



Nutritional Status and Gross Motor Skills: Study of children in coastal areas

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Abstract: This study examines the relationship between nutritional status and gross motor development in children aged 1-3 years in coastal areas with limited economic and infrastructure conditions. The aim of the study was to evaluate the correlation between nutritional status and gross motor abilities. A cross-sectional design with correlation analysis was employed. Data were collected through anthropometric measurements of nutritional status and gross motor skills assessment using the Pre-Development Questionnaire (KPSP). Results indicated that 50% of children were malnourished, while 33.3% showed deviations in gross motor skills. The correlation between nutritional status and gross motor development had a coefficient of 0.75, indicating a strong relationship. The t-test revealed a significant association ($t = 5.136$; $t\text{-table} = 1.701$). The conclusion of this study is that poor nutritional status negatively impacts children's gross motor development, whereas good nutritional status supports optimal physical and motor development. Recommendations include enhancing attention to children's nutritional intake and providing appropriate stimulation, along with further research to explore additional factors influencing gross motor development.

Keywords: Coastal Areas; Gross Motor Skills; Nutritional Status

Introduction

All life, from birth to death, has its own stages. Children have characteristics that continue to develop from conception until the end of puberty. When a baby is three months old in the womb, the growth and development process begins and continues until the child is three years old, which is known as the golden age (Untung et al., 2023). At this age, the child forms himself. At this age, children begin to form themselves. Cognitive and emotional development at an early age is very important for children's growth and development (Alwaely et al., 2021). Many factors influence a child's development, including parental genetics and

environmental factors, stimulation, hormonal influences and good nutrition (Illahi et al., 2023). Adequate nutrition is very necessary for the growth and development of children (Rahmad et al., 2022; Welis & Rosmaneli, 2018) This is due to the fact that this is a formative phase, and if children lack the necessary nutrition, they are likely to experience nutritional disorders (Saavedra & Prentice, 2023). Apart from that, it is very important to pay attention to the health and nutrition of children because they will become the nation's next generation who are very healthy, smart and strong (Ismaniar et al., 2019).

Based on the results of the 2022 Indonesian Nutritional Status Survey (SGSI), data on the prevalence

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of children with underweight in 2022 in Indonesia is 17.1% (Kementerian Kesehatan Republik Indonesia, 2023). This figure is 0.1% higher than in 2021 which reached 17%. In West Sumatra Province, the prevalence of children with malnutrition status in 2022 will decrease to 7.5% from 2021 which reached 18.1% (Kementerian Kesehatan Republik Indonesia, 2023). However, the prevalence of child nutrition in coastal areas has never been studied based on existing references.

Coastal communities are local communities live in coastal areas where most of them are fishermen has different characteristics from other communities (Ade Gafar Abdullah et al., 2017; Bhattacharya et al., 2023; Kabir et al., 2020). This difference is due to the close relationship with characteristics regional economy, cultural background and availability of supporting facilities and infrastructure. In general, coastal communities has a culture that is oriented in harmony with nature so technology utilizing natural resources is technology adaptive to coastal conditions (Eliska et al., 2021). Coastal areas are areas that has unique characteristics, problems and complex. Fisherman's residential area in Coastal areas in general are areas shabby with the level of service will be fulfillment of basic infrastructure and facilities needs very limited environment, especially limitations to obtain facility services clean water, drainage and sanitation, and infrastructure and means to support health (Manaf et al., 2022). The majority of coastal communities live with livelihood as fishermen and divers traditional. Fishermen's welfare in generally very minimal and synonymous with poverty. Problems faced Fishing communities are very complex, one of which concerns their income. It cannot be denied that family income will also determine the meals served to the family every day, both the quality and quantity of meals. However, the assumption should be put aside that food that meets nutritional requirements can only be served in families with sufficient income.

