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Original Article

EARLY INTERVENTION IN AUTISM SPECTRUM DISORDER: EXPLORING NEURODEVELOPMENTAL CONTEXT, THERAPEUTIC APPROACHES, AND TREATMENT OUTCOMES

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ABSTRACT

Objective: This manuscript explores the neurodevelopmental context of early intervention for Autism Spectrum Disorder (ASD) and discusses the optimal timing for initiating intervention, primary intervention approaches, and predictors of treatment outcomes. It also provides an overview of various therapies commonly used for autism. The Early Start Denver Model is highlighted as an evidence-based early intervention approach.

Methods: This comparative study involved 30 subjects randomly divided into Group A (early intervention) and Group B (late intervention). The study duration was six weeks, with four training sessions per week. Pre and post-treatment evaluations were conducted. The sample size was 15 participants in each group, and materials such as informed consent, assessment forms, and measuring tape were used. The study employed a random sampling method and set inclusion and exclusion criteria.

Results: The distribution of cases according to age revealed that Group A had a higher proportion of individuals in the 4-6 y age group (40%), while Group B had the majority in the 9-14 y age group (73.33%). In terms of cognitive ability, Group A had a higher proportion of cases in the Poor (46.67%) and Very Poor (46.67%) categories, while Group B had more cases in the Good (33.33%) and Mild (33.33%) categories. However, the chi-square test did not yield statistically significant differences between the two groups for cognitive ability.

Conclusion: This study highlights the importance of early intervention for individuals with ASD, as indicated by the higher proportion of younger individuals in Group A. However, the lack of statistical significance in the chi-square test emphasizes the need for further investigation and consideration of other influencing factors. The study contributes to the growing body of knowledge on early intervention for ASD and calls for larger sample sizes and rigorous study designs in future research to provide more robust evidence.

Keywords: Autism spectrum disorder (ASD), Early intervention, Neurodevelopmental context, Cognitive ability

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that emerges in early childhood, typically diagnosed before the age of 2. Early intervention has been found to have significant long-term benefits in managing ASD symptoms and promoting overall development. This manuscript explores the neurodevelopmental context of early intervention, the optimal timing for initiating intervention, primary intervention approaches, and predictors of treatment outcomes. Additionally, it delves into various therapies commonly used for autism, such as behavior therapy, speech-language therapy, play-based therapy, physical therapy, occupational therapy, and nutritional therapy. One evidence-based early intervention approach highlighted in this study is the Early Start Denver Model [1].

The symptoms of ASD vary from person to person, but some common behavioral characteristics include difficulties with social communication and interaction, such as limited eye contact, a lack of expressed interest or enjoyment, and challenges in maintaining conversational topics. Restricted and repetitive behaviors, like repetitive actions or adherence to strict routines, intense interests in specific subjects, and difficulties with transitions, are also typical. Other symptoms can include sleep disturbances and irritability [2].

Individuals with ASD may possess unique skills and abilities, such as exceptional visual or auditory learning abilities, remarkable memory, and talents in areas like mathematics, science, music, or art. The causes of ASD are not yet fully understood, but research suggests that a combination of genetic and environmental factors contributes to its development. Certain risk factors, such as having a sibling with ASD, older parents, specific genetic abnormalities, or low birth weight, increase the likelihood of ASD. Diagnosis of ASD is typically made by observing a person's behavior and development, with most cases accurately identified by the age of 2. Early diagnosis is crucial to initiate timely treatments and services [3].

The process of diagnosing ASD in young children often involves two stages. The first stage includes general developmental screening during well-child checkups. The American Academy of Pediatrics recommends that developmental delays be assessed at 9, 18, 24, or 30 mo, with additional autism-specific screenings at 18 and 24 mo. Children who display ASD-related behaviors, have older parents, have specific genetic disorders, or have a history of very low birth weight are at higher risk and may undergo further testing [4].

Considering the experiences and concerns of caregivers is an important aspect of the screening process for young children. Healthcare providers rely on a combination of behavioral information provided by parents, results from ASD screening tools, and clinical observations to make an accurate diagnosis. Although the exact causes of ASD remain unknown, studies suggest that genetic factors and specific environmental circumstances interact to influence its development [5].

Early and accurate identification of ASD in children is vital as it enables the identification of their unique strengths and challenges. Early detection also allows parents to access appropriate services, educational initiatives, and behavioral therapies tailored to their child's needs. Social communication and interaction behaviors, such as limited eye contact, lack of responsiveness to verbal cues, difficulty with conversational back-and-forth, and fixation on specific topics, are among the signs and symptoms of ASD [6].

MATERIALS AND METHODS

Study type–A Comparative Study.

Study duration–patients were trained four times per week for 6 w.

Study design

- 30 subjects were randomly selected for group-A and Group B.
- Group-A received treatment during an early stage.
- Group B received treatment during the late stage.
- Patients were evaluated pre and post-treatment.

Sample size

In this study, 30 subjects were selected according to inclusion and exclusion criteria. 15 participants were in the experimental group (Group-A) and 15 participants in the control group (Group B). Materials used: Informed consent, pen, paper, assessment form, measuring tape [2].

Sampling method

● The subjects were fitted according to inclusion criteria and informed consent was taken from the patients and explained the procedure in detail. The subjects were randomly selected for group-A and Group B.

Eligibility criteria

Inclusion criteria

● Considered children of age group (<20 y), both male and female patients.

● Considered children with an autism spectrum disorder.

● Willing to participate in the study.

Exclusion criteria

● Not considered children above age group (>20 y).

● Not considered mentally challenged children.

● No patients were taken in the study unwillingly and consensually.

Limitations

● The same study could be repeated in a large number of samples.

● Treatment time in session could be increased for better functional outcomes.

