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Effective Mechanisms for Developing Speech in Preschool Children with Autism Spectrum Disorder in an Educational Cluster Environment

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ABSTRACT

This study investigates effective mechanisms for enhancing the speech development of preschool children with autism spectrum disorder (ASD) in the context of an educational cluster. The research employed methods including pedagogical observation, comparative analysis, experimental testing, interviews, questionnaires, and pedagogical experiments. The aim was to identify the most effective approaches to developing speech in these children, focusing on both educational and therapeutic strategies. The findings highlight the necessity of differentiated pedagogical methods and the creation of a model for speech development specific to the educational cluster environment. The practical significance of the research is reflected in the proposed speech development process model and methodological tools that facilitate speech and communication skill development. The study also suggests that the integration of modern communication methods, such as Picture Exchange Communication System (PECS), and a structured therapeutic approach can significantly improve the communication skills of children with ASD. The results contribute to enhancing corrective-pedagogical work and can guide the development of specialized programs for preschool children with ASD.

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1. INTRODUCTION

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent deficits in social communication and interaction, along with restricted, repetitive patterns of behavior, interests, or activities (Homdijah *et al*., 2022). Over the past few decades, the global prevalence of ASD has shown a marked increase, prompting a corresponding rise in the demand for effective educational, therapeutic, and clinical interventions tailored to the unique developmental needs of individuals with autism. According to the World Health Organization (WHO), one in every 100 children is diagnosed with ASD, a figure that underscores the urgent need for comprehensive and accessible support systems (Dawson & Bernier, 2013; Lord *et al*., 2022).

Recognizing the importance of early identification and support, international initiatives have been launched to increase awareness and reduce the stigma surrounding ASD. The establishment of global observances, such as World Autism Awareness Day, has played a crucial role in advocating for early diagnosis, inclusive education, and access to therapy and specialized care. The global mental health agenda has also positioned autism as a priority area for both research and practical innovation.

The understanding of ASD has evolved significantly. Initially, individuals with autism were often misunderstood or misdiagnosed due to limited knowledge of the condition (Au-Yeung *et al*., 2019). Over time, with the refinement of diagnostic criteria and greater awareness, ASD has been more accurately identified as a spectrum that encompasses a wide range of abilities and challenges. This spectrum-based view emphasizes that while individuals with ASD may share certain characteristics, each person experiences the condition in a unique way, requiring personalized approaches in support and education (Constantino & Charman, 2016).

Despite progress in clinical and neurological research on ASD, the field of education—especially early childhood education—still faces challenges in implementing effective strategies that address the specific needs of children with autism. Many traditional classroom settings are not fully equipped to support the development of communication skills among preschoolers with ASD, who often experience delays or difficulties in expressive and receptive language (Wilson, 2013; Kasari & Smith, 2013).

One promising approach to overcome these challenges is the implementation of the educational cluster model. This model brings together a multidisciplinary team—including educators, therapists, and other specialists—within a structured environment aimed at supporting the comprehensive development of children with special needs (Strunk *et al*., 2017). Educational clusters are designed to integrate teaching and therapeutic strategies into the daily learning process, ensuring continuity and consistency in how children receive support (Lumley *et al*., 2017; Rahman *et al*., 2008; Blair & Raver, 2014).

In the context of speech and language development, the educational cluster model provides a platform for applying a variety of pedagogical and therapeutic methods (Overby, 2018; Breen *et al*., 2001). These may include the use of visual communication tools, structured interaction routines, and individualized learning plans that target specific aspects of language acquisition (Isaeva *et al*., 2025). Parental involvement and collaboration with specialists also form a core part of this model, reinforcing learning both at school and at home (Yamamoto *et al*., 2022; Çaliskan & Ulas, 2022).

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However, empirical evidence on the effectiveness of educational cluster environments in promoting speech development among preschool-aged children with ASD remains limited, particularly in settings where resources, trained personnel, and inclusive policies are still developing (Siller *et al*., 2021). This study aims to fill that gap by investigating how speech development in children with ASD can be enhanced through a structured and collaborative educational model.

The study not only addresses the mechanisms by which integrated strategies within educational clusters can facilitate language acquisition but also explores how the model can be adapted to suit various institutional and cultural contexts. In doing so, the research offers theoretical insights into inclusive pedagogical practices and provides practical recommendations for curriculum design, teacher training, and policy development to support early childhood education for children with ASD.

