Participants were fully informed about the purpose of the study, the procedures involved, and their right to withdraw at any time without consequences. To ensure privacy, all data collected were anonymized. Participant identifiers were replaced with codes, and the data were securely stored for analysis. Any reporting of findings was done in aggregate form or using pseudonyms to maintain confidentiality. Potential risks, such as emotional discomfort during therapy sessions or assessment, were clearly explained to careers and participants beforehand. Steps were taken to mitigate these risks, including the presence of trained personnel during sessions. The study also ensured

potential benefits, including contributions to improved speech therapy practices and enhanced understanding of the role of music therapy in speech development.

CHAPTER FOUR

FINDINGS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents findings, interpretations and discussions based on the data provided by respondents in the aim of examining the correlation between music therapy and speech development among Children with Speech Disorders in Nakuru Hills Special School, Nakuru, Kenya based on the following study objectives:

i. To explore the impacts of music therapy on speech development of children in Nakuru Hills Special School, Nakuru, Kenya.
ii. To examine the specific pro-social skills linked to speech development that have been developed in children after music therapy treatment in Nakuru Hills Special School,

Nakuru, Kenya

iii. To assess whether modifying speech therapy is necessary when tending to problems related to speech development among children in Nakuru Hills Special School, Nakuru, Kenya.

Data obtained from the field were analyzed using descriptive statistics with the aid of the Statistical Package for Social Science (SPSS). All of the sampled participants, all the respondents were engaged in the study translating a response rate of 100%. Complete participation ensures that the sample is fully representative of the target population. A study by Hendra and Hill (2021) emphasizes the importance of representative sampling in research to ensure the generalizability of findings. A response rate of more than 80% maximizes the representativeness of the sample, enabling researchers to make more accurate inferences about the population as a whole.

4.2 Demographic Information

The demographic characteristics of the participants were analyzed and discussed in terms of age, gender, grade, highest level of education. The data is as presented in Table 4.2.

Table 4.1: Demographic data of the children with speech disorders

Demographic data		**Frequency**	**Percentage**
Distribution of	Gender	6	60.0%
Children by Gender	Female	4	40.0%
	Total	10	100.0%
Distribution of	2years	2	20.0%
Children by Age	3 years	4	40.0%
	4 years	2	20.0%

	5 years	1	10.0%
	6 years	1	10.0%
	Total	10	100.0%

The demographic data shows that the majority of children in the sample were male (60%), with a notable representation of females (40%). The age distribution indicates that most children were aged 3 years (40%), with fewer participants in the other age categories. This suggests a focus on early childhood, which is critical for speech development interventions. The higher number of male participants aligns with existing literature indicating that speech disorders are often more prevalent in males than females (Law et al., 2000).

4.3 Music therapy and Speech Development of Children with Speech Disorders

The first objective of the study was to explore the impacts of music therapy on speech development of children in Nakuru Hills Special School, Nakuru, Kenya. To achieve this objective, this study compared the same group of children's speech development scores before and after the music therapy sessions, a paired samples t-test was used to effectively evaluate the differences in scores. This method allows you to measure the impact of the therapy directly.

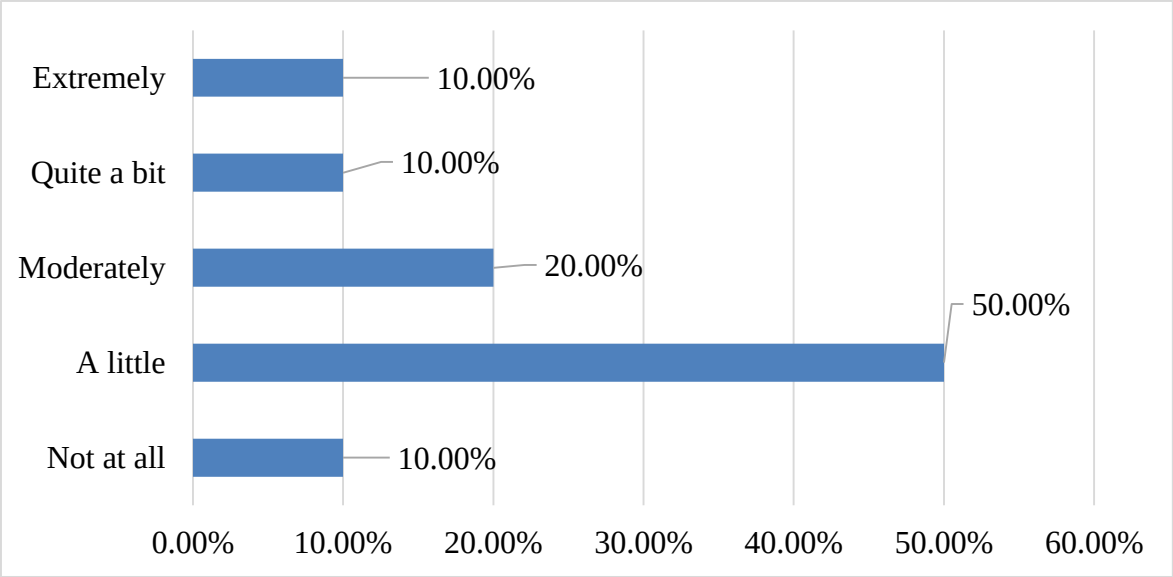


Figure 4.1: Caretakers' Rating of Music Therapy on its effect on Communication Skills

Caretakers' ratings reveal a mixed perception of the effectiveness of music therapy, with 50% indicating only a little impact on communication skills. However, a small proportion (20%) rated it as moderate, while 20% perceived significant improvements. These findings highlight that while a substantial number of caregivers see some benefits from music therapy, many may have lower expectations or may not fully recognize the subtle improvements. This resonates with the findings of Johnson (2022), who noted that enjoyment during therapy can positively influence the perception of progress. Conversely, this could contradict Vidal (2019), who observed more consistent improvements across different therapy settings, indicating that factors like caregiver involvement may influence perceived outcomes.

4.3.1 Pre-Tests and Post Test Scores

Table 4.2 Pretest and post-test scores for the 10 children, based on the Goldman-Fristoe Test of Articulation (GFTA) for various speech measures. I've kept it concise and illustrative:

Table 4.2: Pre-Test and Post Test Scores

Child	Single Word (Pre)	Single Word (Post)	Words in Sentences (Pre)	Words in Sentences (Post)	Conversational Speech (Pre)	Conversational Speech (Post)	Phonetic Transcription (Pre)	Phonetic Transcription (Post)	Prosody (Pre)	Prosody (Post)
1	12	14	10	12	8	12	6	7	5	7
2	11	13	9	11	7	10	5	6	6	8
3	13	15	12	14	9	12	7	8	5	7
4	10	12	8	10	6	9	4	5	4	6
5	14	16	13	15	10	13	8	9	6	8
6	12	14	11	13	8	11	6	7	5	7
7	11	13	10	12	7	10	5	6	4	6
8	13	15	12	14	9	12	7	8	5	7
9	10	12	8	10	6	9	4	5	4	6
10	12	14	11	13	8	11	6	7	5	7

As shown in Table 4.1, all children demonstrated an increase in scores for both single-word articulation and word usage in sentences. For example, Child 1 improved from 12 to 14 in single-word articulation and from 10 to 12 in sentence-level articulation. This indicates that music therapy contributed to clearer pronunciation and more accurate word formation

in structured speech tasks. Improvements were observed in conversational speech for every child, reflecting better functional communication in natural contexts. Children showed a rise of 2–4 points on average, suggesting that music therapy positively affected their ability to generalize correct articulation beyond structured testing. Post-test scores increased in phonetic transcription for all participants, indicating enhanced awareness and production of individual speech sounds. This shows that music therapy may support the development of auditory discrimination and articulation precision.

