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## Speech Development Disorders in Primary School Children: Clinical and Neuropsychological Characteristics in Children with Specific Language Impairment

**Farangisbonu Alisher qizi Doniyorova**

DSc., Associate Professor of the Department of Neurology and Folk Medicine, Tashkent State Medical University, Tashkent, Uzbekistan

**Moxinur Abduaxadova Shomahmudovna**

First-year Doctoral Student, Department of Neurology and Folk Medicine, Tashkent State Medical University Tashkent, Uzbekistan

**Abstract:** Speech and language disorders remain one of the most common neurodevelopmental problems among primary school children and significantly affect academic achievement, social interaction, and cognitive development. The present study aimed to analyze the clinical and neuropsychological characteristics of speech development disorders in primary school children diagnosed with specific language impairment (SLI). A total of 80 children aged 7–10 years were examined using standardized speech assessment methods, neuropsychological testing, and clinical neurological evaluation. The results demonstrated that expressive speech impairment was observed in 62.5% of children, phonological processing deficits in 55%, and lexical-grammatical difficulties in 48.7%. In addition, many children showed mild cognitive and attention difficulties, suggesting a complex neurodevelopmental basis of speech disorders. Early identification and targeted correction programs are essential to improve academic and social outcomes in this population.

**Key words:** Speech development disorder, specific language impairment, primary school children, neuropsychology, communication disorders.

### INTRODUCTION

Speech and language development represents a complex neurobiological process involving cortical language networks, auditory perception mechanisms, and higher cognitive functions. Disruptions in these processes may lead to speech development disorders that negatively affect academic achievement and social adaptation in school-aged children [1,2]. Epidemiological studies indicate that language impairments occur in approximately 5–8% of children worldwide, making them among the most common neurodevelopmental conditions [3].

Recent research highlights the importance of phonological processing and working memory in language acquisition. Deficits in these domains have been consistently associated with reading difficulties and delayed language development in children [4–6]. Furthermore,

neuroimaging studies demonstrate that atypical functioning of the Broca–Wernicke language network and related frontotemporal circuits may contribute to the pathophysiology of language disorders [7,8].

### Purpose of the Study

To investigate the clinical and neuropsychological characteristics of speech development disorders in primary school children diagnosed with specific language impairment.

### METHODS

**Study Design.** The present research was designed as a cross-sectional clinical and neuropsychological study aimed at evaluating the characteristics of speech development disorders in primary school children. The study

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focused on identifying linguistic impairments and their relationship with cognitive and neuropsychological functions during the early stages of school education [9,10].

**Participants.** The study sample consisted of 80 primary school children aged 7–10 years who were referred for evaluation due to suspected speech or language development difficulties. All participants were examined at a specialized pediatric neurological and speech therapy center. The cohort included 42 boys (52.5%) and 38 girls (47.5%) [11], representing a typical gender distribution for developmental speech disorders observed in school-aged populations.

**Inclusion Criteria.** Children were included in the study according to the following criteria: primary school age between 7 and 10 years, presence of clinically identified speech development disorder or suspected language delay, and the absence of severe neurological or systemic diseases that could significantly influence cognitive or speech functioning.

**Exclusion Criteria.** Participants were excluded if they presented with conditions known to substantially affect language development or cognitive performance. These included intellectual disability, hearing impairment, autism spectrum disorder, and major psychiatric disorders.

**Clinical Assessment.** All children underwent a comprehensive multidisciplinary examination that included neurological evaluation, speech-language assessment, neuropsychological testing, and cognitive screening. The neurological examination was performed to identify possible central nervous system

dysfunctions that could contribute to speech impairment.

Speech-language evaluation was conducted by certified speech therapists using standardized clinical procedures. The assessment focused on several key components of language functioning, including phonetic articulation, phonological processing, vocabulary development, grammatical structure, and narrative speech abilities.

### **Neuropsychological Assessment.**

Neuropsychological testing was performed to identify cognitive functions associated with language development. The evaluation included assessment of attention capacity, verbal memory performance, auditory perception abilities, and executive functions. These domains were selected due to their established role in language acquisition and academic performance in school-aged children.

