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Effects of Music Therapy Using Rhymes on Enhancing Social Skills and Behavioural Patterns in Children with Autism – An Experimental Study

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ABSTRACT

Background: Autism is characterized by marked abnormalities in social interaction and communication as well as the presence of stereotypies and unusual interests. Concerning the presence of these abnormalities, this study was conducted to determine the effect of music therapy using rhymes which would be compared with therapy sessions without music therapy to enhance social skills and behavioural patterns in children with autism.

Aims and Objectives: To determine the effects of music therapy using rhymes on enhancing social skills and behavioural patterns in children with autism.

Materials and Methods: This study includes 24 participants and they were divided into two group's i.e. experimental group and control group. Each group consists of 12 participants. Intervention given was therapy with music for experimental group anf therapy without rhymes for control group for 5 days per week for 4 weeks. Outcome measure used was CARS scale at baseline and at end of 4 weeks. Materials used were pen, pencil, CARS sheet, bubbles, animal toys, mobile phone and speaker.

Results: After statistical analysis of data, results illustrated that experimental group and control group both showed improvements however significant improvements were seen in experimental group

Conclusion: The study illustrated that significant effects were seen in experimental group. Hence, the study concludes that music therapy using rhymes does have significant effects on enhancing social and behavioural patterns in children with autism.

INTRODUCTION

The word autism is derived from the root .aut., meaning self, and .ism., meaning orientation or state.[1] Autism spectrum disorders (ASD), including autism, denotes a group of neurodevelopmental disorders with social interaction, verbal, and nonverbal communication difficulties in different levels and monotonous behaviors.[2] The diagnostic criteria outlined in the American Psychiatric Association's Diagnostic Statistical Manual-IV, Text Revision (DSM-IV TR) classify ASDs into three subtypes on the basis of symptom severity: autism, pervasive developmental disorders-not otherwise specified (PDD-NOS), and Asperger syndrome. [3] The world-wide prevalence of autism is reported to be 1-3%.

Social skills are the tools that enable people to communicate, learn, ask for help, get needs met in appropriate ways, get along with others, make friends, develop healthy relationships, protect themselves, and in general, be able to interact with the society harmoniously [4] Autism has an adverse effect on the brain's normal social and communication ability with symptoms showing in the initial three years of life causing individuals affected with ASD to be subjected to peer refusal and social seclusion.[2] Autism is also characterized by sensory disturbances, unusual play and interest in materials, uneven cognitive development, and unusual body use including rocking or posturing.[1] Stereotyped behaviour patterns include one or more stereotyped patterns of interest, inflexible adherence to routines and rituals, stereotyped and

repetitive motor mannerisms, and persistent preoccupation with parts of objects. [3] Children with Autism generally lack eye contact and the impulse or desire to communicate. The verbal responses they produce are generally echolalic. Echolalia is defined as .copying or repeating the content and/ or intonation patterns of another person's speech.[1] It has been shown that social and communication deficits may impact academic performance, occupational accomplishment, and mood/anxiety setbacks, which demands an early intervention to counterbalance the potential risk factors that could impact their social competence and cognitive problem-solving proficiencies.[2]

Music therapy (MT) is a time-honoured health profession in which music is used within a therapeutic association and deals with physical, emotional, cognitive, and social requirements of an individual. Music is a form of human communication and can address problems of movement, sensing, and feeling. Music education involves singing, body percussion, playing on a variety of both tuned and untuned music devices, movement and dancing, and communication activities to help children with developmental delays and disabilities. Children find both security and freedom in music. Music therapy instigates and supports developments in communication, i.e., joint attention, intentionality, initiation, imitation, variation, communication of feelings and use of words. The Cochrane Collection reviews of randomized clinical trials (RCT) showed evidence about the positive effect of MT on ASD and emphasized about the possibility of MT to increase social adaptation skills in children with ASD and to promoting the quality of parent-child relationships. [2]

Childhood Autism Rating Scale (CARS) is a 15-item observation-based diagnostic scale and has high concordance with DSM-III/III-R/IV diagnosis of autism. The CARS has strong psychometric properties. A CARS score of >33 (sensitivity = 81.4%, specificity = 78.6%) is suggested for diagnostic use in Indian populations. The inter- rater reliability (ICC=0.74) and test-retest reliability(ICC=0.81) for CARS is good.[5]

Fig. 1

NEED OF THE STUDY

- There are various studies being done on music therapy as observation and intervention for autism on components like communication skills, social skills and behaviour patterns, but a very few studies have been done in India.
- These studies include effect of music therapy using Indian classical music and regional music.
- Further we got no study for effect of music therapy using rhymes on enhancing social skills and behaviour pattern in children with autism. Hence, the need arises to conduct this study.

