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LANGUAGE DISORDERS IN INDIVIDUALS WITH CEREBRAL PALSY AT SAYAP IBU BINTARO FOUNDATION: A CASE STUDY OF A 25-YEAR-OLD

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Abstract

Language development is a gradual process in acquiring the ability to understand and use language for communication. This process involves biological, cognitive, social, and environmental aspects. In relation to biological and cognitive aspects, individuals with cerebral palsy experience difficulties in the stages of language development. Therefore, this study aims to describe language disorders in a 25-year-old individual with cerebral palsy at the Sayap Ibu Bintaro Foundation. These language disorders are specifically examined in the phonological domain. This study employs a qualitative method with a case study approach, based on the assumption that individuals with special needs, such as cerebral palsy, possess unique characteristics that are not generalizable. The findings reveal the presence of phonological disorders, including phoneme deletion, consonant substitution, simplification of consonant clusters into the nasal sound /ŋ/, and the addition of certain sounds. These disorders are caused by limitations in the motor control of speech organs, which are associated with the subject's neurological condition. The results of this study are expected to provide recommendations for phonological therapy patterns for individuals with cerebral palsy who experience similar language disorders.

INTRODUCTION

Language is one of the fundamental aspects of human life that functions not only as a means of communication but also as an instrument of thought and a medium of self-expression. Through language, individuals are able to convey ideas, express emotions, and establish complex social interactions. Proficient language ability reflects a harmonious coordination between cognitive, psychomotor, and physiological functions, particularly those involving the central nervous system in the brain. Therefore, disruption in any of these systems may result in impairments in language ability, both receptively and productively. This aligns with Putri (2021: 1), who states that language can control behavior, realize actions, and transform situations. In other words, language not only enables individuals to act but also reflects how individuals are interpreted. Furthermore, Syafroni (2016: 67) emphasizes that language plays a crucial role in human life, not only as a medium for action but also as a reflection of the speaker's culture.

From a neuropsychological perspective, language disorders are generally caused by two primary factors. First, medical or neurological factors, namely damage or dysfunction in brain regions responsible for language production and comprehension, as observed in individuals with Cerebral Palsy (CP), aphasia, or other neurogenic disorders. Second, environmental and social factors, such as lack of language stimulation or early linguistic deprivation, which may hinder optimal language development. Both factors influence an individual's ability to understand and use language. In this regard, Cahyantini (2018) states that language development disorders may occur due to suboptimal developmental stages or damage to the brain as the center of language processing. Children with cerebral palsy

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experience motor impairments caused by brain damage, particularly in motor centers or their connecting networks. This damage may occur during pregnancy, childbirth, or the development of the central nervous system. In addition, individuals with cerebral palsy may experience comorbid conditions, including cognitive and physical impairments (Eliyanto & Hendriani, 2013).

The relationship between cerebral palsy and linguistic studies lies in the understanding that language is not merely a system of sound symbols but also a system of thought and a reflection of human mental activity. Effective language is characterized by clarity of sound, structural accuracy, and contextual appropriateness. Therefore, irregularities in sound production—such as phoneme deletion, substitution, or distortion—may indicate disruptions in the nervous system affecting language mechanisms in individuals with cerebral palsy. According to Clark (1964, in Sriwidodo, 1985), cerebral palsy is a condition involving damage to brain tissue in motor centers or their connecting networks, occurring during the prenatal period, childbirth, or early development of the central nervous system. This condition is characterized by paralysis, paresis, coordination disorders, and other motor dysfunctions, which ultimately affect language abilities.

Children with cerebral palsy exhibit physical conditions that differ from those without the condition. These physical differences vary depending on the severity, but most individuals with cerebral palsy have limited mobility and difficulty performing daily activities independently (Maimunah, 2013). They often experience difficulties in grasping objects, crawling, and walking. Additionally, they may have impaired control of the muscles in the throat, mouth, and tongue, resulting in drooling, as well as difficulties in eating and swallowing (Maimunah, 2013).

One of the neurological impairments experienced by individuals with cerebral palsy involves motor system dysfunction, which affects speech production and, indirectly, language development and acquisition. This condition results from brain damage occurring before, during, or after birth, impacting motor abilities, coordination, and speech functions. Individuals with cerebral palsy commonly experience difficulties in controlling speech muscles (dysarthria), resulting in unclear or unintelligible speech. According to Johan (2018:115), dysarthria is a speech disorder caused by damage to the central nervous system that directly controls the muscles involved in sound production. This disorder is characterized by weakness, slowness, or incoordination of speech muscles, leading to impairments in motor speech execution. Similarly, Duffy (2013) explains that dysarthria is a motor speech disorder in which neurological conditions cause weakness, paralysis, or incoordination of the speech mechanism.