**Statistical Analysis.** Statistical processing of the obtained data was performed using descriptive statistical methods and correlation analysis. Quantitative variables were expressed as mean values and percentages, allowing for the evaluation of the prevalence of different speech disorders and associated neuropsychological deficits. Correlation coefficients were calculated to explore potential relationships between speech impairments and cognitive indicators.

## **RESULTS**

The clinical evaluation revealed several patterns of speech impairment.

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Figure 1

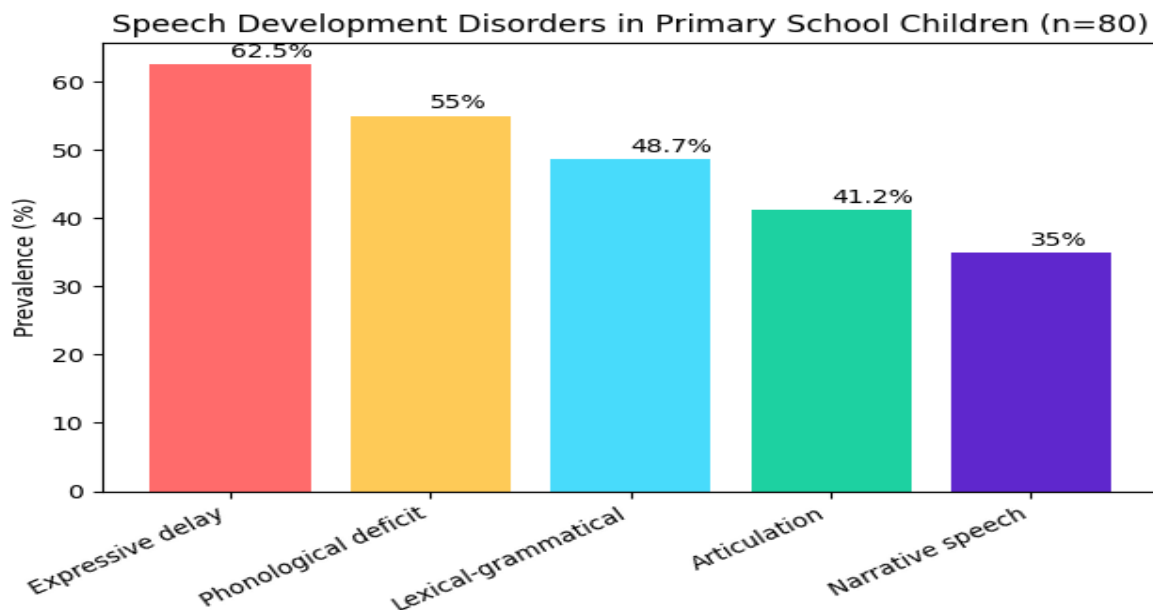


Figure 1. The most common disorder observed in the studied cohort was expressive speech delay (62.5%), followed by phonological processing deficits (55%). Lexical-grammatical

difficulties were identified in nearly half of the children (48.7%), while articulation and narrative speech difficulties were somewhat less frequent.

Figure 2.