REVIEW OF LITERATURE

1. Bharathi G.et all (2019) conducted a study on Music therapy as a therapeutic tool in improving the social skills of autistic children.
   This study was designed as a pre test/ post test and follow up among autistic children. 54 children with mild to severe autism were assigned into 2 groups : active and passive. The children received MT for 3 months and groups were followed up for 3 months. This study concluded that MT is an effective intervention in improving social skills of autistic children with steady effects. MT helped in developing a form of communication of these children which led to improvement in their ability to understand, respond and maintain their interaction with peers.
2. LaGasse AB (2014) conducted study on Effects of a music therapy group intervention on enhancing social skills in children with autism.
   Seventeen children, ages 6 to 9 with diagnosis of ASD were randomly assigned to music therapy group (MTG) or no music social skills group (MSSG). Children participated in ten 50 min group sessions over period of 5 weeks. The social responsiveness scale (SRS), the autism treatment evaluation checklist (ATEC) and video analysis of sessions were used to evaluate changes in social behaviour. The results of this study support further research on use of music therapy group interventions for social skills in children with ASD. Statistical results demonstrate initial support for use of music therapy social groups to develop joint attention.
3. Geretsegger, et.al. (2014) conducted a study on Music therapy for people with autism spectrum disorder. This systematic review evaluated 10 RCTs for effects of music therapy in children with ASD using non generalised outcomes. Music therapy was compared to standard care or to a 'placebo' therapy. Music therapy may have positive effects on social interaction and communication skills of child with ASD. Music therapy has been shown to be superior to standard care.
4. Gattino , et.al. (2011) conducted a study on Effects of relational music therapy on communication of children with autism: A randomized controlled study.
   A RCT with 24 boys (age 7-12 years) was designed to compare individuals with music therapy (n=12) and standard treatment (n=12) by simple randomization procedure. Participants included were diagnosed according to DSM IV-TR criteria: autistic disorder, PDD-NOS and Asperger's syndrome Each child of experimental group received 3 music therapy assessment sessions (30 min/session), 16 weekly interventions of relational music therapy(30 min/session), one final music therapy assessment session of 30 mins , besides weekly routine activities. Control group only participated in weekly clinical activities. The outcomes were assessed by two blind evaluators before and after interventions through nonverbal, verbal and social communication scores of brazillian version of CARS-BR. The overall results from 3 outcomes measured were inconclusive. Only in subgroup analysis was result in favour of relational music therapy over control condition in improving non verbal communication behaviour of participants with autistic disorder.
5. Russell, et.al (2010) conducted a study on Diagnostic accuracy, reliability and validity of Childhood Autism Rating Scale in India.
   Children and adolescents suspected of having autism were identified from the unit's database. Scale and item level scores of CARS were collected and analysed. Sensitivity, specificity, likelihood ratios and predictive values for various CARS cut-off scores were calculated. Test-retest reliability and inter-rater reliability of CARS were examined. The dichotomized CARS score was correlated with the ICD-10 clinical diagnosis of autism to establish the criterion validity of CARS as a measure of autism. Convergent and divergent validity was calculated. The factor structure of CARS was demonstrated by principal components analysis. A CARS score of ≥33 (sensitivity = 81.4%, specificity = 78.6%; area under the curve = 81%) was suggested for diagnostic use in Indian populations. The inter-rater reliability (ICC=0.74) and test-retest reliability (ICC=0.81) for CARS were good. Besides the adequate face and content validity, CARS demonstrated good internal consistency (Cronbach's α=0.79) and item-total correlation. The CARS has strong psychometric properties and is now available for clinical and research work in India.
6. Farmer KJ (2003) conducted a study on The effect of music vs. non music paired with gestures on spontaneous verbal and nonverbal communication skills of children with autism between the ages 1-5.
   In this study, 10 children diagnosed with ASD were evaluated based on observation form. Out of 10, n=5 were given music therapy (experimental group) and n=5 were given therapy without music (control group). Each subject received 5 sessions. Each session lasted for approx 20 mins and was based on five different activities. This study concluded that music is great facilitator for gestures, signs and movements.