In the early stages, development and growth determine further development. Gross motor development is part of body posture that involves large muscles and is one of the parameters of child development (Pitnawati et al., 2023). Children's gross motor development is very important for their survival because children's movements which are influenced by the nerve muscles themselves, such as walking, running and jumping, can be disrupted if their development is hampered which are influenced by the nerve muscles themselves, such as walking, running, jumping (Ockta et al., 2024). Nutrient absorption is very important for gross motor development because nutrition must be balanced and satisfying (Handayani, 2020; Handayani et al., 2022). This research was carried out because there were no records regarding children around coastal areas

and the relationship between children's nutritional status and their gross motor development in coastal environments.

This research aims to find out how the gross motor development of children in coastal areas correlates with their nutritional status. One of the advantages of this research is that it can provide health practitioners with knowledge about gross motor developmental disorders. The results of this research can be used as a basis or source of data for further research and as motivation for parties who wish to conduct further research, especially those related to children in coastal areas.

Method

In this research, correlation analysis is used. This is a way of research that looks at the relationship between two variables in a particular situation or group (Kumar & Chong, 2018). This research uses a cross-sectional method, which means that the independent variable and dependent variable data are only measured or observed once, namely at the time of measurement. This research was conducted to determine the relationship between nutritional status and gross motor skills of children aged 1-3 years. To obtain research material, the next data collection method uses tests and direct measurements on samples. The test carried out is a nutritional status measurement test, a tool for measuring nutritional status using anthropometric tests and gross motor skills using the Developmental Pre-Screening Questionnaire instrument (KPSP) (Atmanegara et al., 2022; Wahidin., 2017).

Before testing the hypothesis, a prerequisite test is carried out. Researchers must ensure that the data analyzed is normally distributed, which means the normality test uses the chi square formula and the homogeneity test uses the f test (Kocsis et al., 2020). The method used to analyze research data in order to prove the truth of the hypothesis proposed in this research is the statistical analysis method with correlation techniques. The statistic used to test the truth of the hypothesis proposed is product moment.

Result and Discussion

Nutritional status is defined as the healthy state of a person or group as determined by the level of their physical and energy needs. The test carried out is a nutritional status measurement test, a tool for measuring nutritional status using anthropometry and assisted by local health center health workers. The frequency distribution table shows the results (Table 1).

Table 1. Frequency Distribution of Children's Status in coastal areas

Nutritional Norms	Frequency	%
Good Nutrition	5	16.7
Moderate Nutrition	10	33.3
Malnutrition	15	50.0
Total	30	100

The Pre-Developmental Screening Questionnaire (KPSP) is a child development examination that is used to identify developmental disorders in children from an early age. The goal is to find out whether the child's development is normal or not. The results of the gross motor skills of the Anak Dalam Tribe children can be seen in (Table 2).

Table 2. Distribution of Gross Motor Frequency of children in coastal areas

Ability Level	Frequency	%
In accordance	2	6.7
Doubtful	18	60.0
Deviation	10	33.3
Total	30	100

Then from Table 3, it is known that $X_{count} < X_{table}$. This shows that the data from one experimental group studied has a normal distribution. Then from table 20 above, the F_{count} value = 1.18, while the F_{table} value at the significant level is $\alpha = 0.05 = 1.66$. The result of F_{count} is 1.18 and F_{table} is 1.66, meaning it is homogeneous. Based on table 5, the calculated r value is 0.75, meaning the correlation coefficient has a strong relationship. To find out more about the closeness of the relationship between these two variables, then based on table 6 above, the results of the t test calculation show that the value of $t = 5.136 > t_{table} 1.701$ means that H_a is accepted. Therefore, the gross motor skills of children aged between 1-3 years are closely related to their nutritional status.