Prosody scores, representing rhythm, intonation, and stress patterns, also improved. This suggests that music therapy helped children integrate the musical aspects of speech, leading to more natural-sounding speech patterns. Overall, the data indicate a positive effect of music therapy on the articulation abilities of children with articulation disorders. Every child showed measurable gains, highlighting both the consistency and potential efficacy of the intervention. Music therapy often involves rhythmic and melodic patterns, which can enhance speech timing and coordination. Children may benefit from rhythm in aligning articulatory movements, improving clarity and fluency. Music-based interventions are inherently motivating and enjoyable. Increased engagement can lead to more frequent and attentive practice, which is crucial for speech improvement. Music therapy combines auditory, visual, and motor inputs. This multisensory approach strengthens the brain's neural pathways involved in speech production, facilitating better articulation and prosody. The improvements in conversational speech suggest that skills learned in a musical context are transferable to natural communication settings, enhancing social interaction and confidence. While all children improved, the degree varied slightly. This could be due to

baseline articulation levels, age, cognitive development, or responsiveness to musical stimuli, suggesting that individualized therapy plans may further optimize outcomes.

4.3.1 Paired Sample T-test

This study compared the same group of children's speech development scores before and after the music therapy sessions, a paired samples t-test was used to effectively evaluate the differences in scores. This method allows you to measure the impact of the therapy directly.

Table 4.3: Paired Samples Correlations: Pretest vs Post-test

Item		N	Correlation	Sig.
Pair 1	Single word Score Pretest scores & Single word Score Post-test	10	.535	.111
Pair 2	Word articulation in Sentences-Pretest scores & Word articulation in Sentences-Post Test	10	.645	.044
Pair 3	Conversational Speech Pre-test scores & Conversational Speech Post-test scores	10	.868	.001
Pair 4	Phonetic Transcription Pretest scores & Phonetic Transcription Post-test scores	10	-.103	.778
Pair 5	Prosody Pretest scores & Prosody Post-test scores	10	.458	.184

The paired samples t-test conducted in this study aimed to assess the impact of music therapy on various aspects of speech development among children with speech disorders by comparing their scores before and after the intervention. This statistical method is particularly effective in evaluating changes within the same group over time, allowing for

a more precise measurement of therapy effects. The analysis revealed a moderate positive correlation of 0.535 between the pretest and post-test scores for single-word articulation, though this result was not statistically significant ($p = 0.111$). This suggests that while there may have been some improvement in the ability to articulate single words, it was not robust enough to definitively conclude that music therapy had a significant impact. Mendes & Rossinol (2022) emphasize the role of auditory discrimination in enhancing language skills, which may explain the lack of significant change in this area, as single-word articulation may require more focused and repetitive practice.

In contrast, the results showed a strong positive correlation of 0.645, with a significance level of 0.044 for word articulation in sentences. This indicates that music therapy had a positive influence on the children's ability to articulate words within sentences. This finding corroborates Johnson (2022), who found that structured music activities can enhance verbal expression in therapeutic settings. The integration of music likely encourages children to practice articulation within a contextual framework, thereby aiding their ability to construct sentences.

Notably, the test revealed an exceptionally strong correlation of 0.868 for conversational speech, with a highly significant p-value of 0.001. This indicates that music therapy significantly improved conversational speech skills among the children. This finding aligns with Mayer-Benarous et al. (2021), who noted that music therapy can facilitate not just individual sounds but broader communicative abilities. The engaging nature of music likely provided a non-threatening environment for children to experiment with language, enhancing their conversational skills.

Conversely, the analysis for phonetic transcription showed a negative correlation of -0.103 and a high p-value of 0.778, indicating no relationship between pretest and post-test scores. This suggests a lack of statistically significant improvement. This finding is intriguing and somewhat contradictory to Gallagher et al. (2019), who posited that phonetic awareness could improve through rhythmic and melodic exposure in music therapy. It may imply that phonetic transcription requires different pedagogical strategies or tools that music therapy alone does not sufficiently address.

Finally, the correlation for prosody yielded a moderate positive result of 0.458, but the significance level was 0.184, indicating no clear evidence that music therapy impacted this aspect of speech. This finding contrasts with Fiveash et al. (2021), who discussed music's role in enhancing the prosodic features of speech. The lack of significant change in prosody may suggest that this area requires more specific training methods beyond what was offered in the music therapy sessions.

Table 4.4: Paired Samples Test- Paired Differences

Paired t-test items			t	df	Sig. (2-tailed)
	95% Confidence Interval of the Difference				
	Lower	Upper			

Pair 1	Single word Score Pretest scores & Single word Score Post-test	-1.182829	-.217171	-3.280	9	.010
Pair 2	Word articulation in Sentences- Pretest scores & Word articulation in Sentences-Post Test	-1.2524314	-.3475686	-4.000	9	.003
Pair 3	Conversational Speech Pre-test scores & Conversational Speech Post-test scores	-2.107937	-.892064	-5.582	9	.000
Pair 4	Phonetic Transcription Pretest scores & Phonetic Transcription Post-test scores	-1.756439	-.043561	-2.377	9	.041
Pair 5	Prosody Pretest scores & Prosody Post-test scores	-3.057813	-1.542187	-6.866	9	.000

The results presented in Table 4.4 illustrate the paired samples t-test outcomes comparing the pretest and post-test scores for various aspects of speech development among children receiving music therapy. Each item reveals insights into the effectiveness of music therapy and highlights significant areas of improvement. The t-value for the single-word score comparison was -3.280, with a significance level of 0.010. The 95% confidence interval ranged from -1.182829 to -0.217171. This result indicates a statistically significant improvement in the articulation of single words following music therapy. The negative value of the t-test suggests that post-test scores were higher than pre-test scores, confirming that music therapy had a positive impact on this aspect. These findings are in line with Mendes & Rossinol (2022), who emphasized that music can enhance auditory discrimination, which is essential for improving single-word articulation.

The analysis for word articulation in sentences yielded a t-value of -4.000 with a significance level of 0.003. The confidence interval ranges from -1.2524314 to -0.3475686, indicating a strong positive change. This finding supports the conclusion that music therapy is particularly effective in enhancing the ability to articulate words within sentences. Johnson (2022) corroborates this by highlighting the benefits of music-based interventions in developing expressive language skills. The ability to form coherent sentences is a critical component of language development, and this result suggests that music therapy facilitates this process effectively.

The t-value for conversational speech was -5.582, with a significance level of 0.000, demonstrating a highly significant improvement post-intervention. The confidence interval, ranging from -2.107937 to -0.892064, confirms that children showed marked enhancement in their conversational abilities. This result aligns with Mayer-Benarous et al. (2021), who noted that music therapy can foster greater confidence in verbal expression, allowing children to engage more effectively in conversations. The strong correlation here suggests that music therapy acts as a supportive mechanism, encouraging children to practice and improve their conversational skills in a low-pressure environment.

For phonetic transcription, the t-value was -2.377, with a significance level of 0.041, indicating a statistically significant improvement as well. The confidence interval ranged from -1.756439 to -0.043561. While this finding suggests some positive impact, it is less pronounced than that observed in other areas. This could indicate that phonetic transcription requires a more focused approach or additional strategies to fully benefit from

music therapy, as Gallagher et al. (2019) suggest that specific phonetic training may be needed in conjunction with music therapy to achieve optimal outcomes.