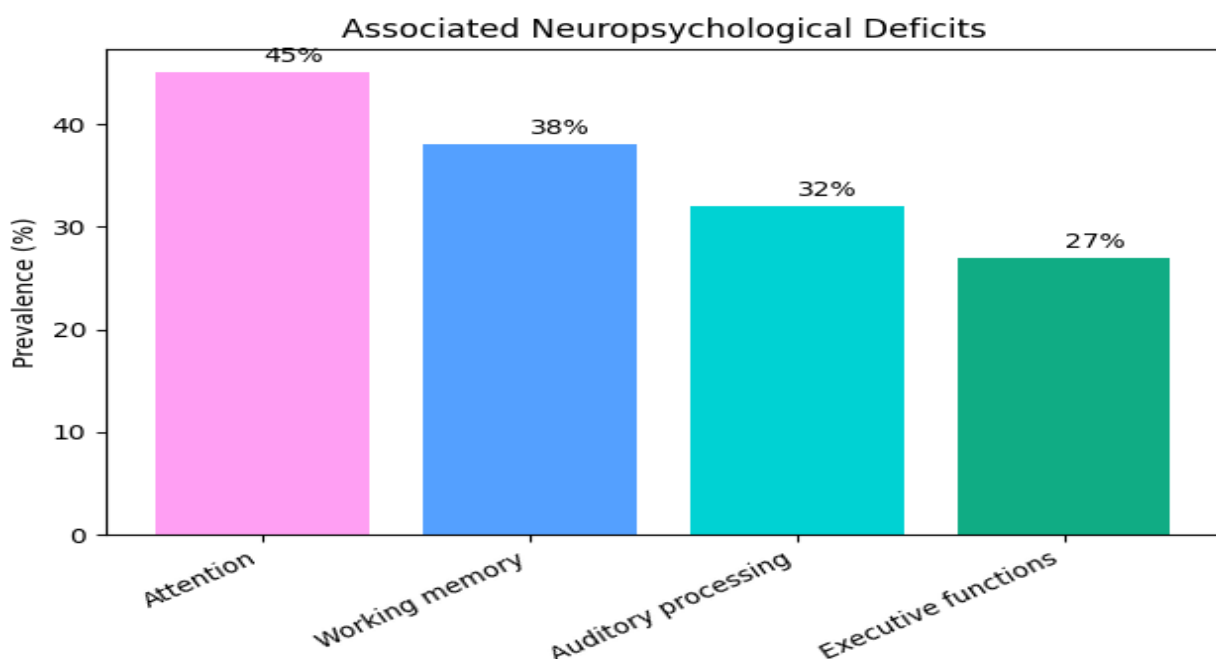


Figure 2. Neuropsychological evaluation revealed that speech disorders were frequently accompanied by attention difficulties (45%)

and reduced verbal working memory (38%), highlighting the complex neurocognitive nature of language development disorders.

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Figure 3

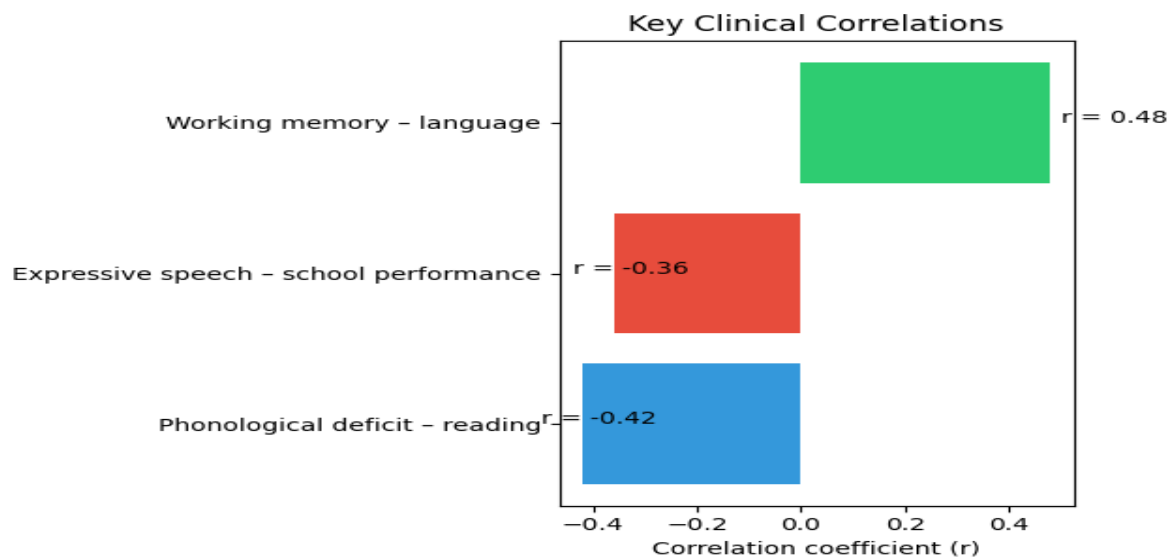


Figure 3. Correlation analysis demonstrated a moderate association between working memory and language complexity ( $r = 0.48$ ). Negative correlations were observed between phonological deficits and reading performance ( $r = -0.42$ ) and between expressive speech impairment and academic achievement ( $r = -0.36$ ).

