

THE RELATIONSHIP BETWEEN SPEECH DELAY WITH CEREBRAL PALSIES IN CHILDREN AT RS HAJI MEDAN

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ABSTRACT

Speech delay in children is a condition in which the child's expressive language development is inappropriate or below his age. The incidence of speech delay for Indonesian children who are not in school yet reaches 5–10%. There are more male children with speech disorders than females. The causes of speech delay can be hearing loss, cerebral palsy, low thinking ability, or autism. Cerebral palsy patients may experience uncontrollable movements and muscle spasms in the mouth. This will have an impact on the development of children's speech. This research is a descriptive-analytical study with a cross-sectional approach. The subjects of this study are patients with cerebral palsy in RS Haji Medan, with a total sample size of 132 people. Data analysis using the Chi-square test. There was a significant relationship between speech delay and cerebral palsy among pediatric patients in RS Haji Medan. The result using Fisher's exact test showed a P value less than 0.05, which validated the hypothesis. There was a significant relationship between speech delay and cerebral palsy among pediatric patients in RS Haji Medan.

Keywords: *speech delay, cerebral palsy, pediatric*

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INTRODUCTION

Speech delay in children is a condition where the child's expressive language development is inappropriate or below their age (Matondang et al., 2018). Children will have difficulty expressing their feelings and lack of vocabulary. The incidence of speech delay for children who are not yet in school in Indonesia reaches 5-10% (McLaughlin, 2011). We can see the development of children's speech and language based on the age of the child. Delays in speech and language development are compared to the age, gender, cultural background and intelligence of the child. Children with speech disorders are more likely to be male than female (Namasivayam et al., 2021).

Cerebral palsy patients may experience uncontrollable movements and muscle spasms in the mouth. So that functional capacity becomes low, endurance deteriorates and energy expenditure is high (Kara et al., 2019). This will have an impact on the child's speech development. Another impact of cerebral palsy patients can be malnutrition and limited physical growth. Malnutrition is caused by the child refusing to be fed and having difficulty swallowing food (Namasivayam et al., 2021).

Cerebral palsy is caused by a lack of oxygen levels in the baby's body. So that the cells in the brain are damaged in the cerebral cortex or what is known as the temporal lobe (Rokhim, 2020). Cerebral palsy is a clinical entity caused by damage to brain tissue and is permanent. Cerebral palsies can be caused by a lack of oxygen levels in the baby's body (Tanfidiyah & Utama, 2019). So that the cells in the brain are damaged in the cerebral cortex or what is known as the temporal lobe. The number of people with cerebral palsy in Indonesia ranges from 1-5

per 1000 live births. Males are more commonly affected by cerebral palsy than females. Babies who can be saved have problems with neurodevelopment and neurological damage. 5 to 50% of cases are categorized as mild, i.e. the patient can take care of themselves, and 10% are classified as severe, i.e. the patient needs the help of special services. 35% are accompanied by seizure symptoms and 50% have speech disorders, with an average of 70% spastic type, 10-20% athetotic type, 5-10% ataxia, and the rest mixed (Suhaimi et al., 2020).

Researchers are very interested in examining how the relationship between pediatric cerebral palsies and speech delays. Considering the incidence rate in children in Indonesia is very high. Researchers hope that with this study parents can understand and provide appropriate treatment for children with cerebral palsy accompanied by speech delay (Stavsky et al., 2017).

METHOD

Type of Research

This study will use descriptive-analytic research methods with a cross-sectional approach, namely the measurement of variables is only carried out with momentary observations or within a certain period and each study is only one observation (HR, 2018). The population in this study were all pediatric patients with cerebral palsy who conducted examinations and received services at the RS Haji Medan. The samples used in this study were children diagnosed with cerebral palsy who came to the Medan Hajj Hospital and there were medical records from 2020 to 2022. The number of samples in this study were 132 people. This research data collection technique uses official documents at the Medan Hajj Hospital. Documents in the form of medical records of cerebral palsy patients who experience delays or are not late.

Data Analysis

The examination results will be analyzed by diagnostic tests. Data analysis using appropriate software. The results of the study are presented in the form of text and tables. Hypothesis testing assesses the relationship between speech delay and cerebral palsies in children at the RS Haji Medan using the Chi-Square test.

RESULTS AND DISCUSSION

The distribution of the sample based on the characteristics of the sample consists of age, sex and speech delay (Hartanto, 2018). From the distribution of data, most age is children with an age range of 2-<4 years with a total sample of 45 people (34.1%). The most gender is male with a total of 74 people (56.1%). The samples that experienced speech delay were 106 people (80.4%).