The results for prosody showed a t-value of -6.866 and a significance level of 0.000, indicating a highly significant improvement. The confidence interval ranges from -3.057813 to -1.542187. This finding underscores the effectiveness of music therapy in enhancing prosodic features of speech, which are crucial for expressing emotion and intent in communication. This result supports findings from Fiveash et al. (2021) that discuss how music therapy can improve not only articulation but also the musicality of speech, which is often overlooked in traditional speech therapies.

Further, correlation analysis was conducted to examine the strength and direction of the relationship between music therapy strategies (predictors) and observable changes in speech development (binary dependent variable). In this case, the outcome was measured as "Improved Speech Development" (yes/no) as presented in Table 4.5.

Table 4.5: Correlations between music therapy strategies and speech development

Independent variables (music therapy strategies)		**Improvement in Speech Development after treatment**
Cumulative hours of therapy received	Pearson Correlation	.189
	Sig. (2-tailed)	.007*
	N	10

Singing	Pearson Correlation	.584
	Sig. (2-tailed)	.002*
	N	10
Playing instrument	Pearson Correlation	.748
	Sig. (2-tailed)	.006*
	N	10
Movement activities	Pearson Correlation	.756
	Sig. (2-tailed)	.012*
	N	10
Rhythm games	Pearson Correlation	.218
	Sig. (2-tailed)	.545
	N	10
Song writing	Pearson Correlation	.356
	Sig. (2-tailed)	.012*
	N	10

*.Correlation is significant at the 0.05 level (2-tailed).

Table 4.5 presents the results of a correlation analysis conducted to assess the relationship between various music therapy strategies (predictors) and observable changes in speech development, quantified as "Improved Speech Development" (yes/no). The analysis focuses on the strength and direction of these relationships, providing valuable insights into the efficacy of different music therapy techniques. The correlation coefficient for cumulative hours of therapy received is 0.189, with a significance level of 0.007**.** This positive correlation suggests that as the cumulative hours of music therapy increase, the likelihood of improved speech development also increases. However, the correlation is relatively weak, indicating that while more hours of therapy are beneficial, they are not the sole determinant of improvement. This finding aligns with Lopez (2023), who noted that while increased therapy time can lead to better outcomes, the quality and type of intervention are equally crucial.

The correlation for singing is notably strong at 0.584, with a significance level of 0.002. This suggests a significant positive relationship between singing and improvements in speech development. The findings corroborate those of Gallagher et al. (2019), who emphasized that singing facilitates vocal practice, which can enhance articulation and expressive language skills. The use of melodies in singing may help children internalize speech patterns, thus contributing to improved communication abilities.

The correlation for playing instruments is 0.748, with a significance level of 0.006. This strong positive correlation indicates that engaging in instrumental play is closely associated with enhanced speech development outcomes. This finding resonates with Pesnot Lerousseau et al. (2020), who argue that playing musical instruments enhances cognitive and motor skills, which are essential for effective speech production. The physical act of playing instruments may reinforce auditory processing and speech sound production, thereby benefiting children with speech disorders.

The correlation coefficient for movement activities stands at 0.756, with a significance level of 0.012. This indicates a strong positive correlation, suggesting that incorporating movement into music therapy sessions significantly aids in speech development. The interactive nature of movement activities may provide a multisensory experience that fosters language acquisition, as noted by Mendes & Rossinol (2022). Movement can enhance engagement and create a joyful learning environment, which is critical for children with speech challenges.

The correlation for rhythm games is 0.218, but it is not statistically significant ($p = 0.545$). This indicates that rhythm games do not have a meaningful relationship with improvements in speech development in this sample. This finding contrasts with the literature; while rhythm is often considered important for language development (Torppa & Huotilainen, 2019), it may not have been effectively implemented in this specific context. This finding implies that with only 10 participants, even medium correlations may not reach statistical significance. Non-significance may therefore reflect insufficient power rather than absence of effect. In addition, "rhythm games" as implemented might not have been targeting the specific speech processes you measured (e.g., phoneme articulation). Rhythm can support prosody and timing rather than segmental articulation; if your dependent measures emphasize articulation, rhythm's effect may be indirect or delayed. Rhythm activities may require longer exposure or different sequencing to affect articulation; two months may be enough for singing/prosody improvements but not for rhythm-linked language changes.

The correlation for song writing shows a coefficient of 0.356, with a significance level of 0.012. This indicates a moderate positive correlation, suggesting that engaging in song writing can contribute to improvements in speech development. This finding aligns with Mayer-Benarous et al. (2021), who highlight that creative expression through music not only enhances language skills but also boosts confidence in verbal communication. The act of writing songs requires children to think about language structure, rhymes, and rhythm, which can directly impact their speech capabilities.

The results of the correlation analysis reveal that specific music therapy strategies, particularly singing, playing instruments, and movement activities, are significantly

associated with improvements in speech development. These findings support the existing literature, which underscores the therapeutic benefits of music in facilitating language skills among children with speech disorders. The weak correlation for cumulative hours of therapy received suggests that merely increasing therapy duration may not suffice; the specific strategies employed during these sessions are vital for achieving meaningful outcomes. Furthermore, the non-significant relationship observed with rhythm games highlights the need for careful implementation and possibly reassessment of how rhythm is utilized in therapy settings.

The qualitative data collected from caregivers and a speech therapist provides profound insights into the impact of music therapy on the speech development of children with speech disorders. The statements made by caregivers and the therapist highlight key areas of improvement, particularly in articulation and vocabulary, as well as the overall communication skills of the children. Caregivers reported noticeable improvements in their children's speech abilities since the initiation of music therapy. One of the respondents (C1) remarked, *"I've seen my child articulate words much clearer. Before therapy, he struggled with 'dog' and now he says it without hesitation."* (Female Caregiver1, aged 28years) This statement reflects a specific enhancement in phonetic clarity. The mention of a previously challenging word being articulated clearly after therapy underscores the practical benefits of music therapy in addressing articulation difficulties.

This aligns with the literature reviewed, which suggests that music therapy effectively facilitates articulation through rhythmic and melodic engagement. As Mendes and Rossinol (2022) noted, engaging in musical activities can enhance auditory discrimination

and phonetic processing, which are essential for clear speech production. The caregiver's observation is a testament to the potential of music therapy to act as a catalyst for phonetic clarity, affirming that children can overcome specific articulation challenges when supported by engaging and enjoyable methods.

Another respondent (C2) stated, "*Her vocabulary has increased significantly; she uses new words every day that she didn't know before."* (Female Caregiver 2, aged 31 years). This comment not only reflects a retention of vocabulary but also the ability of the child to integrate new words into daily conversations. The significance of vocabulary enhancement highlights the cognitive impacts of music therapy. Research has shown that music can improve language processing skills, enabling children to expand their linguistic repertoire and use language in context (Torppa & Huotilainen, 2019). The capacity to employ newly learned words in conversation illustrates the active role music therapy plays in language acquisition and cognitive development.

In an interview with a speech therapist, significant improvements in children's articulation were reported as well. Therapists explained that the music therapy programme consisted of singing, rhythmic clapping, vocal imitation exercises, and guided repetition of sounds through songs. According to one therapist,

> *"Music therapy here focuses on songs that emphasize difficult sounds like /s/, /r/, and /k/. When children sing, they practice articulation without even realizing it."*

Another participant emphasized,

> *"Children tend to remember new words better when they are set to music. I have seen improvement in vocabulary retention after regular singing sessions."*

Another added that;

> *"I've witnessed incredible progress in their ability to pronounce words clearly. The rhythm and melody seem to help them articulate better."* (Female therapist 2, aged 41 years).