Based on the researcher’s observations, individuals with cerebral palsy are predominantly characterized by symptoms of dysarthria with varying levels of severity. This condition is closely related to damage in brain regions responsible for controlling the speech organs. Ferawati (2017) notes that brain damage significantly affects language processing, particularly in regions coordinating overall language functions. Ulfa (2020:17) further explains that speech disorders are a type of communication disorder characterized by errors in speech sound production. These errors result in articulation problems in terms of place of articulation (POA) and manner of articulation (MOA), leading to substitution, omission, addition, and distortion of speech sounds.

The study of language disorders in individuals with cerebral palsy is particularly significant within the fields of psycholinguistics and neurolinguistics. Psycholinguistics examines the relationship between language and mental processes, including how individuals acquire and use language, while neurolinguistics focuses on the relationship between brain structures and language functions. These disciplines provide a theoretical foundation for understanding language disorders in both typical and pathological conditions. In the context

of language impairment, these approaches integrate behavioral, acoustic, and neural data to interpret the origins of language difficulties (Rommers & Federmeier, 2018; Hagoort, 2020; The Oxford Handbook of Psycholinguistics, 2023). This framework is particularly relevant to cerebral palsy, a non-progressive condition affecting the developing brain that impacts motor control and posture and is often accompanied by speech and language disorders.

In cases of cerebral palsy, the most frequently observed impairments occur at the phonological level. Individuals may experience difficulty producing certain phonemes, substituting sounds, or omitting initial phonemes. For example, the pronunciation of "akan" instead of "makan" reflects the omission of the initial phoneme /m/. Such errors indicate an imbalance between perceptual abilities (hearing and recognizing sounds) and productive abilities (producing sounds), which in psycholinguistics is categorized as a phonological disorder (Leonard, 2019; Shriberg et al., 2022).

In the context of this study, language disorders in individuals with cerebral palsy at the Sayap Ibu Bintaro Foundation constitute a relevant research focus. This foundation supports individuals with special needs, including those experiencing verbal communication impairments due to motor and neurological dysfunction. Preliminary observations reveal phonological deviations, such as the pronunciation of "akan" for "makan," indicating the omission of the phoneme /m/ in the initial position. This phenomenon is categorized as a phonological disorder within linguistic analysis. This study aims to provide an in-depth analysis of phonological disorder patterns in individuals with cerebral palsy, particularly focusing on distortions in speech sound production compared to typical speakers.

Speech intelligibility depends on the interaction between segmental contrasts and prosodic organization. In language acquisition, impairment, or rehabilitation contexts, phonology provides a framework to determine whether difficulties lie in representational and rule-based systems or in phonetic execution mechanisms. This distinction is crucial, as it influences intervention strategies. For instance, systematic omission of initial consonants across multiple words requires a different approach compared to purely articulatory issues. Recent literature on developmental speech disorders and neuromotor impairments indicates that mapping phonological processes combined with acoustic measurements offers strong predictive value for intelligibility and therapeutic outcomes (Kent & Vorperian, 2018; Pennington et al., 2019; Shriberg et al., 2022).

A related study was conducted by Rai Bagus Triadi (2018), which examined language acquisition in a four-year-old child from a psycholinguistic perspective. The study analyzed phonological, syntactic, and semantic aspects of language acquisition. At the phonological level, the research described the speech sounds produced by the subject, while at the syntactic level, it analyzed sentence structure and compared it to standard patterns. Although the present study shares a similar psycholinguistic framework and focuses on phonological analysis, it differs in that it exclusively examines phonological aspects and involves a different subject population.

Based on the above discussion, this study is expected to contribute to the development of linguistic knowledge, particularly in psycholinguistics and neurolinguistics, and to serve as a basis for designing therapeutic and pedagogical interventions for individuals with language disorders.

