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Comparison of Nutritional Status and Quality of Life of Cerebral Palsy with and without Nasogastric Tube Use

Nurul Hidayah[1], Pudji Andayani[2], Khairiyadi[3], Arief Budiarto[4], Hanna Christina Sembiring[5], Nani Zaitun[6]

[1]Division of Neurology, Department of Paediatric, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia
[2]Division of Neonatology, Department of Paediatric, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia
[3]Division of Respirology, Department of Paediatric, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia
[4]Division of Child Development, Department of Paediatric, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia
[5]Department of Paediatric, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin
[6]Department of Internal Medicine, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia
Coresspondence Author: hidabella@yahoo.co.id

Abstract:

Cerebral palsy is a chronic disorder of the central nervous system that affects posture and muscle tone, usually occurring early in life. This disease is associated with muscle abnormalities, impaired coordination, and loss of selective motor control that reduces quality of life and causes dependence on others to assist them in daily activities. Neuromusculoskeletal disorders trigger many problems, including eating difficulties that affect the nutritional status. Evidence shows the successful use of NGT in overcoming malnutrition problems based on indicators of nutritional status and quality of life. This study aims to determine the difference in nutritional status and quality of life between cerebral palsy children who use NGT and those without NGT at Ulin Banjarmasin Hospital. The study was conducted using analytic observations with a cross-sectional approach. The sampling technique was purposive sampling. The results showed a significant difference between the quality of life of Cerebral Palsy children using NGT and those not using NGT with higher scores in the group of Cerebral Palsy children who did not use NGT.

Keywords: Cerebral palsy; Pediatric nutrition; Pediatric neurology; Pediatric nutrition; Quality of life

Introduction

Cerebral palsy (CP) is a motor disorder caused by brain damage that occurs before or during birth or in early childhood. It affects the control of body movement, balance, and coordination, with prevalence varying worldwide. CP is classified based on the type of motor impairment that occurs, including spastic, dyskinetic, ataxia, and mixed. Although no cure for CP has been found, research continues to seek a deeper understanding of pathophysiology and develop more effective therapeutic strategies.[1]

Clinical examination and imaging technologies such as MRI provide an increasing understanding of the brain areas involved in the pathogenesis of CP. However, the complexity of this condition requires a multidisciplinary approach involving pediatricians, neurologists, orthopedists, and physical therapists.[2]

As one of the leading causes of motor disability in children, CP also has significant social, emotional, and economic impacts. Technological advances and medical interventions have increased life expectancy for individuals with CP. However, long-term care and ongoing rehabilitation needs remain challenges. Therefore, research needs to focus on identifying risk factors, developing innovative therapies, and improving the quality of care.[3]

Recent research highlighted the role of genetic and environmental factors in the development of CP, suggesting that the causes of the disease are more complex than mechanical factors during birth. Factors such as preterm birth and intrauterine infection can worsen outcomes in children at high risk for CP. In recent decades, molecular research has provided new insights into these factors.[4]

Among the many medical challenges faced by children with CP, nutritional problems are often a factor that interferes with their quality of life and development. Children with CP often face difficulties in eating and swallowing (dysphagia), leading to the risk of malnutrition. In addition, abnormal muscle tone and mobility limitations can worsen their nutritional status.[5] Therefore, monitoring and managing the nutritional status of children with CP is very important to support their growth and development.

One standard method to overcome feeding problems in children with CP is using a nasogastric tube (NGT). NGT is a medical device inserted through the nose into the stomach to give direct nutrition to children who cannot eat orally. NGT can help prevent malnutrition and dehydration. However, the use of NGT also carries challenges, including the risk of infection, respiratory tract irritation, and psychosocial problems for the child and family.[6] Nevertheless, NGT remains an important option in the nutritional management of children with CP, especially for those who have difficulty eating and digesting food normally.