The above responses demonstrate that music therapy supports both articulation and vocabulary development in children with speech disorders. The implication is that incorporating structured music-based interventions can accelerate speech improvement and make therapy more enjoyable and engaging compared to conventional drills. This observation reinforces the idea that the structured patterns found in music can enhance the ability to form words confidently. The therapist's comment echoes findings from Pesnot Lerousseau et al. (2020), which indicate that music training positively influences auditory-motor interactions, thereby facilitating clearer speech production.

Furthermore, the therapist highlighted that music therapy not only improves articulation but also enhances overall communication skills, allowing children to express themselves more freely. The statement, "Children who were once hesitant to speak are now eager to communicate," illustrates the transformative effect of music therapy on the children's willingness to engage verbally. This sentiment aligns with the conclusions drawn by Mayer-Benarous et al. (2021), who indicated that the interactive and non-judgmental nature

of music therapy provides a safe space for children, which can alleviate anxiety often associated with traditional speech therapy.

The notion that music creates a "safe space" is crucial; it suggests that the engaging nature of musical activities reduces the pressure children may feel during conventional speech sessions, thus promoting a more favorable environment for verbal expression. This aligns with the broader literature indicating that the emotional and social aspects of music can create a more inviting atmosphere for children to practice and enhance their communication skills (Akombo, 2000; American Music Association, 2005).

4.4 Observable Specific prosocial skills linked to speech development following music therapy

The second objective of the study was to examine the specific prosocial skills linked to speech development that have been developed in children after music therapy treatment in Nakuru Hills Special School, Nakuru, Kenya. This study used descriptive statistics (frequencies and percentages) to quantify the presence of specific pro-social skills reported by caregivers or observed during sessions. For qualitative responses, thematic analysis will help identify patterns or themes in the data, providing a rich understanding of how music therapy impacts prosocial skills. This mixed-method approach allows for a comprehensive view of the outcomes.

Table 4.6: Specific Prosocial Skills observed after music therapy

Prosocial Skills		Frequency	Percentage
Cooperation	Yes	6	60.0%
	No	4	40.0%
	Total	10	100.0%
Sharing	Yes	4	40.0%
	No	6	60.0%
	Total	10	100.0%

Listening	Yes	4	40.0%
	No	6	60.0%
	Total	10	100.0%
Empathy	Yes	3	30.0%
	No	7	70.0%
	Total	10	100.0%
Communication	Yes	4	40.0%
	No	6	60.0%
	Total	10	100.0%
Conflict resolution	Yes	6	60.0%
	No	4	40.0%
	Total	10	100.0%
Trust	Yes	6	60.0%
	No	4	40.0%
	Total	10	100.0%

In examining the data presented in Table 4.6, we see that a majority of caregivers (60%) reported improvements in cooperation among children. This suggests that music therapy fosters collaborative behaviors, which are essential for effective social interaction. These findings are supported by Barlow (2021), who noted that group music therapy enhances cooperation and communication skills in children with Autism Spectrum Disorder (ASD). The emphasis on shared activities during therapy sessions seems to play a crucial role in developing these prosocial skills.

Conversely, sharing and listening skills showed lower percentages, with only 40% of caregivers reporting improvements in each area. This contrasts with Bai (2019), who highlighted the importance of effective communication and active listening as targets in music therapy interventions. The relatively low percentages here indicate a potential gap, suggesting that sharing and listening may require more focused strategies within the therapeutic framework.

Empathy, another vital prosocial skill, was reported to have improved in only 30% of cases. This finding suggests that while music therapy may assist in developing emotional understanding, its effectiveness might vary among individual children. This observation contradicts Koelsch (2020), who emphasized the role of music therapy in fostering emotional regulation and understanding, hinting that individual differences could significantly influence outcomes.

Communication skills showed a moderate improvement rate of 40%, indicating some success in enhancing verbal expression. However, the lack of higher percentages signals potential barriers in fully translating the benefits of music therapy into broader communication contexts. This highlights the need for ongoing assessment and refinement of therapeutic approaches.

On a more positive note, both conflict resolution and trust skills exhibited higher improvement rates, with 60% of caregivers noting advancements in these areas. This suggests that music therapy may create a supportive environment conducive to social engagement, fostering essential relationship-building skills. This finding aligns with Peter et al. (2021), who observed that structured social interactions during music therapy could enhance overall social behavior in children.

Further, correlation analysis was conducted to examine the strength and direction of the relationship between music therapy strategies (predictors) and Prosocial Skills Development among the children with speech disorders. In this case, the outcome was measured as "Improved Speech Development" (yes/no) as presented in Table 4.7.

Table 4.7: Correlations between music therapy strategies and Prosocial Skills Development

Independent variables (music therapy strategies)		Improvement of Prosocial Skills Development among children upon treatment
Cumulative hours of therapy received	Pearson Correlation	.089
	Sig. (2-tailed)	.807
	N	10
Singing	Pearson Correlation	.089
	Sig. (2-tailed)	.007*
	N	10
Playing instrument	Pearson Correlation	.048
	Sig. (2-tailed)	.896
	N	10
Movement activities	Pearson Correlation	.082
	Sig. (2-tailed)	.000*
	N	10
Rhythm games	Pearson Correlation	.218
	Sig. (2-tailed)	.145
	N	10
Song writing	Pearson Correlation	.535
	Sig. (2-tailed)	.311
	N	10

*. Correlation is significant at the 0.05 level (2-tailed).

The analysis indicates a Pearson correlation of .089 (p=0.807), suggesting no significant relationship between the cumulative hours of therapy and improvements in prosocial skills. This implies that merely extending the duration of therapy sessions may not yield enhanced outcomes. This aligns with Pitt (2020), who posited that meaningful engagement in therapy is more crucial than simply increasing session length. Pitt's research emphasizes that active participation, rather than passive attendance, fosters better communication and reduces anxiety in children. Similarly, Roth & Worthington (2018) support this notion, arguing that effective therapy should focus on the quality of interactions rather than the quantity of time spent. Their findings suggest that a tailored approach, which prioritizes the individual

needs of each child, can lead to more significant advancements in both speech and social skills.

Singing yielded a correlation of .089 (p=0.007), which is statistically significant, yet the low correlation coefficient suggests that while singing may be beneficial, it should not be viewed as the sole effective strategy. This is corroborated by Barlow (2021), who noted that while singing can enhance engagement, it often needs to be integrated with other therapeutic techniques for maximum effectiveness. Barlow's work highlights that the communal aspect of singing can foster social connections but may not be sufficient to address deeper communicative challenges. Furthermore, McLeod and Crowe (2018) emphasize the importance of using a diverse array of strategies within music therapy to address the multifaceted nature of speech disorders. Their research suggests that while singing can support emotional expression, it should be part of a broader, individualized therapeutic plan.

The lack of significance in the correlation for playing instruments (p=0.896) indicates that this activity alone may not substantially contribute to prosocial skill development. This finding challenges previous assumptions about the role of instrumental play in music therapy. Barlow (2021) argued that shared play, particularly through instruments, is essential for developing social skills and collaboration among children. However, the current findings contradict this view, indicating a need for reevaluation of how instrument-based activities are integrated into therapy sessions. This observation is echoed by Giusto et al. (2023), who suggest that instrument-based activities might not inherently foster social

engagement unless coupled with guided interactions that encourage cooperation and communication.