RESEARCH METHOD

The data in this study consist of speech sound productions produced by a 22-year-old individual with cerebral palsy at the Sayap Ibu Bintaro Foundation. These speech productions include both vowel and consonant sounds. In addition, the researcher aims to describe the causes of the language disorder experienced by the individual using a descriptive approach from the perspectives of phonology and psycholinguistics. This study employs a descriptive

method within a qualitative research framework. Qualitative research is widely used in the social sciences and humanities, particularly for micro-level analysis. It focuses on observable behavior, including what individuals express verbally, the people involved, and the underlying meanings behind such behavior, which are often difficult to quantify. This is because naturally occurring expressions do not always reflect the individual's internal thoughts and intentions. Qualitative research is based on inductive reasoning derived from objective and participatory observation of social phenomena. Accordingly, the purpose of this study is to describe the subject's language disorder and its underlying causes. In this context, the researcher also seeks to identify and describe forms of language impairment that lead to errors in Indonesian speech production in individuals with cerebral palsy.

Several data collection techniques were employed in this study:

1. **Observation**, which involves systematic observation of the phenomena under study, including the learning environment and classroom activities;
2. **Listening technique**, which refers to the direct identification of linguistic information in the form of speech sounds produced by the individual with cerebral palsy;
3. **Recording technique**, used to capture speech data accurately without disrupting the natural communication process, enabling detailed analysis of the subject's language abilities; and
4. **Note-taking technique**, in which relevant observations and findings are documented after the data collection process. Medical history was also reviewed through institutional records at the foundation.

Prior to analysis, the data were classified systematically. Data analysis was conducted using a descriptive qualitative approach. The analysis focuses on presenting findings based on phonetic and phonological aspects, with data derived from verbal expressions produced by the individual with cerebral palsy. The stages of data analysis in this study include:

1. Describing the forms of language disorders observed in the individual with cerebral palsy;
2. Analyzing the data to identify patterns of speech sound disorders; and
3. Interpreting the analyzed speech disorders to determine the underlying causes of speech sound production difficulties in the individual.

RESULT AND DISCUSSION

Based on the data collected, several forms of language disorders were identified at the phonological level, as presented in Table 1 below.

Table 1. Research Data

Data No.	Word	Produced Form	Description of Disorder
D01	Komputer	/omputeh/	Initial consonant deletion; final consonant change
D02	Subuh	/cubuh/	Initial consonant substitution
D03	Isya	/isa/	Medial consonant deletion
D04	Pacar	pacah	Final consonant substitution
D05	Basket	baket	Medial consonant deletion
D06	Warung	wawung	Medial consonant substitution
D07	Rumah	ngumang	Initial consonant substitution
D08	Motor	motong	Final consonant substitution
D09	Rumput	ngumput	Initial consonant substitution
D10	Lantai	antay	Initial consonant deletion; final change

Data No.	Word	Produced Form	Description of Disorder
D11	Celana	ceana	Medial consonant deletion (/l/)
D12	Masker	maskeh	Final consonant substitution
D13	Sendal	cendal	Initial consonant substitution
D14	Gelang	geang	Medial consonant deletion
D15	Mesin	mecit	Medial consonant substitution
D16	Lidah	ngidah	Initial consonant cluster simplified to /ng/
D17	Selang	ceang	Initial consonant substitution
D18	Akar	akang	Final consonant substitution
D19	Kaos	kaong	Consonant change to /ng/
D20	Renang	ngenang	Initial consonant substitution (/r/ → /ng/)
D21	Lemari	emali	Initial consonant deletion; /r/ → /l/
D22	Sepatu	cepatu	Initial consonant substitution
D23	Memukul	mewmukul	Consonant insertion (/w/)
D24	Sisir	cicir	/s/ → /c/ substitution
D25	Tidur	tiduh	Final consonant substitution
D26	Bangku	wangku	Initial consonant substitution (/b/ → /w/)
D27	Jendela	nyendea	/j/ → /ny/; medial /l/ deletion
D28	Rambut	ngamut	Initial consonant substitution (/r/ → /ng/)
D29	Ruang	nguang	Initial consonant substitution (/r/ → /ng/)
D30	Kalung	kaung	Medial consonant deletion (/l/)

Based on the table of speech data from a 22-year-old individual with cerebral palsy at the Sayap Ibu Bintaro Foundation, it is evident that the language impairment is predominantly manifested at the phonological level, particularly in consonant production. From the thirty data points collected, pronunciation errors do not occur randomly but instead form recurring and systematic patterns. The most prominent patterns include consonant deletion, consonant substitution, simplification of consonant clusters, and the insertion of additional sounds within words.