AIM AND OBJECTIVES OF THE STUDY

AIM:

To determine the effect of music therapy using rhymes on enhancing social skills and behaviour pattern in children with autism.

OBJECTIVES:

To find out effect on enhancing social skills and behaviour patterns in children with autism using music therapy – rhymes.

HYPOTHESIS

Null Hypothesis :

Music therapy using rhymes does not have statistically significant effect on enhancing social skills and behaviour pattern in children with autism.

Alternate Hypothesis :

Music therapy using rhymes does have statistically significant effect on enhancing social skills and behaviour pattern in children with autism.

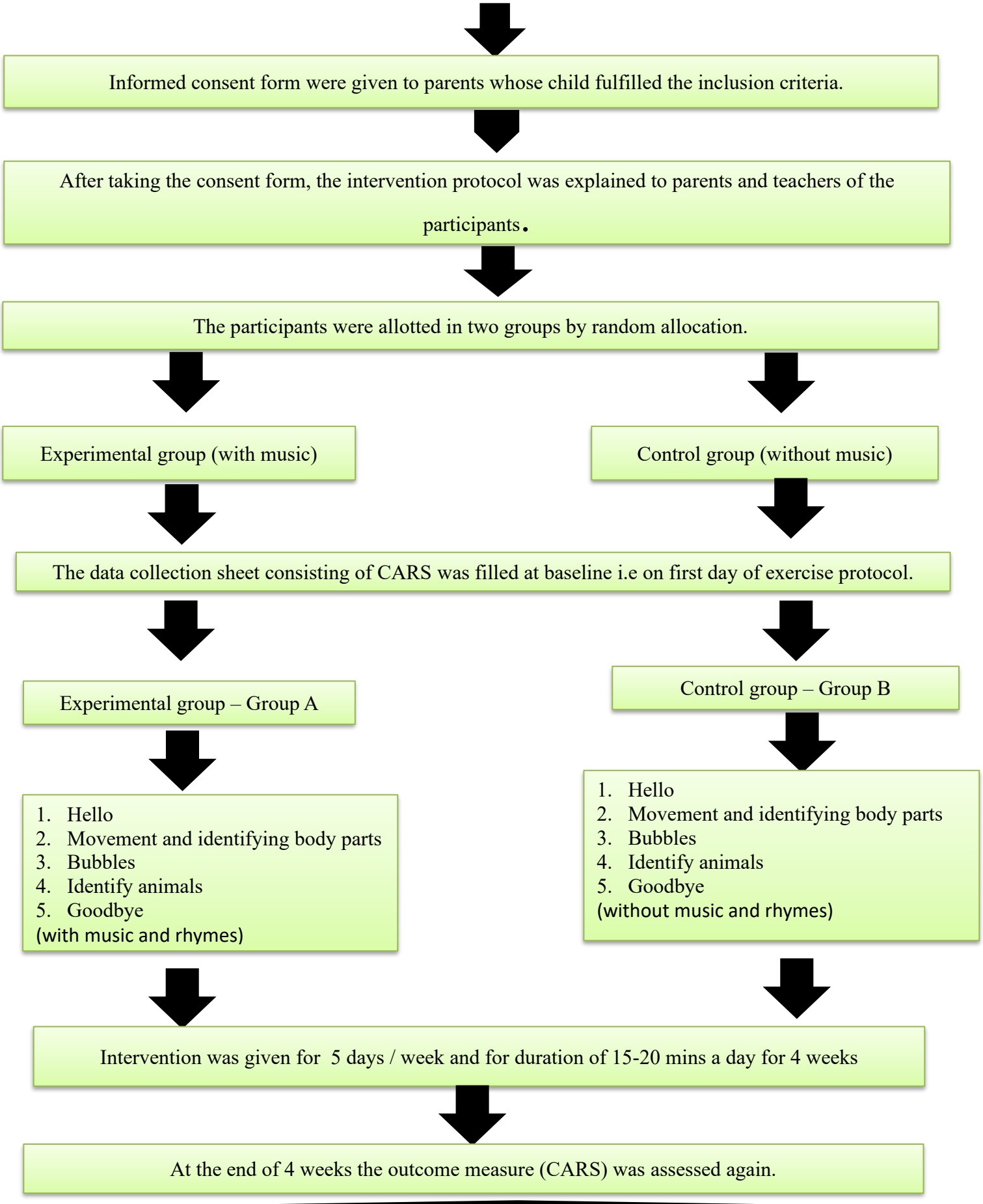
METHODS

- *Type of Study* - Experimental study
- *Study Setting* - Navi Mumbai
- *Study duration* – 3 months
- *Study Population* - Autistic children
- *Sampling Method* – Simple Random sampling
- *Sample Size* – 24 (by Open EPI with 95% of confidence level)
- *Inclusion criteria* - Autistic children of age 5 – 9 years
  - a formal clinical diagnosis of ASD
- *Exclusion criteria* - Children who exhibit severe physical or sensory disabilities (eg . Deafness)
  - Children with other neurodevelopmental, psychiatric, or neurological co-morbidities or are on prescribed psychiatric medication
  - Children with severe autism
- *Materials Used* – pen / pencil , speaker, mobile phone, outcome measure (CARS-II) , animal toys, bubbles.

METHODOLOGY

Approval from research ethics committee of college was taken

Official permission was taken from the Sunshine school for differently abled children.


Informed consent form were given to parents whose child fulfilled the inclusion criteria.
After taking the consent form, the intervention protocol was explained to parents and teachers of the participants.
The participants were allotted in two groups by random allocation.
Experimental group (with music)
Control group (without music)
The data collection sheet consisting of CARS was filled at baseline i.e on first day of exercise protocol.
Experimental group – Group A
Control group – Group B
1. Hello
2. Movement and identifying body parts
3. Bubbles
4. Identify animals
5. Goodbye
(with music and rhymes)
1. Hello
2. Movement and identifying body parts
3. Bubbles
4. Identify animals
5. Goodbye
(without music and rhymes)
Intervention was given for 5 days / week and for duration of 15-20 mins a day for 4 weeks
At the end of 4 weeks the outcome measure (CARS) was assessed again.