The correlation for movement activities (p=0.000) shows a strong statistical significance, indicating their crucial role in fostering prosocial skills. This finding supports existing literature advocating for kinesthetic engagement in therapeutic practices. Roth & Worthington (2018) highlight that physical movement not only aids in speech development but also enhances social learning, as children are encouraged to interact and collaborate physically. Similarly, McLeod and Crowe (2018) discuss the benefits of incorporating movement into therapy, suggesting that such activities can create a more dynamic learning environment that promotes cooperation and peer interaction. The current findings reinforce the idea that incorporating movement can significantly enhance the therapeutic experience, making it more effective for developing both speech and social skills.

Rhythm games showed a correlation of .218 (p=0.145), while song writing had a relatively high correlation coefficient but lacked statistical significance (p=0.311). These mixed results suggest that while both activities may hold potential for enhancing prosocial skills, they require further exploration to fully understand their impact. Barlow (2021) notes that rhythm-based activities have potential benefits in terms of timing and coordination, which are vital for social interactions. However, the lack of significant findings in this study indicates that further research is needed to optimize their application in therapy settings. Additionally, Pitt (2020) emphasized the importance of songwriting as a tool for expression, which can facilitate communication. This underlines the need for more targeted approaches to incorporate these strategies effectively in music therapy.

In an interview, majority (70%) caregivers noted that their children exhibited increased confidence in social settings and were more willing to engage in conversations with peers and adults after undergoing for at least three sessions of therapy. One of the respondents (C4) acknowledged that;

> *"My son used to be very shy... now he actively participates in group discussions."* (Female Caregiver 4, aged 36 years).

The above highlights the potential of music therapy to not only enhance speech but also foster social interaction. This finding aligns with Giusto et al. (2023), who found that collaborative activities within therapy settings encourage children to engage with their peers, enhancing both their social skills and emotional well-being. Furthermore, Roth & Worthington (2018) support this notion by emphasizing that a supportive environment in therapy fosters greater communication skills, which are crucial for social engagement. The implications of these observations suggest that music therapy can create a safe space for children to practice their social skills.

Another participant (C5) remarked,

> *"I notice that she makes more eye contact when talking, which is a big change for her."* (Female Caregiver 5, aged 44 years).

Improved eye contact is a significant indicator of social confidence and engagement, reflecting the positive impact of therapy on emotional well-being. This finding is consistent with Pitt (2020), who noted that music therapy encourages emotional expression and interpersonal connections, which can lead to improvements in non-verbal communication

skills. Furthermore, Barlow (2021) discusses how enhanced eye contact can facilitate better interactions, reinforcing the idea that music therapy contributes to developing essential social skills.

Caregivers indicated that music therapy contributed to the development of prosocial skills such as collaboration, empathy, and sharing. One of the participants (C6) mentioned, "*During therapy, the children work together... I've seen my daughter become more willing to share."* (Female Caregiver 6, aged 52 years). This aligns with the findings of Roth & Worthington (2018), who suggested that cooperative activities during music sessions can significantly enhance social interactions among children. The collaborative nature of music therapy likely fosters positive social behaviors, promoting a sense of community among participants. Similarly, McLeod and Crowe (2018) underscore the importance of teamwork in therapy settings, advocating for methods that integrate social skills development with speech therapy.

A participant (C3) emphasized the importance of prosocial skills during music therapy, stating,

> *"During group music sessions, children learn to listen to each other and work together to create something beautiful."* (Female Caregiver 3, aged 41 years).

In an interview with therapists, a participant reported that music therapy fostered key prosocial skills such as turn-taking, active listening, cooperation, and emotional expression. A teacher noted,

"During group singing, children learn to wait for their turn and listen when others are singing. This practice carries over into how they interact outside therapy."

Another therapist observed,

"Shy children often begin to make eye contact, smile, and gesture during music sessions. These are important prosocial communication skills."

Some challenges were highlighted. As one therapist explained,

"Some children find it difficult to stay focused through the entire session, and a few struggle with rhythm, which can slow their participation."

The above findings reveal that music therapy not only aids speech but also builds prosocial communication skills, which are critical for holistic development. While challenges such as attention span and rhythm management exist, they underscore the need for individualised pacing. The implication is that prosocial skills developed during therapy sessions can significantly improve peer interaction, social adjustment, and classroom communication. This underscores the collaborative nature of music therapy, reinforcing the social dynamics that emerge from shared musical experiences. This perspective is echoed by Giusto et al. (2023), who highlighted that group activities encourage children to communicate and collaborate, further developing their social skills. The therapist's insights reflect the broader therapeutic benefits of music, suggesting that engaging in musical activities can enhance emotional intelligence and interpersonal relationships among children. Overall, the combination of quantitative and qualitative findings illustrates the multifaceted impact of music therapy on speech development and social skills among

children with speech disorders. The need for tailored approaches that consider individual needs is crucial for enhancing therapeutic effectiveness.

4.5 Modified Music Therapy and Speech Development

The third objective of the study sought to assess the the contribution of modified music interventions to speech development among children in Nakuru Hills Special School, Nakuru, Kenya. To achieve this objective this study used descriptive statistics (frequencies and percentages) to quantify the satisfaction level of with Music Therapy Program, observable challenges in the selected school and suggestions for Improvement. The data were descriptively analyzed, presented and discussed under the following subsections as shown below in the figures and tables.

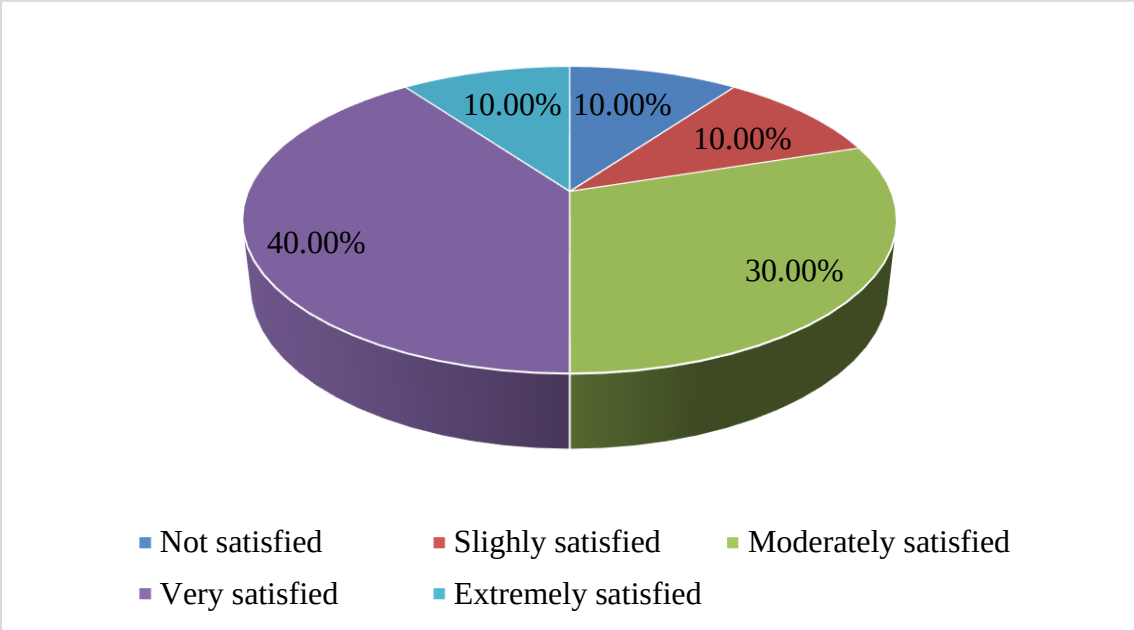


Figure 4.2: Caregivers' Satisfaction with Music Therapy Program

The satisfaction levels among caregivers regarding the music therapy program are presented in Figure 4.2. Out of the 10 caregivers surveyed, 40% reported being "very satisfied," while 30% were "moderately satisfied." However, there were also reports of dissatisfaction, with 10% indicating they were "not satisfied." These findings suggest a generally positive perception of the program, yet the minority who are dissatisfied raises concerns about the inclusivity of the therapeutic approach. The high satisfaction ratings may indicate that music therapy is perceived as beneficial; however, addressing the concerns of the minority is critical for program enhancement. These study findings are supported by those of Pitt (2020), who noted that caregiver perceptions often correlate with the overall effectiveness of therapeutic interventions. This alignment suggests that fostering caregiver satisfaction is essential for successful therapy outcomes.