Table 3. Normality Test

N	Nutritional status		Rough motoric		Information
	Xcount	Xtable	Ycount	Ytable	
30	8.77	11.07	10.58	11.07	Normal Distribution

Table 4. Homogeneity Test

N	Variable		Information
	Fcount	Ftable	
30	1.18	1.66	Homogeneous

Table 5. Results of r-test calculations

r count	Coefficient Interval	Criteria
0.75	0.69=0-0.79	Strong

Table 6. T-test calculation results

Dk (n-1)	Tcount	Ttable	Criteria
29	5.136	1.701	There is a Relationship

If children have poor nutritional status, they will experience slower growth and development because there is an imbalance between the amount of nutritional intake received by the body, especially the brain, and the child's growth and development will be disrupted (Raibowo et al., 2023). Thus, good nutritional status helps children be healthy and prevent disease.

Gross motor skills require good brain and muscle activity, so the body needs very good nutrition. This is in accordance with theory (Rahmad et al., 2022), that children who receive adequate nutrition tend to be more active, while children who receive poor nutrition can experience developmental disorders because it affects brain development and their level of intelligence (Yunita, 2021).

Food consumption and health level influence nutritional status (Galgamuwa et al., 2017; Saavedra & Prentice, 2023). Apart from the factors above, nutritional status is also influenced by other factors such as the economy work, social, and culture. In this study, researchers saw that the factors above greatly influence the nutritional status of children in coastal areas.

In addition, the research results show that there is a significant correlation between toddlers' gross motor development and nutritional status. This is because every movement requires muscle contraction and relaxation, ATP energy produced from the metabolism of energy-forming substances (carbohydrates, fats & proteins) is needed for contraction and relaxation (Kato et al., 2019; Komaini et al., 2023). While the heart and lungs require additional energy to transport nutrients and oxygen throughout the body, muscles require additional energy from metabolism to move during physical activity (Sangadah, 2022).

Observation results show that some of the respondent parents do not know much about their children's development. Education and the surrounding environment are related to this. Some parents follow their children's wishes by giving them food without paying attention to its nutrition. For example, when children are growing up, children prefer snacks that do not have nutritional labels over the very important vegetables. Smart parents don't always give in to their children's wishes just because they don't want them to cry. The solution to this problem is to teach parents as early as possible about good nutrition for children so that they get used to consuming nutritious food since preschool education. Apart from that, parents must be firm in meeting their children's nutritional needs to

support their motor development and be the best they can be at their age.

The research results also found children with good nutritional status but impaired motor development and children with poor nutritional status but whose motor development was questionable. This happens considering that apart from nutritional status, there are other factors that influence children's motor development, such as stimulus. Stimulus is stimulation that comes from the environment outside the individual child (Handayani et al., 2022; Sin & Cahyani, 2022). Children who receive a lot of stimulation will develop more quickly than children who receive little or no stimulation. Stimuli also function as reinforcers. Stimulus will work better if the child's needs are taken into account according to their developmental stages. This is due to the fact that parents do not realize the importance of stimulation for children, especially between the ages of 1-3 years (golden age). Children must have motor skills that are not unequal so that they can be involved in various play activities and enable social interaction processes (Tantowi et al., 2021).

The role of health workers is very necessary, because not all parents get the right information about their child's development (Welis et al., n.d.; Welis & Rosmaneli, 2018). Considering the differences in educational background and economic status of parents. The better the stimulation measures given to the child, the more normal and appropriate the results of the child's motor development will be (Nur Kholifah et al., n.d.; Pang et al., 2014).

Conclusion

From the results of the research above, it can be concluded that poor nutrition affects children's gross motor skills, especially stunted growth and development. Having good nutritional status will have an impact, including having good physical fitness and preventing various types of diseases. Apart from nutritional status, further research can look at other variables that can influence the development of gross motor skills, such as the environment and others. Furthermore, families must pay more attention to children's nutritional intake so that they can grow and develop well and healthily and provide stimulation during the child's development.

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Author Contributions

Riska Ramadani Lasri is the lead author of this study responsible for all writing processes. Septian Raibowo interprets data analysis form statisticians. Indri Wulandari contributed to the interpretation and drew conclusions. Tjung Hauw shin, Wilda Welis and Sri Gusti Handayani refines data analysis.

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Conflict of Interest

The content of this article does not create a conflict of interest.

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