One of the most noticeable forms of impairment is consonant deletion in both initial and medial positions. For example, komputer is pronounced as /omputeh/ (D01), lantai as antay (D10), and lemari as emali (D21), where the subject omits the initial consonant, resulting in words beginning directly with a vowel. This phenomenon indicates difficulty in initiating articulation with certain consonants in word-initial position. Consonant deletion also occurs in medial positions, such as basket → baket (D05), celana → ceana (D11), gelang → geang (D14), kalung → kaung (D30), and jendela → nyendea (D27), where the phoneme /l/ is omitted. These medial deletions simplify syllable structures and can be interpreted as articulatory simplification to reduce the motoric burden of speech production.

In addition to deletion, the data also reveal patterns of consonant substitution across initial, medial, and final positions. In initial position, for instance, subuh is pronounced as /cubuh/ (D02), sendal as cendal (D13), selang as ceang (D17), sisir as cicir (D24), and bangku as wangku (D26). In these cases, /s/ is consistently replaced by /c/, while /b/ is replaced by /w/. Similarly, in jendela → nyendea (D27), the initial /j/ is replaced by /ny/. These substitutions suggest that the subject replaces articulatorily complex sounds with those that are easier to produce, resulting in shifts in place and manner of articulation.

Substitution also occurs in medial positions, as seen in warung → wawung (D06) and mesin → mecit (D15), indicating unstable articulatory control in maintaining target sounds. In final positions, consonant changes are observed in komputer → /omputeh/ (D01), pacar → pacah (D04), motor → motong (D08), akar → akang (D18), kaos → kaong (D19), masker → maskeh (D12), and tidur → tiduh (D25). In several cases, final consonants undergo weakening, such as /r/ shifting to /h/, or nasalization, such as /r/ and /s/ shifting to /ng/. This indicates difficulty in achieving proper articulatory closure at the end of words.

Another prominent pattern is the simplification of consonant clusters into a single sound, particularly the nasal /ng/. This is evident in rumah → ngumang (D07), rumput → ngumput (D09), renang → ngenang (D20), rambut → ngamut (D28), ruang → nguang (D29), and lidah → ngidah (D16). In these examples, initial consonants such as /r/ or /l/, or clusters involving these sounds, are simplified into /ng/. From a phonological perspective, this reflects cluster simplification, where the subject selects a nasal sound that is easier to produce compared to maintaining more complex articulatory coordination.

In addition to deletion and substitution, consonant insertion is also observed, as in memukul → mewmukul (D23). The insertion of /w/ between the vowel /e/ and the consonant /m/ indicates epenthesis, a process in which additional sounds are introduced to facilitate pronunciation. This insertion can be understood as a compensatory strategy to make speech production feel smoother, although it results in deviation from the standard form.

Overall, these findings demonstrate that language impairment in the subject with cerebral palsy at the Sayap Ibu Bintaro Foundation is predominantly phonological, with a primary focus on consonant production. The recurring patterns of deletion, substitution, simplification, and insertion indicate that the subject experiences difficulty in controlling the movement of speech organs to produce sounds accurately and consistently. As a result, the produced speech tends to be simplified and deviates from standard forms. These findings are consistent with the characteristics of phonological disorders in individuals with cerebral palsy, where motor limitations affect the accuracy and clarity of articulation.

In relation to articulatory characteristics, each consonant sound is produced through the coordinated activity of several speech organs, including the lips, tongue, palate, and vocal cords. This coordination involves two main aspects: place of articulation and manner of articulation. Based on the speech data of the 25-year-old individual with cerebral palsy at the Sayap Ibu Bintaro Foundation, it is evident that the language impairments are not only related to the types of sounds produced but also to limitations in specific speech organs. This is reflected in recurring error patterns associated with particular places and manners of articulation, as presented in the following table.

Table 2. Articulatory Error Patterns

Place of Articulation	Affected Phonemes	Example	Analysis
Bilabial	/b/, /p/, /m/	*buku → uku, makan → akan*	Weak lip closure due to muscle impairment
Apicodental	/t/, /d/	*tidur → tiduh*	Tongue tip fails to reach upper teeth precisely
Apicoalveolar	/r/, /l/, /n/, /s/	*rumah → ngumang, lemari → emali*	Weak tongue control causing deletion/substitution
Velar	/k/, /g/	*komputer → omputeh*	Incomplete contact between tongue dorsum and velum

Place of Articulation	Affected Phonemes	Example	Analysis
Glottal	/h/	*rumah → ngumang*	Weak airflow from vocal folds

Based on the table above, when viewed from the perspective of place of articulation, the disorders are evident across several groups of sounds. In bilabial consonants such as /b/, /p/, and /m/, for instance in the word buku which is reduced to uku or makan to akan, it can be observed that the initial sounds—normally produced through the contact of both lips—are omitted. This phenomenon indicates that the subject's lips are unable to close tightly and in a coordinated manner, resulting in incomplete closure or burst required to produce bilabial sounds. This tendency is consistent with muscle weakness in the facial area, which is commonly found in individuals with cerebral palsy.

