

### Speech Language Disorder in Children: An Overview

Laila Areju Man Banu<sup>1</sup>, Tania Saad<sup>2</sup>, Kawsar Hossain<sup>3</sup>, Azizul Hossain<sup>4</sup>

#### Abstract:

The speech and language development of a child reflects his or her overall growth and cognitive abilities. Children frequently experience speech and language disorders, which may have long-term effects. Depending on its intensity, it could impair daily functioning, communication, learning, and social interaction. The purpose of this review is to address common speech and language disorders, their

etiologies, and interventional strategy. With the rising incidence of speech language problem in children, it is important to early identification of the problem that may help us to take appropriate measures. Children's speech and language abilities can be significantly improved with early detection and timely intervention.

**Key Word:** Speech, Language, Intervention.

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1. Dr. Laila Areju Man Banu  
Assistant Professor  
Department of Pediatric Neurology  
Comilla Medical College, Cumilla
2. Dr. Tania Saad  
Assistant Professor  
Department of Pediatric Neurology  
Shaheed Suhrawardy Medical College, Dhaka
3. Dr. Md. Kawsar Hossain  
Assistant Professor  
Department of Pediatrics  
Comilla Medical College, Cumilla
4. Prof. Dr. Md. Azizul Hossain  
Professor and Head  
Department of Pediatrics  
Comilla Medical College, Cumilla

#### Address of Correspondence:

Dr. Laila Areju Man Banu  
Assistant Professor  
Department of Pediatric Neurology  
Comilla Medical College, Cumilla  
E-mail: [drlailak54dmc@gmail.com](mailto:drlailak54dmc@gmail.com)  
Mobile: 01711451867

#### Introduction:

Speech and language are the vital means of communication that begins early in childhood. The rate of speech and language development varies among children and depends on various factors. Disruption of this process adversely affect not only in communication development but also in acquiring new knowledge and participation in society.

Speech is defined as the actual ability to organize and articulate speech sound whereas language is a process of communication.<sup>1</sup> Speech is created by a series of complex and coordinated movements of the respiratory, laryngeal, velopharyngeal, and oral systems.<sup>2</sup> In speech problem a person usually exactly knows what to say and appropriate for situation, but they have trouble in producing the sounds for effective communication. Speech problem includes : fluency disorders, articulation disorders, and voice disorders.<sup>3</sup> Language includes receptive language and expressive language. The receptive language refers to ability of understanding language by decoding the words, grammatical structures and inherent meaning of the phrases in context. Expressive language is the ability to convey information, feelings thoughts, and ideas.<sup>1</sup> Children may have one or both type of language problem and with or without speech problem. These language problems can involve difficulty with grammar (syntax), the rules and system for speech sound production (phonology), words or vocabulary (semantics), units of word meaning (morphology), and the use of language particularly in social contexts (pragmatics).<sup>4</sup>

Delayed speech is defined as when the child’s conversational speech sample is more incomprehensible than would be expected for age or error in speech sound patterns not appropriate for age.<sup>5</sup> In delayed language child’s language appears to be developing normally but at a slower rate than expected from his or her intellectual ability. Some delays are resolved with time and some leads to lifelong difficulty. On the other hand, language acquisition does not follow a normal pattern and various components of language are misaligned with each other in disordered language where outcomes are difficult to predict.<sup>1</sup>

**Epidemiology**

The prevalence of speech language delay is difficult to estimate and vary in different study. Estimated prevalence of speech language delay is between 5% and 12% (median 6%) in children aged 2 to 5 years in United States.<sup>6,7</sup> In school aged children the prevalence of speech disorders is between 3% to 6% while that of

the language disorders is approximately 2% to 3% having no obvious genetic or neurologic condition. Some children have both disorders.<sup>8</sup> In a study in India speech–language delay was found in 2.53% of the children attending pediatric OPD. Severe speech and language disorders in young children may exhibit diminished reading skills, poor verbal and spelling skills, behavior problems, and impaired, psychosocial adjustment even after intervention and persist into adulthood.<sup>4</sup>