This study used an experimental research design with an experimental group and control group and a pre and post test scores. The population of this study was recruited from school for differently abled children. The study includes 24 children from ages 5-9 years. They were divided in groups by random sampling. The inclusion criteria for the study includes autistic children aged between 5-9 years and a formal clinical diagnosis of ASD. Exclusion criteria are as follows - Children who exhibit severe physical or sensory disabilities (eg . Deafness), Children with other neurodevelopmental, psychiatric, or neurological co-morbidities or are on prescribed psychiatric medication and children with severe autism.

Children who took part in the study were evaluated in detail. For each child pre and post 4 week therapy CARS score was recorded by researcher. Parents and teachers approval and consent to participate in the study was duly signed. Materials used for this study includes smartphone for camera and music, Bluetooth speaker, animal toys, bubbles, pen, pencil and CARS score sheets.

For experimental group, 5 rhymes were selected for each 5 domains. Each rhymes was played using a Bluetooth speaker. First domain represented greeting with hello. Second domain represented identification of body parts. Third domain was bubbles. Fourth domain was to identify animals and their sounds. Fifth domain represented end of session with saying bye. For control group similar activities related to those 5 domains were carried out. Each session lasted for 20 mins and 5 sessions were carried out in a week for both groups. The post test scores were measure for both groups at the end of fourth week.

Therapist interacting with children during identifying body parts activity.

Fig 1

Therapist interacting with children during bubble activity

Fig 2

Therapist interacting with children during identifying animals activity

Fig 3

RESULTS

- The data collected was entered in Ms Excel and was statistically analysed by using statistical software – Graph pad In stat (version 3.10).
- Normality was tested using Shapiro-Wilk test. Data tested was normally distributed hence student t-tests was performed.
- Student t-tests was used for analysing data of two groups.
- Paired t test was used to analyse within the group.
- Unpaired t test was used to analyse between two groups.
- P value and T value was found out.
- The data collected had autistic children of age group of 5-9 years. Overall the study had 71% of boys and 29% of girls. There were 7 boys and 5 girls in group A- experimental group and 10 boys and 2 girls in group B - control group.