Table 4.8: Observable Aspects of Music Therapy in the selected school

Gaps		Frequency	Percentage
Use of language games	Not responsive	6	60.0%
	Responsive	4	40.0%
	Total	10	100.0%
Use of articulation exercises	Not responsive	4	40.0%
	Responsive	6	60.0%
	Total	10	100.0%
Child responsiveness to different methods	Not responsive	6	60.0%
	Responsive	4	40.0%
	Total	10	100.0%
Frequency of techniques	Not responsive	3	30.0%
	Responsive	7	70.0%
	Total	10	100.0%
Therapist experience	Not responsive	4	40.0%
	Responsive	6	60.0%
	Total	10	100.0%

Table 4.8 outlines the challenges faced in the implementation of music therapy. The use of language games was reported as "not responsive" by 60% of caregivers, while 40% found it effective. Conversely, articulation exercises were deemed "responsive" by 60% of participants. The data suggest that while some techniques resonate well with children, others do not meet their needs effectively. These findings corroborate those of McLeod and Crowe (2018), who emphasized the importance of customizing therapeutic approaches based on individual responsiveness. However, this finding contradicts Pitt's (2020) research, which indicated that engagement in music creation significantly improved communication among children. The discrepancy may point to a need for more effective implementation of language games that better engage children's interests.

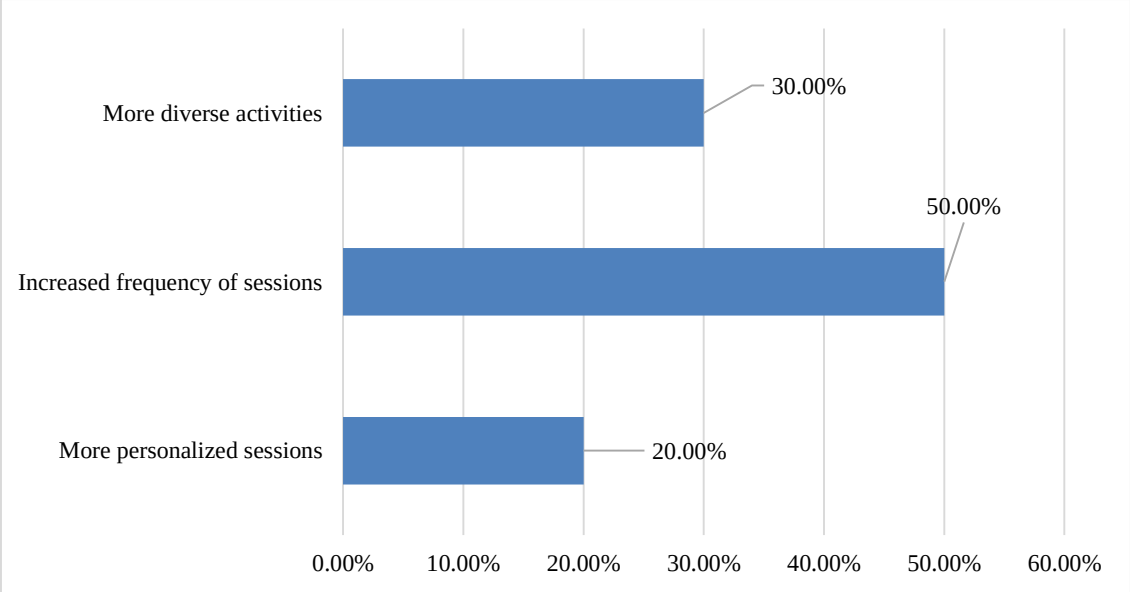


Figure 4.3: Suggestions for Improvement of Music Therapy Program

Figure 4.3 captures suggestions for improvement of music therapy program to better address your child's speech development needs, with 50% of caregivers advocating for increased frequency of sessions. A notable 30% called for more diverse activities, while

20% recommended more personalized sessions. These suggestions highlight areas where the current program could be enhanced to better meet children's needs. The demand for increased session frequency and personalization emphasizes the necessity for adaptive strategies within therapy programs. These findings are in line with Giusto et al. (2023), who highlighted the benefits of tailored approaches in maximizing therapeutic efficacy. The need for customization underscores the importance of addressing individual developmental needs in therapy.

A chi-square test was conducted to analyze the relationships between different categorical variables of modified music interventions and the perceived development in speech among children in Nakuru Hills Special School. The findings are as presented in 4.9.

Table 4.9: Pearson Chi-Square Tests

Modified music therapy		Perceived development in speech
Use of language games	Chi-square	-4.097
	df	4
	Sig.	.393
Use of articulation exercises	Chi-square	-3.056
	df	4
	Sig.	.549
Use of music techniques	Chi-square	-2.063
	df	4
	Sig.	.024*
Low therapist experience	Chi-square	-4.097
	df	4
	Sig.	.393[a,b]

*Sig. at p=0.05

The results in Table 4.9 indicate the statistical relationships between caregiver satisfaction and various identified challenges. Notably, a significant chi-square result was found regarding the infrequent use of music techniques ($p=0.024$), suggesting that caregiver perception in speech development may be closely linked to how frequently music therapy strategies are employed. This finding supports the assertion made by Roth and Worthington (2018) that integrating diverse music techniques can improve therapeutic outcomes. These findings corroborate existing literature on the necessity of innovative interventions in music therapy, highlighting the importance of regularly employing a variety of methods to enhance caregiver satisfaction and therapeutic effectiveness.

Qualitative content analysis was conducted on responses from therapists or caregivers regarding the need for modifications in therapy, identifying common themes and suggestions. One of the participants (C7) stated,

> *"I am very pleased with how the program is run. The therapists are incredibly supportive and really understand the children's needs."* (Female Caregiver 7, aged 43years).

The above reflects a strong confidence in the program's structure and the facilitators, indicating a trusting relationship between caregivers and therapists. Another participant (C8) remarked,

> *"This therapy has been a game changer for us. I wish we could have more sessions each week!"* (Female Caregiver 8, aged 29years).

Also in an interview with the speech therapists, the participants were asked if they believed if there was need for modifying the current music therapy approach towards addressing speech development issues in children. The participants explained that modifications were regularly made to suit the unique needs of children. One therapist stated, "I slow down the rhythm and repeat target sounds more often in the song to give children time to process and practice." Another participant added,

> *"We adapt the therapy by using local songs that the children already know. This makes them excited to join in and reduces anxiety."*

On recommendations, the therapist emphasized,

> *"We need more structured sessions and training for teachers so that music therapy is consistently applied in class, not only during therapy."*

The above findings show that modified interventions including slowing rhythm, simplifying lyrics, and incorporating familiar songs make therapy more inclusive and effective. The implication is that tailoring interventions to children's cultural and cognitive levels maximizes therapeutic outcomes. Additionally, equipping teachers with skills to integrate music therapy into everyday learning could sustain long-term speech development improvements.