Speech and language disorders are more common in boys than girls. It is also more prevalent among children having a positive family history of speech, language, or reading disorders in a first-degree relative.<sup>8</sup>

**Normal developmental milestone of speech language in children:<sup>8,9</sup>**

Age	Receptive Skills	Expressive Skills
Birth to 3 months	Startle on sound, shows interest to face,can recognize voice.	Cries, cooing, smiles
4 to 6 months	Turns on direction to sound, respond to name	Babbling sound
9 months	Understand some verbal words (bye – bye)	Say ma-ma, da-da without meaning
12 months	Understand common items, begins to respond on verbal command	Say first meaningful word, uses jargon.
15 months	Points body part when asked	Learns words
18 months to 2 years	Points to pictures on a book, understand simple sentence	Say more words, puts 2 words together.
2 to 3 years	Understand 2 step command, difference in meaning ( big – little, up –down)	Speech >50% intelligible. Make 3 or more words sentence.
3 to 4 years	Understands much of what is said	Sentences 75% intelligible. Talks easily without repeating syllables or words.
4 to 5 years	Understands most what is said, listen short story and answer short question.	Voice sound clear, tells stories ,communicate easily with others

**Red flags Suggesting language or speech disorder and immediate evaluation:<sup>2, 8</sup>**

Age	Indication for referral
Any age	Lack of response to sound, failure to show interest in interaction with other people and lack of social communication.
6 months to 9 months	Lack of ability to laugh, vocalize, respond to sound, participate in reciprocal vocal interactions. Loss of early ability to coos, babble
12 months	No pointing or gesture
18 months	No single word, pretend play, failure to follow simple command.
2years	Vocabulary less than 50 words. Absence of two-word combinations. < 50% of speech intelligible to unfamiliar.
3 years	Not linking word, Inability to understand simple command without gestures. More than 75% of speech unintelligible to strangers, repetition of others' speech.
4 years	Failure to participate conversation.  Repetitive initial sounds or parts of words
5 years and above	Immature, inaccurate speech sound production. Difficulty in understanding.

**Primary speech language disorder:** There is no consistent classification of speech language disorders as many children have difficulties that overlap several categories. Speech disorder can be classified as speech sound disorder, stuttering or fluency disorder and voice disorders.<sup>3</sup> Language disorder can be subdivided into receptive, expressive, and mixed expressive - receptive language disorders. It can affect any component of language such as phonology, lexicon, syntax, semantics and pragmatics.<sup>2</sup>

**Speech disorders:**

1. Speech sound disorders (SSD): It can be further classified as articulation disorder, dysarthria and childhood apraxia of speech.

**Articulation disorder:**

Articulation disorder is a motor speech disorder in which a person has trouble pronouncing sounds or makes errors.<sup>3</sup> One sound might be substituted for another (“wabbit” for “rabbit”), omitted (“and” for “hand”), or distorted by mispronouncing it (“ship” for “sip”). The most common error sounds include “s,” “l,” and “r.” These difficulties usually corrected with speech therapy.<sup>1</sup>

**Dysarthria:**

Dysarthria is a motor speech disorder occur due to impairment muscle movements required for speech production and usually occurs after neurological injury, disease or in children some congenital disorder.<sup>10</sup> Dysarthric speech are slurred and strained quality and also affect rate, pitch and tone.