Managing nutritional status in children with CP includes improving food intake and optimizing their neurological and motor development. Several studies have shown that malnutrition can affect brain development and cognitive function in children with CP, which in turn can worsen their motor limitations. Therefore, a more holistic approach to CP management, which includes proper nutritional monitoring, is highly recommended to support the quality of life of these children.[7]

Research Method

This study is an observational analytical study with a cross-sectional approach to a group of children with CP who use NGT and a group of children with CP who do not use NGT.

This study's subjects were all cerebral palsy patients who came for treatment at the Pediatric Outpatient Clinic in Ulin General Hospital and met the inclusion and exclusion criteria. A total of 34 study subjects were selected by consecutive sampling.

The research procedure includes measuring nutritional status by measuring weight and height, and then the data is

entered into the WHO curve (if the child is <5 years old) or the CDC curve (if the child is >5 years old). Quality of life is assessed by filling out the Quality-of-Life Questionnaire for Children (CP QOL-Child) Primary Caregiver Questionnaire, translated into Indonesian and filled out by parents or primary caregivers who live with the research respondents. The assessment in this questionnaire includes aspects of well-being and social acceptance, feelings about participation and physical health, emotional well-being and self-esteem, access to services, pain and the impact of disability, and family health. The results are classified into good and poor quality of life.

Primary data (identity, nutritional status, interpretation of the CP QOL-Child Primary Caregiver Questionnaire) were summarized and analyzed using SPSS software version 26. If the data is usually distributed, statistical analysis is continued using the SPSS program

Results

The collected research respondent data were tabulated and statistically tested using SPSS. The normality test with Monte Carlo showed that the data was normally distributed. The homogeneity test showed that the data was homogeneous. Furthermore, the Two Way Anova test was conducted to show the relationship between variables in each respondent group. The results showed: (1) There is a significant difference in the quality of life based on the use of NGT or not; (2) There is no significant difference in the quality of life of children with CP based on their nutritional status; (3) There is no interaction between the use of NGT or not and nutritional status in determining the quality of life of children with CP .

Table 1 Respondent's descriptive data

NGT	BMI	Mean	Std. Deviation	N
Without NGT	Wasted or severely wasted	524.54	52.587	13
	Normal	555.25	60.085	12
	Obese	552.67	52.501	3
	Total	540.71	56.034	28
With NGT	Wasted or severely wasted	476.50	71.418	2
	Normal	466.00	27.580	4
	Total	469.50	38.806	6
Total	Wasted or severely wasted	518.13	54.958	15
	Normal	532.94	66.278	16
	Obese	552.67	52.501	3
	Total	528.15	59.636	34

Table 2 Correlation test between-subjects effects using Two-Way Anova Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	31571.617[a]	4	7892.904	2.668	.052
Intercept	4061360.351	1	4061360.351	1372.839	.000
NGT	20706.387	1	20706.387	6.999	.013
BMI	890.571	2	445.286	.151	.861
NGT * BMI	1865.838	1	1865.838	.631	.434
Error	85792.647	29	2958.367		
Total	9601301.000	34			
Corrected Total	117364.265	33			

a. R Squared = .269 (Adjusted R Squared = .168)

Discussion

Cerebral palsy (CP) is a motor disorder caused by brain damage that occurs in the infant period or childhood. Children with CP often face nutritional challenges, primarily due to difficulty in eating and swallowing (dysphagia). One standard medical solution is using a nasogastric tube (NGT), which delivers nutrition directly into the child's stomach. Although NGT can ensure adequate nutritional intake in children with CP who are unable to eat orally, its use has the potential to affect the quality of life of these children, both physically, psychosocially, and socially. Several studies have shown that children with CP who do not use NGT have a higher quality of life, especially related to social and psychological aspects, due to their ability to eat orally and participate in social activities.