2. METHODS

An experimental study was conducted to evaluate the speech development of preschool children diagnosed with ASD. The study involved three main stages:

(i) Development of Methodology: This stage involved creating a detailed methodology to assess the speech development characteristics of preschool children with ASD. Tools included specialized questionnaires for parents and educators, interviews, and observational checklists.

(ii) Experimental Study: In this phase, data was collected from parents, caregivers, and educators of children with ASD. The participants included 29 children from two multi-profile specialized preschool institutions. The parents filled out questionnaires, and educators provided insights into their experiences with speech development challenges in children with ASD. Various speech assessment tasks and didactic games were employed to evaluate communication skills.

(iii) Data Analysis and Conclusion: The final stage involved analyzing the collected data to identify trends, challenges, and effective interventions for speech development. The results were used to develop a model for supporting speech development in children with ASD within the educational cluster environment.

3. RESULTS AND DISCUSSION

3.1. Results of the Parent Survey on Speech and Communication Skills in Children with ASD

In this study, responses were gathered from the parents of 29 children diagnosed with Autism Spectrum Disorder (ASD), enrolled in the 375th and 20th multi-profile specialized state preschool education institutions shown in **Figure 1**. The survey aimed to assess the characteristics of the children's speech and communication development, as observed by their parents at home. One of the most critical indicators evaluated was the child's ability to initiate verbal communication. Only 28.5% of parents reported that their child was capable of initiating speech independently. In contrast, a significant 71.4% stated that their child did not exhibit any verbal communication at all. This finding highlights a core challenge commonly faced by children with ASD — delayed or absent expressive language skills — which can severely limit social interaction and learning opportunities during early developmental stages (McCleery *et al*., 2013; Hutchins & Prelock, 2014). Parents were also asked whether their child employed nonverbal means of communication, such as gestures, facial expressions, or

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vocalizations like crying or screaming. Approximately 42.8% of parents reported that their child used these forms of communication to express needs or desires. However, 57.1% indicated that their child did not utilize any such nonverbal cues, suggesting that a substantial portion of the children might face broader communication barriers, potentially including difficulties with joint attention, social reciprocity, or intentional signaling—skills that are often underdeveloped in individuals with ASD. The repetition of spoken words or phrases, was observed in 35.7% of the children according to their parents. Although sometimes perceived as non-functional speech, echolalia can represent a developmental milestone for children with autism, as it reflects engagement with language and may precede the emergence of spontaneous, functional communication. Nevertheless, 64.2% of parents did not observe echolalia in their child, which may suggest either more severe language delays or differing communication profiles. When asked whether their child could express basic affirmations or negations (such as 'yes' or 'no') through body language — for instance, head nodding, shaking, or simple hand gestures — only 28.5% of parents confirmed this ability. The remaining 71.4% of children were reportedly unable to express these fundamental choices. This limitation severely affects the child's ability to participate in even the most basic decision-making or interactions, and may contribute to behavioral frustrations when desires or refusals cannot be effectively communicated. A critical insight from the survey is the extremely limited awareness among parents regarding speech development interventions for children with ASD. Only 7.1% (2 parents) indicated they were familiar with any methods or strategies to support their child's speech development. The vast majority, 92.8%, were unaware of such resources. This lack of knowledge may hinder the ability of families to implement supportive communication practices at home, further emphasizing the need for structured parent training and outreach as part of early intervention services.