**Childhood Apraxia of speech:**

Childhood Apraxia of Speech also known as developmental apraxia of speech, is considered a disorder of utilizing motor planning to perform movement and executing speech sounds. Children with this condition has delayed onset of babbling or first word productions. They also have errors in articulating vowel sounds, inconsistent errors in producing words, increasing difficulty with long phrases, difficulty with production of spontaneous sentences and effortful speech. These children typically require an approach that emphasizes motor programming and motor learning to improve production of speech sounds. They also need speech specific intensive and frequent follow up.<sup>2,3</sup>

2. Stuttering or fluency disorder: Fluency disorders related to interruption of normal flow of speech. A person may hesitate, repeat words or prolong certain sounds, syllables, words or phrases. Fluency disorders include stuttering and cluttering. Children with developmental dysfluency, often make repetitions of sounds, syllables, words, at the beginning of sentence. Individual with stuttering show greater part of word repetition (b-b-b-but), sound prolongations (MMM MMM-an) and frequency of stuttering is much higher than developmental dysfluency. Cluttering is more rapid and irregular rate of speech.<sup>9</sup>

3. Voice Disorders: A person with a voice disorder has a problem producing the sounds of speech and involve vocal pitch, quality (resonance), and/or loudness. It is caused by damage, disease, or deformity of the larynx.<sup>3</sup>

**Language disorders:**

1. Expressive language disorder: The child has impaired capacity to use words to express thoughts and messages.
2. Receptive language disorder: The child has difficulty in understanding messages encoded in words and sentences.
3. Expressive-Receptive Language Disorder: It is the deficit of both understanding and producing messages.

Approximately 11–18% of children aged between 18 and 36 months may show a significantly reduced expressive and/or receptive language in the absence of intellectual disability, brain lesions or hearing impairments. These children are usually called late talkers.<sup>12,14</sup> About 70% of late talkers show a significant lexical improvement after the age of three that allows them to perform within normal limits on linguistic tasks, even if some difficulties may persist in daily communication.<sup>15</sup> However, some late talkers cannot catch up with their peers by the age of three and diagnosed as Developmental Language Disorder.

According to CATALIZE Consensus, Developmental language disorder includes a number of conditions that adversely affect language development in absence of known biomedical conditions (e.g., brain injury, cerebral palsy, neurodegenerative diseases) or other difficulties related to genetic or neurological causes. DLD diagnosis is not precluded by the presence of neurobiological or environmental risk factors, can co-occur with other neurodevelopmental disorders and does not require a mismatch between verbal and nonverbal ability.<sup>16</sup> Specific language development (SLI) is the most common DLD. SLI diagnosis based on the presence of normal nonverbal IQ with evidence of expressive and or receptive language development significantly below for the expected age and intelligence. They must have absence of other specific conditions like autism, intellectual disability, metabolic and genetic condition or severe environmental deprivation.<sup>17</sup>

Causes and risk factors related to speech – language disorder:

Normal speech language ability is a complex function of interconnected neural networks that is widely distributed across the brain and synchronized for specific activity. Along with neurological injury a number of factors may contribute to speech language disorder.

**Genetic factor:**

Genetic variations appear to play an important role in influencing how quickly and efficiently children learn to talk. Speech and language Disorders cluster in families; language difficulties was found 30% in first degree relatives of proband children.<sup>9</sup> Studies of twin have shown that concordance of speech and language disorders is higher in monozygotic twins than it is in dizygotic twins.<sup>18</sup> A number of Genes with heterogeneous functions are involved in speech and language disorder such as FOXP1, FOXP2, KIAA0319, ROBO1, APOE or CNTNAP2 etc.<sup>19</sup> Besides these, a number of specific genetic conditions are associated with specific profiles of speech and language impairment. Examples, in children with Down syndrome deficits in speech and language skills are often more severe than deficits in non-verbal skills. In Williams syndrome, children are fluent but more deficit in non-verbal skill.<sup>20</sup> Frequent echolalia, rapid bursts, phonological disorders with poor pragmatic skill are often present in boys with fragile X syndrome.<sup>11</sup>

Environmental factor:

Poor family environment, parental education, parental health, and the level of engagement of parents with children are all associated with the rate of language development. All these factors may exert epigenetic influences by dysregulating gene expression of language development.<sup>21, 22</sup>

Secondary conditions:

A number of physical conditions and diseases including neurodevelopmental disorder may cause impairment of speech language. Some of these condition are as follows:

Hearing impairment:

It is a major cause of delayed or disordered speech-language development. Hearing impairment range from mild to profound and can be conductive or sensorineural hearing loss. Hearing loss can be present at birth or acquired after birth.<sup>9</sup> Hearing loss can cause delayed development of receptive and expressive communication skill, language deficit that reduces academic achievement communication problem lead to social isolation and poor self-esteem.<sup>23</sup> In prelingual hearing loss the child has delayed speech, distorted speech sound but good visual communication. In post lingual hearing loss speech language are gradually affected, child cannot acquire new vocabulary. Parent describes the child speaking better than listening.<sup>24</sup>

**Autism Spectrum disorder (ASD):**

Autism Spectrum disorder (ASD) is a neuro developmental disorder where deficits in the domain of social communication and excessive restricted or repetitive pattern of behaviors. In autism there is often delays or regression in speech and language. Speech or language problem in children with ASD can range from absent to rich vocabularies. Some may have very limited speaking skills, some able to talk about specific subjects in great detail. Many have problems with the grammar, prosody or have pragmatic problems. Approximately 10 percent of children with ASD have specialized high abilities in specific areas called "savant" skills, such as calendar calculation, memorization, music etc.<sup>25</sup> As early intervention can improve language development, consideration of the diagnosis of autism important in the evaluation of children with language delay.

**Global developmental delay and intellectual disability:**

Intellectual disability (ID) includes deficit in both intellectual and adaptive functioning with deficits in conceptual, social, and practical domains. Global developmental delay (GDD) is usually reserved for younger children (typically less than 5 years of age) and refers to a subset of developmental disabilities defined as a significant delay in two or more developmental domains.<sup>26</sup> Children with global developmental delays usually have language and speech delay. Children with mild intellectual disability learn to talk slowly and follow normal pattern but may have difficulties in higher level language concept and use. Children with moderate to severe degrees intellectual disability have marked language impairment and communication skill.<sup>9</sup>

**Cerebral Palsy:**

Cerebral palsy (CP) defined as a group of permanent disorders of movement and posture causing activity limitation and that are attributed to non-progressive disturbances of developing brain. The speech language problem in children with CP is characterized by impairment at multiple levels of speech production phonetic, cognitive-linguistic, neuromuscular execution, and high-level planning/programming.<sup>27</sup> The speech problem may be due lack of coordination and spasticity of the muscles of the tongue, hearing loss, coexisting intellectual disability or a defect in the cerebral cortex.<sup>4</sup>

**Other neurological disorder:**

Various congenital and acquired neurological condition affect speech language in children. Various structural

and microstructural abnormalities of the cerebrum, cerebellum, midbrain, and posterior cortex; abnormalities of white matter tracts, including the corpus callosum affect speech language development.<sup>28</sup> Inborn errors of metabolism that have been shown to affect speech and language such as phenylketonuria, galactosemia, wilson disease etc. Children can exhibit language disorders from acquired condition like central nervous system injury, seizure disorder (ex. Landau-Kleffner syndrome), vascular cause (stroke), infection (ex. Meningitis), brain tumor, hypoxic injury (ex. near-drowning) and also from cancer treatment.

**Structural causes:** Some structural causes may lead to impaired speech production. Cleft lip and palate, tongue tie, malocclusion of jaw, macroglossia, enlarge adenoid are some example.

**Evaluation and Management:**

All children with speech-language impairment should have a complete medical evaluation with history, physical examination, and formal audiologic testing that is appropriate for their age. Details history of a child, including medical status, cultural, socioeconomic, education, and linguistic backgrounds and information should be sought out, from parents, teachers and other related service providers. If etiology can be determined, then specific intervention should be initiated. Hearing aid in hearing impairment, surgical intervention for cleft lip, palate, enlarged adenoid and so on. Children should receive a comprehensive developmental assessment. If there is no apparent etiology or the disorder is one manifestation of a larger condition, then the goals of the assessment are to describe the impairment and provide an intervention strategy.<sup>29</sup>

Most of the time, children with speech and language delays and disorders have failed to learn language from observation and social participation. Due to the long delays for many diagnostic services, referral to early intervention is acceptable even while a thorough evaluation of the disease is ongoing. The children should be evaluated by a speech-language pathologist, psychologists, and medical professionals such as developmental behavioral, pediatricians, or neurologists for the purpose of developing a diagnosis.<sup>2, 8</sup>

A child with language or speech delay should send for early intervention (for children up to 3 years of age) and special education services (for children aged 3 years and older).