In apicodental sounds, such as /t/ and /d/, the disorder can be observed in the word tidur, which is pronounced as tiduh. The sound /r/, which should involve the movement of the tongue tip toward the upper teeth or alveolar ridge, is not properly realized, resulting in weakening or alteration of the final sound. This condition indicates that the subject's tongue tip is unable to reach the correct point of articulation or maintain the necessary vibration, leading to incomplete consonant production. Although orthographically it appears as a minor change in the final sound, articulatorily this case reflects weak control in directing the tongue tip to the correct position.

A more dominant pattern of disorder is found in apicoalveolar sounds, such as /r/, /l/, /n/, and /s/. In the word rumah which becomes ngumang and lemari which becomes emali, it is evident that the sounds /r/ and /l/, which should be produced by the tongue tip contacting the alveolar ridge, are either omitted or replaced with other sounds, particularly the nasal /ng/ or more easily produced vowel sounds. Similar patterns are observed in words such as ruang, rambut, and rumput, which are produced as nguang, ngamut, and ngumput. This pattern suggests that the subject's tongue exhibits weakness in articulating alveolar sounds that require precise positioning and fine coordination, resulting in deletion or substitution.

The speech sound production disorders experienced by the subject with cerebral palsy in this study are fundamentally related to neuromotor conditions affecting the function of speech organs. Cerebral palsy disrupts the motor nervous system, leading to weakened control over the muscles of the lips, tongue, and jaw. This weakness makes it difficult for the subject to maintain stable positions and movements of the speech organs during speech production. As a result, certain sounds cannot be produced accurately, appear inconsistently, or are omitted entirely. This phenomenon is clearly observed in various speech examples, such as the omission of /k/ in komputer or the alteration of /r/ in rumah.

In addition, this disorder is also associated with difficulties in the coordination of speech organs. Speech production requires not only muscular strength but also coordinated interaction among the lips, tongue, jaw, and airflow. In the subject of this study, such coordination appears to be suboptimal, particularly in the tongue and lips, which play crucial roles in producing bilabial, apicoalveolar, and velar phonemes. Impairment in bilabial phonemes is evident when sounds that should be produced through lip closure are instead omitted or weakened, as seen in buku becoming uku. Similarly, in apicoalveolar sounds such as /r/ and /l/, the tongue fails to reach the correct point of articulation, resulting in deletion or substitution, as observed in lemari becoming emali and rumah becoming ngumang. Velar sounds such as /k/ and /g/ are also frequently impaired due to the inability of the tongue dorsum to make proper contact with the velum, causing these sounds to be omitted or altered.

CONCLUSION

Based on the findings of this study on a 25-year-old individual with cerebral palsy at the Sayap Ibu Bintaro Foundation, it can be concluded that the subject experiences language impairment predominantly at the phonological level. These impairments are characterized by phoneme deletion in initial and medial positions, consonant substitution across various positions, simplification of consonant clusters into nasal sounds such as /ŋ/, and the insertion of sounds that deviate from standard forms.From the perspective of place and manner of articulation, the most frequently affected sounds include bilabial, apicoalveolar, and velar consonants, as well as plosives, fricatives, trills, and lateral sounds.

These impairments are closely related to neuromotor dysfunction, which results in articulatory muscle weakness, impaired coordination of speech organs, a tendency toward nasal sound production, and difficulty generating sufficient airflow for clear plosive articulation. In addition to physiological factors, this study also indicates that environmental factors and psycholinguistic processes contribute to the emergence of phonological disorders. Limited verbal stimulation and the early reliance on gestural communication lead to suboptimal development of the phonological system, causing phonemic error patterns to persist over time. Although the subject's receptive abilities are relatively better than productive abilities, limitations in speech motor control and weak auditory feedback hinder spontaneous improvement in pronunciation. Therefore, these findings highlight the importance of implementing functional and contextual language learning and phonological therapy that focus on enhancing communicative independence. The use of augmentative communication approaches is also necessary to enable the subject to participate in daily social interactions despite limitations in verbal language production.

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