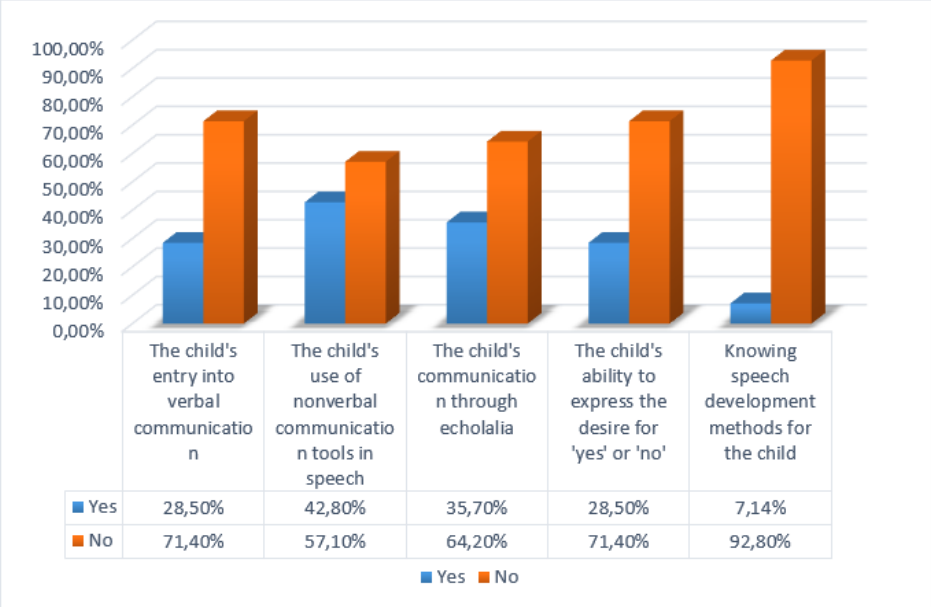

Figure 1. Results of the survey conducted with parents during the study of the unique characteristics of speech and communication skill development in children with ASD.

3.2. Survey Results from Educators on Speech and Communication Development in Children with ASD

The survey involved 12 educators, comprising defectologists and caregivers, working in multi-profile specialized state preschool education institutions shown in **Figure 2**. The

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purpose of the survey was to assess the educators' knowledge and application of effective strategies to support speech and communication development in children diagnosed with Autism Spectrum Disorder (ASD). When asked whether they possessed information about autism syndrome, only 33.3% of the educators reported having substantial knowledge of the condition. A significant 66.6% admitted to being aware only of the term without a deeper understanding. This indicates a knowledge gap in foundational concepts related to ASD, which may impact the effectiveness of interventions delivered in early childhood education settings. Regarding specialized correctional approaches — including Applied Behavior Analysis (ABA), Floortime, DIR (Developmental, Individual Differences, Relationship-based), Ergotherapy, and the Son-Rise program — only 16.6% of the educators demonstrated awareness of these methodologies. The remaining 83.3% were unfamiliar with any of these intervention strategies. This finding underscores a critical need for professional development in evidence-based practices tailored to the specific learning needs of children with autism (Alexander *et al*., 2015; Dynia *et al*., 2020; Larraeleta *et al*., 2022). Responses to questions about common speech impairments in children with ASD revealed a split: 50% of respondents had a nuanced understanding, identifying specific language challenges such as echolalia, delayed speech onset, or pragmatic language deficits. The remaining 50%, however, displayed a superficial understanding, merely reporting that "children with autism do not speak." This dichotomy suggests variation in training levels between defectologists and general caregivers, with implications for the quality of language interventions provided (Weiland, 2016). When asked whether they were aware of any special methods aimed at developing speech in children with ASD, again only 33.3% responded affirmatively. A considerable 66.6% of educators reported no knowledge of structured techniques for language acquisition in children with autism. This lack of methodical knowledge may hinder the implementation of individualized education plans (IEPs) and further limit the speech development progress of students (Klingner & Boardman, 2011; Hurwitz *et al*., 2020; Bingham *et al*., 2018). PECS is a widely-used augmentative and alternative communication (AAC) method for non-verbal or minimally verbal children with autism (Syriopoulou-Delli & Eleni, 2022; Camilo *et al*., 2023; Abonoa *et al*., 2023; Jurgens *et al*., 2009). Alarmingly, only 16.6% of educators (just 2 individuals) were aware of PECS and reported using it in practice. A large 83.3% had no information about this communication tool, despite its proven effectiveness in promoting functional communication and reducing behavioral frustrations in children with speech impairments.

3.3. Discussion

The combined data from parents and educators underscores a central finding of this study: there is a significant disconnect between the communication needs of preschool children with ASD and the current levels of preparedness among both their families and educators to support those needs effectively.

From the parental side, the limited awareness of speech development methods suggests a lack of access to resources, training, or guidance following diagnosis. This places a heavier burden on educators to provide targeted interventions in the classroom (Christ & Christ, 2006). However, the educator responses indicate that many are not yet equipped—either through training or institutional support—to meet that challenge.

The lack of familiarity with structured communication systems such as PECS is particularly concerning. PECS, designed to support nonverbal children, allows them to express their needs through visual symbols and structured exchanges. Its low recognition among educators (only

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16.6%) highlights a gap in professional readiness that likely impedes the broader adoption of effective communication practices in inclusive settings (Gilroy *et al*., 2017).