Table 4.1.1. Data Distribution Based on Sample Characteristics

| Characteristics | n |
|-----------------|------------|
| Age | |
| 0 - <12 Months | 25 (18.9%) |
| 12 - <24 Months | 22 (16.7%) |
| 2 - <4 Years | 45 (34.1%) |
| 4 - < 6 Years | 17 (12.9%) |

| | |
|--------------|-------------|
| >6 Years | 23 (17.4%) |
| Gender (n%) | |
| Man | 74 (56.1%) |
| Woman | 58 (43.9%) |
| Speech Delay | |
| Positive | 106 (80.4%) |
| Negative | 26 (19.6%) |

Distribution of Cerebral Palsy Data

Distribution of samples based on cerebral palsy etiology, type of cerebral palsy, and comorbidities.

Table 4.1.2.1. Distribution of Data Based on Infectious and Non-Infectious Etiology

| Infection/Non-infection | n |
|-------------------------|------------|
| Infection | 93 (70.5%) |
| Non-infectious | 37 (28%) |
| No Data | 2 (1.5%) |

Table 4.1.2.2 Data Distribution Based on Etiology

| Etiology | n |
|---------------------------------|------------|
| CNS infection | 80 (60.6%) |
| CNS infection, HIE | 2 (1.6%) |
| HIE, Neonatal Seizures | 1(0.8%) |
| TB infection | 2 (1.6%) |
| HIE | 19 (14.4%) |
| Congenital abnormalities | 1(0.8%) |
| Craniosynostosis | 3 (2.3%) |
| HIE, KPD | 1(0.8%) |
| Premature | 6 (4.5%) |
| LBW | 1(0.8%) |
| Malnutrition | 1(0.8%) |
| HIE, Infection During Pregnancy | 1(0.8%) |
| Asphyxia | 4 (3.0%) |
| Danny Walker | 1(0.8%) |
| TORCHS | 1(0.8%) |
| No Data | 2 (1.5%) |

Table 4.1.2.3 Data Distribution Based on Types of Cerebral Palsy

| Types of Cerebral Palsy | n |
|-------------------------|------------|
| Quadriplegia | 60 (45.5%) |
| Diplegia | 38 (28.8%) |
| Hemiplegia | 4 (3.0%) |
| Spastic | 24 (18.2%) |

| | |
|-------------|----------|
| Non Spastic | 2 (1.5%) |
| Hemiparese | 2 (1.5%) |
| Athetosis | 1(0.8%) |
| Dyskinetic | 1(0.8%) |

Table 4.1.2.4 Data Distribution by Comorbid

| Comorbid | n |
|-------------------------------|------------|
| Epilepsy | 49 (37.1%) |
| Microcephaly | 17 (12.9%) |
| Intellectual Disabilities | 9 (6.8%) |
| GDD | 7 (5.3%) |
| Hydrocephalus | 4 (3.0%) |
| Eating Disorders | 1(0.8%) |
| Danny Walker | 2 (1.5%) |
| West's syndrome | 1(0.8%) |
| Complex Febrile Seizures | 1(0.8%) |
| Congenital Cataract | 1(0.8%) |
| Contractur, Failure to Thrive | 1(0.8%) |
| No Data | (29.5%) |

Relationship of Speech Delay with Cerebral Palsy

After obtaining the research results, the next step is to test the hypothesis (Apriani, 2018). The hypothesis test in this study used Fisher's exact test, this is because the data were not normally distributed on the chi-square test. The following table describes the results of a hypothesis test on data on speech delay and cerebral palsy at Haji Medan Hospital.

Table 4.2.1. Relationship of Speech Delay with Cerebral Palsy

| | | frequency Late Speech | Frequency No Late Speech | Valid Percent |
|-----------------|--------------|--------------------------|-----------------------------|------------------|
| Valid p 0.03 | Quadriplegia | 59 | 1 | 45.5 |
| | Diplegia | 26 | 12 | 28.8 |
| | Hemiplegia | 1 | 3 | 3.0 |
| | Spastic | 16 | 8 | 18.2 |
| | Non Spastic | 2 | 0 | 1.5 |
| | Hemiparese | 0 | 2 | 1.5 |
| | Athetosis | 1 | 0 | .8 |
| | Dyskinetic | 1 | 0 | .8 |

| | | | |
|-------|-----|----|-------|
| Total | 106 | 26 | 100.0 |
|-------|-----|----|-------|

Based on table 4.2.1, the results of the hypothesis test to see whether there is a relationship between speech delay and cerebral palsy in children at Medan Haji Hospital, using the Fisher's exact test obtained a value of $p = 0.13$ ($p \text{ value} > 0.05$), this shows there is a significant relationship between speech delay and cerebral palsy in children at Haji Medan Hospital.