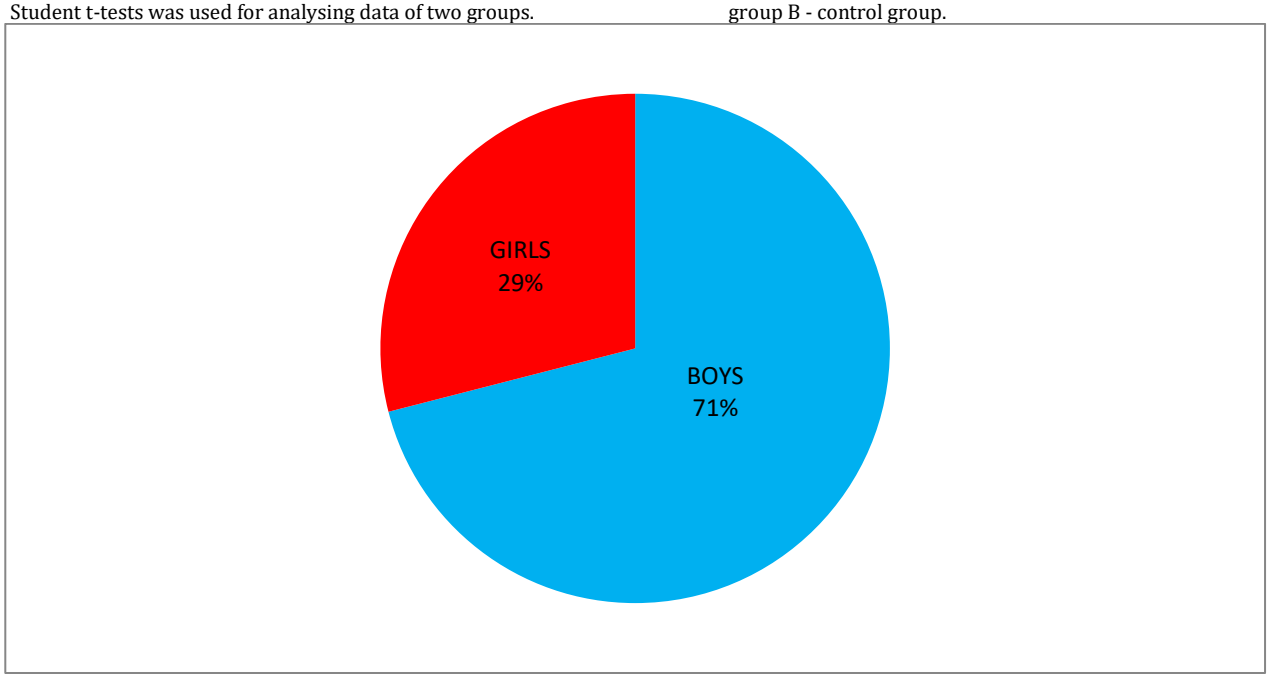


Diagram 1

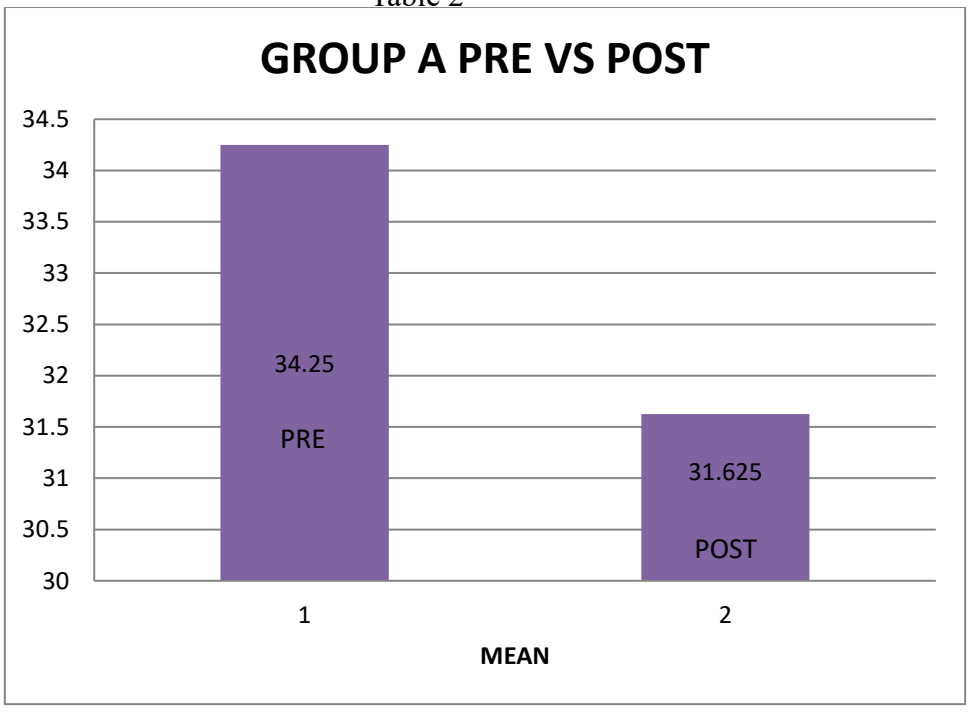
CHARATERISTICS	GROUP A	GROUP B
AGE (MEAN ± SD)	7.83 ± 1.11	8 ± 0.95

GENDER (MALE %)	58%	83%
(FEMALE %)	42%	17%

Table 1

COMPARISON OF PRE AND POST SCORES OF GROUP A (PAIRED T TEST)				
	PRE	**POST**	**T value**	**P VALUE**
MEAN	34.25 ± 1.948	31.625 ±1.798	7.411	<0.0001 (extremely significant)
MEAN DIFFERENCE	2.65			

Table 2

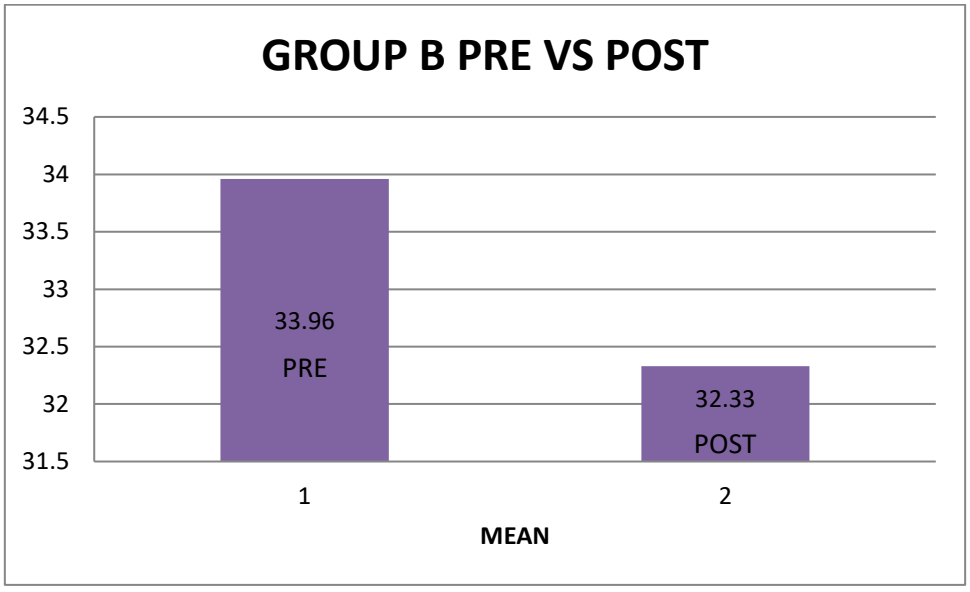


Graph 1

Results were graphically analysed. The above figure represents the difference of mean of CARS between pre and post sessions for group A (experimental group). There is significant improvement in responses in experimental group.

COMPARISON OF PRE AND POST SCORES OF GROUP B (PAIRED T TEST)				
	PRE	**POST**	**T value**	**P VALUE**
MEAN	33.96 ±2.028	32.33 ± 1.513	5.547	0.0002 (extremely significant)
MEAN DIFFERENCE	1.633			