### DISCUSSION

The present study examined the clinical and neuropsychological characteristics of speech development disorders in primary school children aged 7–10 years. The obtained results demonstrate that expressive speech delay and phonological processing deficits represent the most prevalent types of language impairment within the studied cohort. These findings are consistent with previous studies indicating that expressive language difficulties are among the most common manifestations of developmental language disorders in school-aged children [1,2].

Phonological processing deficits were identified in more than half of the examined children. This observation supports the widely accepted phonological deficit hypothesis, which suggests that impaired phonological awareness significantly contributes to difficulties in reading acquisition and early literacy development [3,4]. Children with phonological impairments frequently demonstrate challenges in sound discrimination, phoneme

segmentation, and phonological memory, which ultimately affects their ability to master reading and writing skills during the first years of formal education.

Another important finding of the present study is the high prevalence of accompanying neuropsychological deficits, particularly in attention and verbal working memory. Previous research has emphasized that working memory plays a crucial role in language processing, especially in tasks requiring sentence formulation, comprehension of complex linguistic structures, and narrative organization [5,6]. The positive correlation identified between working memory capacity and language complexity in our study further confirms the important role of cognitive regulatory mechanisms in speech development.

In addition, the moderate negative correlation between expressive speech impairment and academic performance indicates that language development is closely linked with educational outcomes in primary school children. Language competence is a fundamental component of classroom learning, as it influences comprehension of instructional materials, participation in discussions, and the ability to express knowledge verbally or in written form [7].

Recent neurobiological studies suggest that speech and language disorders may be

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associated with functional immaturity or atypical connectivity within cortical language networks, including Broca's area, Wernicke's area, and frontotemporal circuits responsible for language processing and cognitive control [8]. These mechanisms may explain the coexistence of linguistic and cognitive difficulties frequently observed in children with developmental speech disorders.

The results obtained in the present study also align with clinical observations reported in recent neurological and developmental investigations conducted in pediatric populations, which emphasize the importance of early identification and multidisciplinary rehabilitation strategies [9]. In particular, integrated approaches combining speech therapy, cognitive training, and neuropsychological support may significantly improve language outcomes and academic adaptation in children with speech development disorders.

Furthermore, contemporary research conducted by Doniyorova F.A. and colleagues has highlighted the importance of neurobiological and cognitive factors in the development of neurodevelopmental disorders in children. These studies emphasize that disturbances in neural regulatory systems may contribute to deficits in communication, cognitive functioning, and behavioral regulation [10,11]. The integration of neuropsychological assessment with clinical speech evaluation therefore represents an important step toward improving diagnostic accuracy and developing individualized therapeutic interventions.

Overall, the findings of this study support the concept that speech development disorders should not be considered isolated linguistic impairments but rather complex neurodevelopmental conditions involving multiple cognitive and neurological mechanisms.

### CONCLUSION

The results of the present study demonstrate that speech development disorders are relatively common among primary school children and frequently involve multiple

linguistic and cognitive components. Expressive language delay and phonological processing deficits were identified as the most prevalent forms of speech impairment in the examined cohort of children aged 7–10 years.

In addition to linguistic difficulties, a substantial proportion of children exhibited neuropsychological deficits, particularly in attention and verbal working memory. The presence of significant correlations between cognitive indicators and language performance suggests that speech disorders may reflect broader neurodevelopmental dysfunction affecting multiple brain systems involved in language processing and executive control.

These findings highlight the importance of early identification and comprehensive multidisciplinary assessment of children with speech development disorders. Early diagnostic evaluation combining neurological, speech-language, and neuropsychological approaches may facilitate timely intervention and improve both academic outcomes and social adaptation.

Implementation of targeted rehabilitation programs that integrate speech therapy with cognitive training and educational support may significantly enhance language development and learning capacity in children with speech disorders.

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