● Children were hard to deal with as they could be less attentive during treatment.

● Children were sometimes not in the mood, which might have caused disturbance.

● Mild pain and even mild discomfort to the children could have caused immediate cessation of the treatment.

Procedure

● Participants–subjects meeting inclusion criteria were included in the study.

● The sample was initially selected and then randomly divided into 2 groups.

● A consent form was signed by both groups i.e. parents and children.

● Treatment for early-stage group A (n=15), in this, the patient was taken with early intervention i. e children diagnosed with autism in early stages of life (age>7-8)

● Treatment for later stage group B (n=15), in this, the patient was taken with later intervention i. e children diagnosed with autism in later stages of life (age<10)

● Short-term and long-term goals were planned for the patients.

● Appropriate treatment category was chosen according to the plan for the patients for better effectiveness, proper treatment, and thus better results. Treatment categories may have included electrical stimulus, manual therapy, IASTM, and psychological counseling.

● Precautionary measures were taken while treating children.

After obtaining ethical approval dated 29/08/2022, PMU/PMCH/IEC/229/2022. All participants completed information and consent form at recruitment

RESULTS

In Group A, 40% are in the 4-6 y age group, while 60% are in the 7-8 y age group. In Group B, 73.33% are in the 9-14 y age group, while 26.67% are in the 15-20 y age group (table 1).

Table 1: Distribution of cases according to Age

Age group	Group A		Group B	
	Number of cases	Percentage	Number of cases	Percentage
4-6 y	6	40.00	0	0.00
7-8 y	9	60.00	0	0.00
9-14 y	0	0.00	11	73.33
15-20 y	0	0.00	4	26.67
Total	15	100	15	100.00
mean±SD	6.60±1.24		12.47±3.25	

The table shows the distribution of cases based on cognitive ability for two groups, A and B. There are four levels of cognitive ability: Good, Mild, Poor, and Very Poor. In Group A, there were 2 cases (13.33%) in the Good cognitive ability category, 6 cases (40.00%) in the Mild category, 7 cases (46.67%) in the Poor category, and 7 cases (46.67%) in the Very Poor category. In Group B, there were 5 cases (33.33%) in the Good cognitive ability category, 5 cases (33.33%) in the Mild category, 4 cases (26.67%) in the Poor category, and 1 case (6.67%) in the Very Poor category. The chi-square value is 5.570, and the p-value is 0.178, which is not statistically significant (NS) at the 0.05 level of significance (table 2).

Table 2: Distribution of cases according to cognitive ability

Cognitive ability	Group A		Group B	
	Number of cases	Percentage	Number of cases	Percentage
Good	2	13.33	5	33.33
Mild	6	40.00	5	33.33
Poor	7	46.67	4	26.67
Very Poor	7	46.67	1	6.67
Total	15	100.00	15	100.00

Chi-square = 5.570; P-Value = 0.178 (NS)

DISCUSSION

The present study aimed to compare the efficacy of early intervention and treatment versus late intervention and treatment for autism in children and adults. The distribution of cases according to age revealed interesting findings. In Group A, a higher proportion of individuals (40%) fell within the 4-6 y age group, while the majority of individuals in Group B (73.33%) were in the 9-14 y age group. These results suggest that early intervention and treatment are more prevalent in younger children, while late intervention is more common in older individuals [7].

When examining cognitive ability, the distribution of cases in Group A and Group B provided valuable insights. In Group A, the majority of cases fell within the Poor (46.67%) and Very Poor (46.67%) cognitive ability categories. In contrast, Group B had a higher proportion of cases in the Good (33.33%) and Mild (33.33%) cognitive ability categories. These results indicate that individuals in Group B may exhibit better cognitive abilities compared to those in Group A [8].

To contextualize these findings, it is essential to compare them with other relevant studies. Several studies have emphasized the significance of early intervention for individuals with autism spectrum disorder (ASD). Early Start Denver Model (ESDM), an evidence-based early intervention approach, has demonstrated promising results in improving social communication skills and reducing autism symptoms (Rogers and Vismara, 2008). This aligns with the higher proportion of younger individuals in Group A, indicating the implementation of early intervention practices [9].

Additionally, the distribution of cases based on cognitive ability in this study is consistent with previous research. Eldevik *et al.* (2009) conducted a meta-analysis of early intensive behavioral intervention for children with ASD and found improvements in cognitive outcomes. The higher proportion of individuals in the Good and Mild cognitive ability categories in Group B may reflect the positive impact of early intervention and treatment [10].

However, it is important to note that the chi-square test results for cognitive ability did not yield statistically significant differences between the two groups. This suggests that the distribution of cases across cognitive ability categories in Group A and Group B may not differ significantly. While the sample size and other factors may have influenced these results, it is crucial to interpret them with caution [11].

It is worth noting that this study has certain limitations, including the small sample size and the potential influence of confounding variables. Future research should aim for larger sample sizes, consider diverse demographic factors, and employ rigorous study designs to provide more robust evidence on the efficacy of early intervention and treatment for individuals with autism. Overall, this study contributes to the growing body of knowledge on early intervention for ASD, shedding light on the distribution of cases based on age and cognitive ability. Further research in this field will help refine and optimize intervention approaches, leading to improved outcomes and better support for individuals with autism spectrum disorder [12].

CONCLUSION

In conclusion, the findings of this study highlight the importance of early intervention and treatment for individuals with ASD. The higher proportion of younger individuals in Group A and the distribution of cases based on cognitive ability provide insights into the potential benefits of early intervention practices. Comparisons with other studies support the notion that early intervention can positively impact cognitive outcomes in individuals with ASD. However, the lack of statistical significance in the chi-square test for cognitive ability suggests the need for further investigation and consideration of other factors that may influence outcomes.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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