Table 3

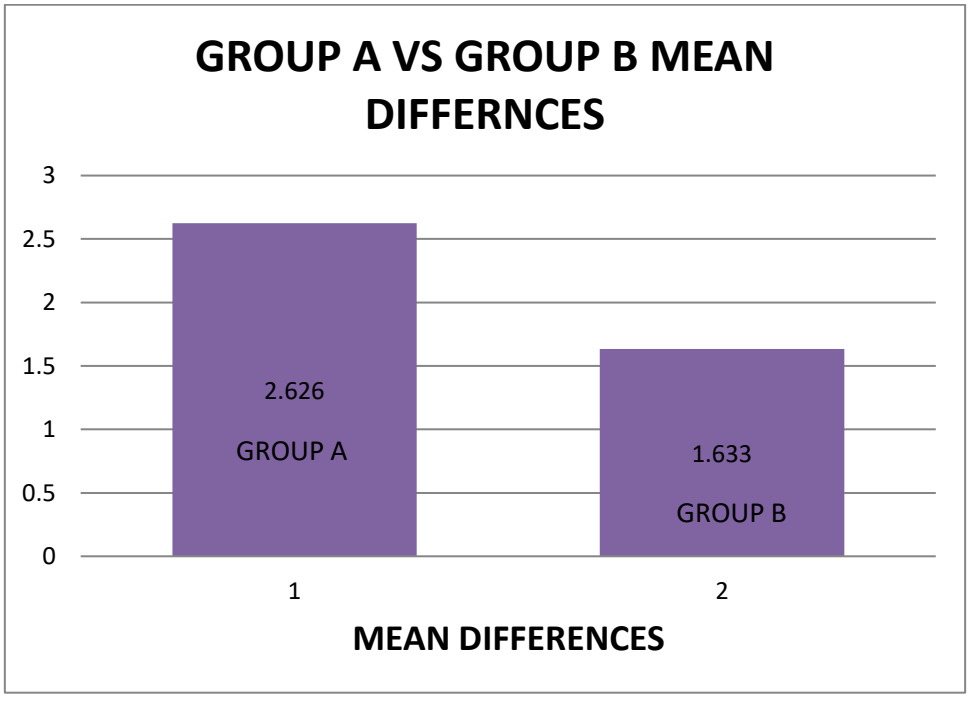


Graph 2

Results were graphically analysed. The above figure represents the difference of mean of CARS between pre and post sessions for group B (control group). There is significant improvement in responses in control group.

COMPARISON OF GROUP A AND GROUP B FOR POST SCORES (UNPAIRED T TEST)				
	GROUP A	**GROUP B**	**T value**	**P VALUE**
MEAN	31.625 ±1.798	32.333 ± 1.513	2.1528	0.021281 (significant at p<0.05)
MEAN DIFFERENCE	2.625	1.633		

Table 4



Graph 3

Results were graphically analysed. The above figure represents the difference of mean of CARS between post sessions for group A

(experimental group) and group B (control group). The results show statistically significant difference in responses indicating that music therapy was better as compared to conventional treatment.

DISCUSSION

Music therapy is a type of therapy that uses music as a means of communication and expression, with the aim of improving the physical, emotional, cognitive, and social well-being of individuals. There is growing evidence that music therapy can be an effective intervention for children with autism, who may experience difficulties with communication, social interaction, and behaviour.[9] Using rhymes in music therapy can be an effective way to enhance social and behavioural patterns in children with autism. Rhymes can help children with autism to develop language and communication skills, as well as improving their memory and attention span. Rhymes can also be used to teach social skills, such as turn-taking and sharing, which are essential for building relationships with others. Therefore, the main purpose of this study was to find out whether music therapy using rhymes helps in enhancing social and behavioural patterns in children with autism.

Research has shown that music therapy can help to reduce negative behaviours, such as aggression and emotional disturbances, in children with autism. For example, a study conducted by Kim and Wigram (2009) found that children with autism who received music therapy showed significant improvements in their social behaviour, including increased eye contact, joint attention, and positive affect.[10] Rhymes are used in music therapy to promote positive behaviour and social interaction. Music therapy may help to increase social adaptation skills in children with ASD and to promote the quality of parent-child relationship. [7] For example, use of a song with a repetitive chorus to teach a child with autism how to take turns with others. The therapist might sing a line, and then the child can sing the chorus. This activity can help the child to develop the skills necessary for social interaction, such as turn-taking, listening, and responding appropriately to others. In addition, rhymes can be used in music therapy to help children with autism regulate their emotions. For example, a therapist might sing a song with lyrics that describe different emotions, such as happiness, playfulness and sadness. The child can then identify which emotion they are feeling and express it through movement or vocalization. This activity can help the child to develop emotional awareness and regulation skills. According to Srinivasan and Bhat, music-based interventions are effective therapeutic means for ASD children, because along with reducing the impairments of these children, they harness musical talents of these individuals. They have three reasons to believe that music therapy is particularly attractive for autism children because first, music may help in directing various core autism impairments in joint attention, social reciprocity, and nonverbal and verbal communication, along with atypical multisensory perception comorbidities, poor motor performance, and behavioural problems. Second, autistic children find musical activities enjoyable that might be due to their enhanced musical understanding. Third, music-based activities can be non intimidating experiences for children with autism. [11] Overall, music therapy using rhymes can be a powerful tool for enhancing social and behavioural patterns in children with autism. By using music as a means of communication and expression, music therapy can help children with autism to develop language and communication skills, improve social interaction, and regulate their emotions.