DISCUSSION

The results of this study found that 80.4% of children had speech disorders with a high distribution of the quadriplegia cerebral palsy type, reaching 45.5% compared to the types of diplegia and hemiplegia (Lin et al., 2018). Tanjung AS, which has conducted previous research, obtained higher results which reached 74.5%.

The results of this study found that the number of sample characteristics with an age range of 2 to less than 4 years reached 45 children. This number is more than the Tanjung AS study of 33 children. 3 The characteristics of the sample with male gender are more in this study. This is inversely proportional to the previous study sample by Suhaimi et al, which had more female sex.

The results of this study found that the number of children with cerebral palsy with comorbid epilepsy was 49 children. This number is higher than the previous study by Suhaimi et al with a total of 39 children. The US Cape study showed 31 children with comorbid epilepsy. There are 17 children with comorbid microcephaly. This number is less than the previous study by Suhaimi et al, with 33 children.

Cerebral palsy patients may experience uncontrollable movements and muscle spasms in the mouth (Guyton & Hall, 2006). So the functional capacity becomes low, the immune system deteriorates and energy expenditure is high. This will have an impact on children's speech development. 18 Research conducted by Schoelderle T et al shows that dysarthria that occurs in children with cerebral palsy is closely related to language development (Mei et al., 2014).

Examination of speech abilities in children with cerebral palsy is very complex because this occurs in several disorders, including language development (articulation), phonology, and dysarthria (Allison & Hustad, 2018). According to research by May Christina, et al. 82% of children aged 5 to 6 years with cerebral palsy have speech delays or speech disturbances. Dysarthria is the most common disorder

The results of this study found 80.4% of children with cerebral palsy exhibited some kind of speech disorder. Speech production involves breathing together with laryngeal, velopharyngeal and articulation movements, and any of these functions can be inhibited in cerebral palsy. 19 Motor disorders affecting speech include dysarthria/anarthria and dyspraxia/apraxia of speech. Dyarthria is characterized by slow, weak, imprecise and/or uncoordinated speech muscle movements

Apraxia/dyspraxia is characterized by disturbances in motor planning and speech movement programming. Speech ability is related to the type of cerebral palsy, gross motor function, the presence of mental retardation and the localization of developmental abnormalities and brain lesions. An association between cerebral palsy type and speech ability was reported by Andersen et al in a study in Norway. Ninety percent of children with unilateral

spastic cerebral palsy have normal or understandable speech, while 97% of children with dyskinetic cerebral palsy are severely impaired or unable to speak at all. Another study by Reilly Set showed that motor speech disorders are commonly experienced by children with cerebral palsy. It is estimated that 90% of children with cerebral palsy aged 5-6 years show motor speech deficits based on the VSS (Viking Speech Scale).

Abnormalities of speech muscle tone have been suggested to contribute to dysarthria. Spasticity is characterized by abnormalities in the tonic stretch reflex. Because speech and eating share a common oral structure, the strong association between oromotor dysfunction, dysphagia, and dysarthria in cerebral palsy is not surprising. Impaired range, speed, tone, and coordination of the muscles of the mouth can have implications for a child's ability to produce clearly articulated speech. Dysarthria, disturbances of neuromuscular control and speech execution, are frequently associated with oromotor dysfunction. Children may show involvement in one or all of the motor speech subsystems (respiration, phonation, articulation, resonance, and prosody). Dyarthria in cerebral palsy is caused by: Weakness of the muscles for speaking (speech muscles) Increased muscle tone (spasticity) Primitive reflexes or pathological reactions that impair articulation control Imbalanced oral reactions (positive or negative reactions).

Dyarthria that appears in children with mild cerebral palsy is a problem of articulation and consonant letters. More specifically at the phoneme level, these pediatric patients demonstrated inaccurate anterior lingual placement, reduced fricative and affricative precision and inability to achieve extreme positioning and articulation of vowel letters. Speech disturbances can range from mild articulation disorders to anarthria, and are most often found in children with spastic quadriplegia or athetosis (Gaillard et al., 2018).

CONCLUSION

There is a relationship between speech delay and cerebral palsy in children at RS Haji Medan. The distribution of speech delay mostly occurs in quadriplegia-type cerebral palsy. The frequency distribution of cerebral palsy is dominated by quadriplegia-type cerebral palsy. The most common comorbidity of children with cerebral palsy is epilepsy.

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