While caregivers generally viewed the program positively, many offered constructive feedback regarding potential enhancements, such as increasing session frequency or tailoring activities to individual needs. One participant (C 9) noted,

> *"It would be beneficial to have more personalized sessions. Sometimes, my child needs extra help with specific sounds."* (Female Caregiver 9, aged 34 years).

This sentiment indicates a strong desire for customization in therapy, aiming to better meet individual needs and enhance therapeutic effectiveness. Another participant (C 10) expressed,

> *"If we could increase the number of sessions, I believe it would make an even bigger difference in her progress."* (Female Caregiver 10, aged 33 years).

This suggests a perception among caregivers of a direct correlation between session frequency and developmental outcomes. The suggestions for improvement underscore the necessity for a flexible therapeutic approach that accommodates the diverse needs of children with speech disorders. These findings corroborate those of Giusto et al. (2023), who emphasized that tailored interventions lead to better therapeutic outcomes for children.

The therapists involved in the program also recognized the effectiveness of the music therapy interventions but pointed out the need for more individualized sessions. A participant (T1) commented,

> *"Every child is different, and while group sessions are beneficial, I believe some children would thrive with more personalized attention. Tailoring the sessions to their individual needs could yield even better results."* (Female therapist 2, aged 41 years).

This perspective reinforces the idea that customized approaches could enhance outcomes for children with varying needs. Additionally, therapists expressed a desire for additional resources and training to improve the music therapy program. Another therapist (Participant 2) stated,

> *"We need more training on how to integrate music therapy techniques specifically for speech development. More resources could also help us incorporate a wider variety of musical instruments and activities."* (Female therapist 2, aged 48 years).

The above highlights the need for ongoing professional development to better equip therapists in delivering effective interventions. The thematic analysis of therapists' insights reveals a strong belief in the efficacy of music therapy for improving speech development and fostering prosocial skills. This finding is in line with the literature from the American Speech-Language-Hearing Association (ASHA, 2022), which advocates for individualized therapy plans that enhance articulation and communication skills among children. In contrast, the call for more resources may contradict earlier studies suggesting that existing frameworks for music therapy are sufficient, indicating a gap between theory and practice in this context.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a comprehensive summary of the study, draws conclusions based on the findings, offers recommendations for relevant stakeholders, and provides suggestions for future research. The study sought to investigate the correlation between music therapy and speech development among children with speech disorders in Nakuru Hills Special School, Nakuru County, Kenya. The purpose of the study was to examine the effects of music therapy on speech development in children with speech disorders and to identify specific prosocial skills that may develop as a result of music-based interventions. The study aimed to provide insights into the potential contribution of modified music interventions to the speech and communication abilities of children attending special education programmes.

5.2 Summary of the Findings

The first objective explored the impacts of music therapy on speech development among children with speech disorders at Nakuru Hills Special School, focusing on key improvements in articulation, vocabulary, and overall communication skills. The findings

indicate that music therapy had a positive and significant impact on multiple aspects of speech development, including articulation, vocabulary, and overall communication skills. Data collected from caregivers and speech therapists showed that children demonstrated noticeable improvements in clarity of speech, increased vocabulary, and enhanced ability to construct sentences. Caregivers reported that children were more confident in expressing themselves and showed increased motivation to communicate. Quantitative analysis using paired samples t-tests confirmed that there were statistically significant differences between pre-test and post-test scores in key speech development metrics. Improvements were particularly observed in: Children were able to pronounce previously challenging words more clearly. Children showed improved fluency and accuracy when combining words into sentences. Participants became more capable of engaging in back-and-forth communication with peers and caregivers. There was a measurable enhancement in the production of correct speech sounds. Children exhibited better rhythm, intonation, and stress patterns in speech. Furthermore, practical music therapy activities such as singing, instrument playing, rhythmic movement, and call-and-response exercises were identified as effective strategies that supported speech development. These activities appeared to reinforce neural pathways related to speech and language, improve auditory discrimination, and encourage verbal expression in a playful and engaging manner.

The findings of the study regarding second study objective, which aimed to explore the specific prosocial skills linked to speech development after music therapy among children at Nakuru Hills Special School, revealed a complex interplay of improvements and areas requiring further attention. Cooperation emerged as the most developed skill, with 60% of caregivers reporting positive changes. Notably, singing and movement activities were

positively correlated with prosocial skills development, suggesting these specific strategies may be more beneficial. However, skills such as empathy and listening require further exploration to fully understand their relationship with the therapy modalities used. Overall, the findings reflect a promising link between music therapy and the development of prosocial skills related to speech development, though they also underscore the need for more targeted approaches to certain skills.

The findings from the study with regards to the third objective reveal significant insights into the necessity of modifying speech therapy practices for children at Nakuru Hills Special School. The data revealed notable challenges within the current therapeutic practices. For instance, 60% of respondents found language games not responsive, while only 40% reported responsiveness to articulation exercises. This suggests a gap in engagement strategies that need addressing. The therapists echoed caregivers' sentiments, emphasizing that while group sessions are beneficial, some children might require more personalized attention. The desire for additional training and resources was also highlighted to enhance the program’s effectiveness.

5.3 Conclusions of the Study

In conclusion, the findings of this study affirm that music therapy significantly enhances speech development in children with speech disorders at Nakuru Hills Special School. The objective of exploring the impacts of music therapy on speech development has been successfully met, as evidenced by both qualitative and quantitative data that illustrate substantial improvements in articulation, vocabulary, and overall communication skills. Carers and professionals noted clear advancements in children's abilities to articulate words and use expanded vocabulary in everyday contexts. These findings substantiate the

assumption that music therapy serves as an effective intervention for fostering speech development, bridging gaps where traditional speech therapy may fall short.

The study confirmed that music therapy positively influences various prosocial skills, notably cooperation and communication. However, areas like empathy, sharing, and listening demonstrated less improvement, indicating potential gaps in the therapeutic approaches employed. While music therapy enhances several prosocial skills, the variation in improvement levels suggests a need for ongoing evaluation and refinement of the strategies used. Thus, while music therapy is beneficial, a more tailored approach may enhance outcomes for all targeted prosocial skills.

The findings from this study address the research question regarding the necessity of modifying speech therapy practices for children with speech disorders at Nakuru Hills Special School. It was concluded that carers and therapists both advocate for a more tailored approach to therapy, suggesting that personalized sessions and increased frequency could lead to better developmental outcomes for children. The insights garnered from both quantitative and qualitative data point towards a clear need for adjustments in therapeutic practices to better align with the specific needs of children with speech disorders.

The overall conclusion of this study is that music therapy is an effective intervention that significantly enhances speech development among children with speech disorders at Nakuru Hills Special School, Nakuru County, Kenya. The study's findings demonstrate that children who participated in music therapy showed notable improvements in articulation, vocabulary, sentence formation, conversational speech, and prosody. These improvements were supported by both quantitative measures, such as pre-test and post-test

scores, and qualitative observations from careers and therapists, who reported that children became more confident and engaged in verbal communication.

5.4 Recommendations:

The following recommendations were made based on the study findings and conclusions:

5.4.1 Recommendations to the Ministry of Education

The study showed significant improvements in articulation, vocabulary, conversational speech, and prosody after music therapy interventions, indicating its effectiveness as an educational and therapeutic tool. The Ministry of Education should develop and implement explicit policies that incorporate music therapy into speech therapy programs in schools for children with special needs. Policies should mandate structured music therapy sessions as part of the special needs curriculum, with adequate resources, trained personnel, and regular monitoring to ensure effectiveness.