After analysis, it was also found that there were improvements seen in social and behavioural patterns in children of control group. This is because use of play-based and socialization activities help the autistic children to improve their interaction skills. Group activities also help to improve behaviour and social skills. For example, children become more discipline, sharing and caring for each other improves.

While there is some evidence to suggest that music therapy using rhymes can be beneficial for children with autism in terms of enhancing social and behavioural patterns, there are studies that have found no significant difference between experimental and control group. A study conducted by Bieleninik et al. (2017) found that while music therapy was effective in improving some aspects of social communication in children with autism, the effects were not specific to music therapy using rhymes. The study involved 364 children with autism who received either music therapy or standard care for six months. While the music therapy group showed some improvement in social communication, there was no significant difference between the group receiving music therapy using rhymes and the group receiving other forms of music therapy.[12]

It is also important to note that music therapy using rhymes may or may not be effective for all children with autism. Each child with autism is unique, and what works for one child may not work for another. It is also important to consider the individual needs and preferences of each child when designing a music therapy program.

Thus, while there is some evidence to suggest that music therapy using rhymes can be beneficial for enhancing social and behavioural patterns in children with autism, there are also studies that have found no significant effects. More research is needed to determine the specific effects of music therapy using rhymes, as well as the factors that may influence its effectiveness for individual children with autism.

CONCLUSION

The study illustrated that significant effects were seen in experimental group. Hence, the study concludes that music therapy using rhymes does have significant effects on enhancing social and behavioural patterns in children with autism.

LIMITATIONS

- One of the limitations of this study was that the sample size was small and that the students selected for the study were all only from Navi Mumbai city.

FUTURE SCOPE OF STUDY

- The future studies need to focus on participants of different age groups, various severity levels of ASD, for longer duration, with different activities and on different components of behaviour of children with ASD.

REFERENCES

- Gattino , et.al. Effects of relational music therapy on communication of children with autism: A randomized controlled study. Nordic Journal of Music Therapy.2011. 20. 142-154. 10.1080/08098131.2011.566933.
- Bharathi G, Venugopal A & Balachandar V. Music therapy as a therapeutic tool in improving the social skills of autistic children. The Egyptian Journal of Neurology, Psychiatry and Neurosurgery. 55. 2019.
- Tecklin JS. Pediatric Physical Therapy: fifth edition. Philadelphia: Lippincott Williams &Wilkins;2015:403-422
- Sarangi S, Ranjan Raj R, Rawat A, Salam S, Tripathi S, Aggarwal D, Kashwani R. Oral health care concerns among autism patients: A review. Bioinformation. 2024 Sep 30;20(9):1017-1021. doi: 10.6026/9732063002001017. PMID: 39917221; PMCID: PMC11795469.
- Russell, et.al(2010). Diagnostic accuracy, reliability and validity of Childhood Autism Rating Scale in India. World journal of paediatrics : WJP. 6. 141-7. 10.1007/s12519-010-0029-y.
- LaGasse AB. Effects of a music therapy group intervention on enhancing social skills in children with autism. *Journal of music therapy*, 2014. *51*(3), 250–275. https://doi.org/10.1093/jmt/thu012
- Geretsegger, et.al. Music therapy for people with autism spectrum disorder. Denmark : The Cochrane Library;2014
- Farmer KJ. The effect of music vs. non music paired with gestures on spontaneous verbal and nonverbal communication skills of children with autism between the ages 1-5. School of music. Florida state university.2003
- Yum YN, Lau WK, Poon K, Ho FC. Music therapy as social skill intervention for children with comorbid ASD and ID: study protocol for a randomized controlled trial. *BMC Pediatr*. 2020;20(1):545. doi:10.1186/s12887-020-02454-6
- Kim, J., Wigram, T., & Gold, C. (2009). Emotional, motivational and interpersonal responsiveness of children with autism in improvisational music therapy. Autism, 13(4), 389–409.
- Ghasemtabar SN, Hosseini M, Fayyaz I, Arab S, Naghashian H, Poudineh Z. Music therapy: An effective approach in improving social skills of children with autism. Adv Biomed Res. 2015 Jul 27;4:157.. PMID: 26380242; PMCID: PMC4550953.
- Bieleninik et.al. Effects of Improvisational Music Therapy vs Enhanced Standard Care on Symptom Severity Among Children With Autism Spectrum Disorder: The TIME-A Randomized Clinical Trial.2017. *JAMA*, *318*(6), 525–535.