Early Intervention (Birth to Age 3 and Preschool) for Language and Speech Disorders:

Early Intervention for this group of children is carried out by parents or caregivers, with the guidance of a speech language therapist. The target areas for early language development are to improve prelinguistic communication, vocabulary development, word combination with early syntax development and pragmatics which emphasizes a child's ability to express a range of communicative functions and participation in conversational interaction.<sup>20</sup>

Preschool time (3-5 years) is a transition time for children. In this period, along with home-based treatment a child is expected to be capable of participating in group activities and can attend and follow the instructions of an adult. Preschool children with severe language disorders often talk like younger child, with limited vocabulary and simple or immature sentences and a lower level of understanding. Speech-language pathologist should create an environment to promote growth of the child's implicit language knowledge base across a range of communication skill.<sup>20</sup>

Intervention:

Interventions for children with speech and/or language disorders may be carried out directly or indirectly. Direct interventions can be given to the child individually or in group session depending on the age and needs of the children requiring therapy. Individual therapy may use play activities for young children rather than drill. Group session include several children with similar language problems to help them benefit from the opportunities to interact and learn from one another. Indirect interventions allow adults who are already within the child's environment to facilitate communication. These approaches create an optimum communicative environment for the child by promoting positive parent-child interaction.<sup>30</sup>

The interventions include environmental modification, joint engagement routines with adult responsivity, focused stimulation on specific language targets (e.g.vocabulary, grammar, language functions), script-based intervention for social and linguistic development and recast for grammatical development.

For children with severe language impairment, augmentative or alternative means of communication are often included in therapy. It includes simple methods such as eye pointing, gestures and manual

signing, body language, use of pictures and symbols, communication boards, books or electronic devices. There is no proof that using these techniques hinders a child's oral language development if they are able to speak; on the contrary, they can help them feel less frustrated, enhance their quality of life, and even somewhat speed up language development.<sup>31</sup>

Treatment for School-Age Children with Language Disorder:

For school-age and older children, interventions shift towards a more functional approach. This includes a shift from explicit instruction to a metacognitive approach whereby the therapist will encourage the child to reflect on what they hear and then adopt it into their own repertoire. The therapist will also encourage them to make judgements based on their inherent knowledge of grammar or phonology, which improves the child's capacity to alter their language and/or speech performance.<sup>30</sup> For children in school-age, the Individuals with Disabilities Education Act (IDEA) and ASHA propose a curriculum-based approach for treating speech and language impairments. School-based speech and language services should focus on those skills that affect the child's educational performance. Curriculum-based treatment of speech and language disorders emphasizes in two related areas: (1) metalinguistics (conscious knowledge of talk about language itself) and (2) the language bases of reading and writing. Metalinguistic treatment targets phonological awareness, which is skill of understanding and awareness of the sound components of words. The language bases of reading and writing contributes to successful reading comprehension, word recognition and language comprehension. Speech Sound disorders are treated with a focus on speech production accuracy for individual sounds (phonemes). In severe cases intervention may be on improving global speech intelligibility where in whole word production rather than individual phonemes is targeted. Other approaches include articulation drills, motor learning, and phonological / lexical interventions.<sup>20</sup>

Children with isolated speech disorders improve better than those with both speech-language impairments. Speech-language therapy has been shown to be beneficial, though some difficulty persists for the rest of one's life in severe cases. Early evaluation, interventions and regular long-term follow-up is essential to help the children to reach their maximal functional capacity for speech and language.

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