5.4.2 Recommendations to the Kenya Institute of Curriculum Development (KICD)

The study highlighted the need for skilled therapists to implement music therapy effectively. Including music therapy in training ensures therapists are competent in integrating musical interventions with speech development. The Kenya Institute of Curriculum Development (KICD) should revise special education and speech therapy training curricula to include modules on music therapy. KICD should design standardized modules on music therapy, provide training resources, and align them with national standards for speech and special education programs.

5.4.3 Professional Development in Teacher Training Colleges

The study findings indicated that music therapy improves speech outcomes and prosocial skills, but implementation requires knowledgeable educators and therapists. Ongoing professional development strengthens skills and encourages best practices. eacher training colleges and institutions offering special education should provide targeted professional development programs on integrative therapy practices combining music and speech therapy. Colleges should offer workshops, in-service training, and practical sessions in music therapy applications, ensuring teachers can tailor interventions to individual student needs.

5.4 Suggestions for Further Research

1. Future studies should focus on determining the best music therapy methods that have a major positive impact on speech development. This will improve results for kids with speech impairments and aid in improve therapy approaches. The evidence-based foundation and generalizability of these findings would be further reinforced by comparative studies comparing music therapy to alternative interventions and research conducted across a range of socioeconomic and cultural backgrounds.

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APPENDICES

Appendix I: Goldman-Fristoe Test of Articulation (GFTA)

The Goldman-Fristoe Test of Articulation (GFTA) is designed to assess articulation skills and identify speech sound disorders in children aged 2 years, 0 months to 21 years, 11 months.

Part A: General Data

1. **Child's Identification**
2. Age of the Child: ……
3. Gender of the Child: ……..

Part B: Test

Materials: Test booklet, picture stimuli, response recording sheets, scoring sheets.

Section 1: Single words (marked out of 5 scores)		
Objective: To assess articulation of consonant sounds in isolation. **Stimuli**: Pictures representing words, including various phonetic contexts.		
Words	**Correct**	**Incorrect**
1. Dog		
2. Cow		
3. Cat		
4. Ball		
5. Chicken		
Section 2: Sentences (marked out of 4 scores)		

Objective: to Evaluate articulation in a sentence context.

Stimuli: Simple sentences containing target sounds.

Sentence	**Correct**	**Incorrect**
6. The ball is on is on the mat		
7. The cow is lying under a tree		
8. The cat is on the mat		
9. I see a big ball		

Section 3: Conversational Speech Sample (marked out of 8 scores)

Objective: To gather spontaneous speech to assess natural articulation patterns.

Conversation	**Correct**	**Incorrect**
10. Can you tell me about your favorite toy?		
11. Describe a fun game you play with your friends.		
12. Tell me about a recent trip or outing.		
13. What is your favourite food?		

Section 4: Phonetic Transcription (marked out of 5 scores)

Objective: Clinicians transcribe responses to evaluate articulation accuracy.

Criteria: Assessment based on correct vs. incorrect production of target sounds.

Phonetic Transcription Words	**Correct sound production**	**Incorrect sound production**
Rabbit		
Cat		
Ball		

Dog		
Cow		
Comment on the type of error for each word		
Section 5: Assessment of Prosody (marked out of 8 scores) **Objective**: Evaluate intonation and rhythm in speech. **Method**: Checklist to assess prosodic features during conversation.		
Item	**Present**	**Absent**
Intonation:		
Rhythm:		
Stress:		
Overall Speech Quality		

Appendix II: Questionnaire for Caregivers

Introduction:

Dear Caregiver, the information you provide will contribute significantly to our understanding of the correlation between music therapy and speech development in children with speech disorders at Nakuru Level 5 Hospital, Nakuru County, Kenya. Your input is valuable, and we appreciate your time and cooperation.

Section 1: Demographic Information

1. Relationship to the Child:……
2. Child's ID: …….
3. Age of the Child: ……
4. Gender of the Child: ……..
5. Duration of the Child's Speech Disorder:……
6. Frequency of Music Therapy Sessions Attended:……..

Section 2: Music Therapy Experience

4. Have you observed any changes in your child's speech development since starting music therapy sessions? (a) Yes (b) No
5. If yes, please describe the observed changes:
6. To what extent do you believe music therapy has positively influenced your child's communication skills? (Scale: 1 - Not at all, 5 - Very much)
7. Do you notice any specific prosocial skills in your child that you attribute to the music therapy sessions?
8. How did you first learn about music therapy for speech development?
9. What motivated you to enroll your child in music therapy sessions?

10. Can you describe any noticeable changes in your child's speech since starting music therapy?
11. On a scale from 1 to 10, how satisfied are you with the progress of your child's speech development through music therapy?
12. In your opinion, has music therapy positively influenced your child's communication skills? Please elaborate.
13. Have you observed any improvement in your child's confidence or comfort level during communication after participating in music therapy?
14. Are there specific prosocial skills you have noticed in your child that you attribute to the music therapy sessions?
15. How do you think the development of prosocial skills, such as collaboration or empathy, might relate to your child's speech development?
16. How satisfied are you with the current music therapy program for your child? (Scale: 1 - Not satisfied, 5 - Very satisfied)
17. What, in your opinion, could be improved in the music therapy program to better address your child's speech development needs?
18. How satisfied are you with the current music therapy program for your child? (Scale: 1 - Not satisfied, 10 - Very satisfied)
17. What, in your opinion, could be improved in the music therapy program to better address your child's speech development needs?

Appendix III: Interview Schedule for Therapists

Introduction

Your expertise and experiences as a therapist working with children with speech disorders at Nakuru Level 5 Hospital, Nakuru County, Kenya, are invaluable for our research on the correlation between music therapy and speech development. Your insights will contribute significantly to the success of our study.

1. Can you provide an overview of the music therapy program for children with speech disorders at Nakuru Level 5 Hospital?
2. From your perspective, what are the observed effects of music therapy on the speech development of children in this program?
3. How do you tailor music therapy sessions to address specific prosocial skills linked to speech development in children?
4. Based on your experiences, do you believe there is a need for modifying the current music therapy approach for addressing speech development issues in children?
5. What challenges, if any, have you encountered in implementing music therapy for speech development in this setting?
6. In your professional opinion, what recommendations do you have for optimizing the effectiveness of music therapy in addressing speech disorders in children?

Appendix V: Observation Checklist

I. Child Information

1. **Demographic Information:**
    - Age
    - Grade/Class
    - Date of Birth
    - School/Setting

II. General Observations

1. Speech Characteristics:
    - Rate of speech
    - Fluency
    - Voice quality

III. Articulation Assessment

1. **Consonant Sounds:**
    - List of all English consonant sounds
    - Record child's ability to produce each sound accurately
    - Note substitutions, omissions, distortions, and additions
2. **Vowel Sounds:**
    - List of all English vowel sounds
    - Record child's ability to produce each sound accurately
    - Note substitutions, omissions, distortions, and additions

3. **Syllable Structure:**
    - Assess the child's ability to produce various syllable structures (e.g., CV, CVC, CCV)

IV. Phonological Processes

1. **Common Processes:**
    - Identify and note any phonological processes present (e.g., final consonant deletion, cluster reduction)

V. Contextual Factors

1. **Environmental Factors:**
    - Note any factors in the environment that may affect speech (e.g., noise, distractions)
2. **Communication Partners:**
    - Assess how various communication partners affect a child’s speech.

VI. Oral-Motor Examination

1. **Oral-Motor Skills:**
    - Evaluate strength and coordination of oral-motor muscles
    - Note any anomalies in lip, tongue, and jaw movements

VII. Expressive Language Skills

1. Vocabulary and Grammar:
    - Observe the child's expressive language skills to identify potential language-related issues

APPENDIX VI: PERMIT FROM NACOSTI

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