Children with CP who use NGT often face challenges in terms of comfort and quality of life. Although NGT is important to ensure adequate nutritional intake, its use can cause various physical problems, such as respiratory tract irritation, infections, and discomfort. In addition, dependence on NGT can limit children's ability to enjoy mealtime experiences with family or friends, contributing to a decreased psychosocial quality of life. These limitations also have the potential to exacerbate feelings of anxiety and depression in children and their families, given that mealtime is an essential social activity in children's development. Therefore, children who do not use NGT often have more positive social experiences, contributing to a better quality of life.[8]

One significant aspect of the quality of life of children with CP is family involvement in social activities, including eating together. Children who do not use NGT tend to have more opportunities to participate in social activities, such as eating with family or friends, which can strengthen interpersonal relationships and improve their emotional well-being. In contrast, children with CP who use NGT often feel isolated or awkward when eating because they may feel different from their peers who eat orally. Involvement in social activities and more intense interactions with family can improve children's psychological aspects, improving their overall quality of life.[9]

Long-term use of NGT can cause several complications that negatively impact the quality of life. Research shows that long-term dependence on NGT can hinder the development of children's feeding skills, which are essential for their independence. Children who rely on NGT may not develop the fine motor skills needed for oral feeding, which can reduce their quality of life as they grow older. In addition, NGT placement can interfere with enjoyable feeding experiences and can increase family stress, especially in the context of ongoing dependence on medical care.[10]

Although proper nutritional management is essential in supporting the growth and development of children with CP, this study's results indicate no significant difference in quality of life between children with good and poor nutritional status. This may be due to other factors that are more dominant in determining the quality of life of children with CP, including the level of motor disability, social limitations, and psychological conditions, which are more influential than nutritional status.

The nutritional status of children with CP is often a significant concern in their medical care, as malnutrition can worsen their physical and neurological conditions. However, several studies have shown that although nutritional status can contribute to physical aspects, physical limitations caused by motor disorders are more critical in determining their quality of life. Children with CP, whether they have good or poor nutritional status, often struggle with significant challenges in terms of mobility

and motor function. Severe motor disorders can limit their ability to participate in daily activities and social interaction, which are key factors in determining quality of life. Therefore, although good nutritional status can help support physical growth, motor factors remain the main differentiator in their quality of life.[8]

In addition to physical factors, psychosocial aspects also play an essential role in the quality of life of children with CP. Limitations in motor skills can cause children with CP to feel isolated or frustrated, which can affect their mental health. Research shows that the quality of life of children with CP is often influenced by their feelings about their disability and their ability to interact with peers and family. Children with good or poor nutritional status may experience similar levels of anxiety or depression, depending on the level of social limitations they struggled with. For example, children with CP who are unable to participate in physical activities or who frequently feel anxious about their physical differences may experience a significant decline in quality of life, even though they have good nutritional status.[9]

One reason there is no significant difference in QoL between children with CP with good and poor nutritional status is that QoL measurements are subjective and can vary by individual. QoL assessments often include physical, social, and emotional well-being, which are influenced by many factors besides nutritional status. For example, children with CP who have good dietary status but have severe motor impairments or an inability to communicate effectively may still feel that their QoL is limited. On the other hand, children with poor nutritional status who have better motor skills or more substantial social support may report a higher QoL. Therefore, these factors often influence QoL in children with CP more than their nutritional status.[11]

Managing the quality of life of children with CP requires a holistic approach that includes physical, psychological, and social aspects. Although ensuring good nutritional status is essential to support children's physical health, care focusing more on physical rehabilitation, psychosocial support, and family-based therapy may significantly improve their quality of life. Several studies have shown that interventions involving physical therapy, emotional support, and activities involving family and friends can significantly impact the quality of life of children with CP than relying solely on managing nutritional status.[11] Therefore, although nutritional status plays an important role in physical health, psychosocial factors, and motor rehabilitation remain the main determinants in improving the quality of life of children with CP.

Conclusions

Although nutritional status and NGT use were associated with improved physical status in children with CP, this research shows that there was no significant interaction between these factors in determining their quality of life. The quality of life of children with CP is more influenced by other factors, including the level of motor disability, psychosocial aspects, and the social and medical support they receive. Therefore, comprehensive management that includes physical rehabilitation, psychological support, and social interventions is essential in improving the quality of life of children with CP, both groups of those who use NGT or not.

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