Moreover, the absence of systemic collaboration between families and educational institutions may further exacerbate these challenges. In the educational cluster model, one of the critical success factors is consistent reinforcement of communication strategies across environments—school, home, and therapy (Baquedano-Lopez *et al*., 2013). Without parental understanding and teacher competence, this consistency is difficult to achieve (Kim, 2009). The findings suggest a two-pronged approach to improvement:

(i) Capacity building for educators
Comprehensive and continuous professional development must be prioritized, focusing on evidence-based strategies for speech and language development among children with ASD. This includes hands-on training in using AAC tools like PECS, implementing behavioral interventions, and understanding the nuances of ASD-related communication disorders.

(ii) Parental empowerment and collaboration
Families must be engaged as active partners in their child's communication journey. Accessible workshops, instructional materials, and home-based strategy guides can help bridge the knowledge gap and ensure that language development efforts extend beyond the classroom.

Ultimately, the study affirms that the educational cluster model—with its potential for multidisciplinary collaboration, personalized instruction, and inclusive engagement—offers a promising framework for supporting speech development in preschool children with ASD (Mullogan *et al*., 2012). However, to realize this potential, deliberate efforts must be made to enhance teacher readiness, parent involvement, and the systemic integration of therapeutic tools into daily educational practice.

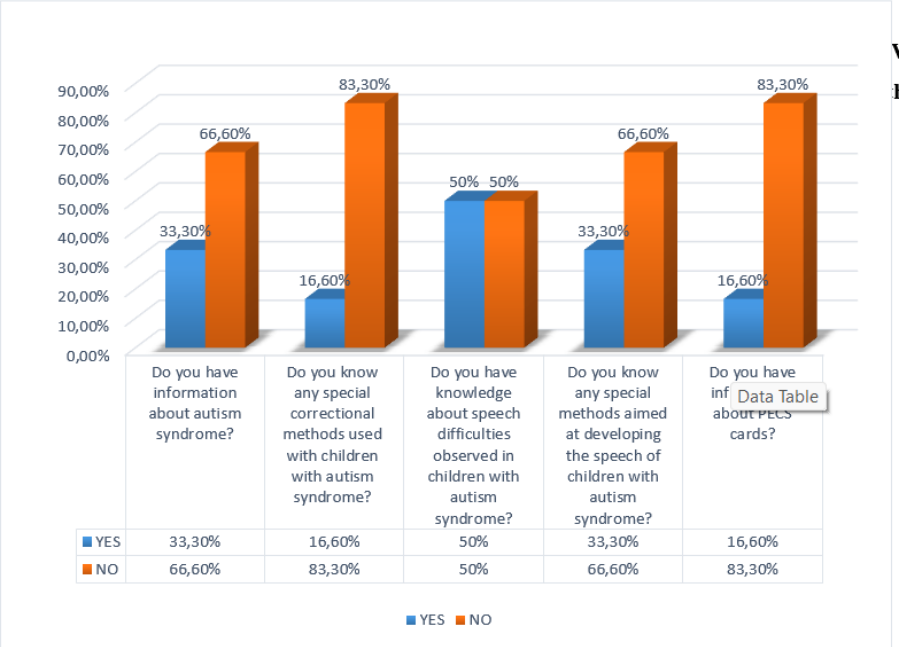

Figure 2. Results of the survey conducted with educators during the study of work aimed at developing speech and communication skills in children with ASD at the multi-profile specialized state preschool education institution.

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4. CONCLUSION

Autism spectrum disorder (ASD) is characterized by detachment from reality, self-isolation, lack of response to external stimuli, passivity, and a tendency to be extremely vulnerable in interactions with the environment. For children with early childhood autism, speech development has distinct features. These include impairments in the communicative function of speech, echolalia (repeating words or phrases), the absence or delayed emergence of personal pronouns, underdeveloped dialogue skills, specific prosody disorders (issues with rhythm, stress, and intonation), the creation of neologisms (new, non-standard words), and a tendency toward autonomous speech, where children speak more to themselves than to others. The study analyzed the unique characteristics of communication skill development in preschool children with autism syndrome. Based on the collected data, differentiated pedagogical correctional approaches and content were developed to help shape their communication abilities. In addition, a speech development process model was created within the educational cluster environment, alongside game-based methodological tools designed to support the development of speech and communication skills.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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