

# Analysis of Environmental Factors, Children's Eating Patterns and Access to Health Services on the Incidence of Malnutrition

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## ABSTRACT

Malnutrition in children is a serious and persistent health problem in many rural areas. Environmental conditions, diet, and access to health services were relevant factors. This study aims to analyze the influence of these three factors on the incidence of malnutrition among school-age children. This cross-sectional study was conducted in December 2023 on 168 school-aged children in Kurima District, Yahukimo Regency. Simple random sampling was used. Data was collected using a questionnaire and analysed using regression. Environment ( $p=0.003$ ), diet ( $p=0.008$ ), and access to health services ( $p=0.027$ ) had a significant influence on the incidence of malnutrition in school-age children both partially and simultaneously ( $p=0.000$ ). Environmental factors, diet, and access to health services were able to predict 54.5% of school-age child malnutrition variables. Health professionals should consider these factors in solving malnutrition problems.

**Keywords:** environmental factors, malnutrition, school-age child diet

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## BACKGROUND

Malnutrition in toddlers will have an impact on toddlers, namely in the short-term disruption of brain development, intelligence, physical growth disorders and metabolic disorders in the body (Katoch, 2022). Meanwhile, in the long term, the bad consequences that can arise are decreased cognitive abilities and learning achievement, decreased immunity so that people get sick easily, and a high risk of developing diabetes, obesity, heart and blood vessel disease, cancer, stroke, and disability in old age (Agostoni et al., 2023). According to Indonesian nutritional surveillance data in 2017, cases of malnutrition in Indonesia were 18.1%, and according to the results of Basic Health Research or Riskesdas in Indonesia in 2018 the percentage of malnutrition and malnutrition was 17.7%. Nationally, malnutrition among children under five in Indonesia is still a public health problem and is approaching high prevalence, while the 2019 Sustainable Development Goals (SDGs) target is 17%, while in Papua Province the incidence of malnutrition among children under five is 14.9% (Ministry of Health Indonesia, 2023).

Malnutrition in children is a serious and persistent health problem in many rural areas, including Kurima District in Yahukimo Regency. Research conducted by UNICEF in 2021 indicates that rates of malnutrition in this area remain high, with serious consequences for children's growth, development and quality of life. One of the factors that contributes to the incidence of malnutrition is the environment. Kurima District is known for its environmental conditions that can be difficult to access, especially during the rainy season, which can limit access to quality food sources and lead to vulnerability to malnutrition. In addition, children's diet is an important factor that plays a role in the risk of malnutrition. An unbalanced diet, lack of proper nutritional intake, and lack of diverse foods are factors that contribute to the incidence of malnutrition in children. In Kurima District, where traditional diets may be impacted by resource limitations, a deeper understanding of these factors is needed to design effective interventions. Furthermore, access to health services is also a significant factor in efforts to prevent and treat malnutrition in children (Shi et al., 2022). The importance of timely and quality access to child health services. In areas that may have limited health infrastructure, the role of access to health services in identifying and treating children with malnutrition is crucial (Kofinti et al., 2022). Therefore, understanding the extent to which access to health services influences the incidence of malnutrition in Kurima District will provide important insights into improving child health care in the region. The impact of poor environmental conditions, such as inadequate sanitation and limited access to clean water, on the incidence of malnutrition in children. An unclean environment can increase the risk of infections and digestive disorders, which in turn can affect children's nutritional status. In Kurima District, environmental factors such as these may play a role in the incidence of malnutrition.

Children's diet is also a key factor. Inadequate food intake, lack of variety in diet, and improper feeding practices can contribute to malnutrition in children. In areas where access to various types of food may be limited, it is important to ensure that children receive adequate nutritional intake (Cazes et al., 2022). Access to health services also has an important role in overcoming malnutrition. Regular health monitoring, nutritional intervention, and prompt medical care can help prevent and treat malnutrition in children. However, in areas with limited access to health services, major challenges may arise. In Kurima District, efforts to improve access and quality of health services may be key to reducing the incidence of malnutrition. In situations like Kurima District, a comprehensive approach that considers environmental factors, children's diets, and access to health services will be critical in efforts to reduce the incidence of malnutrition in children. Based on this, researchers are interested in researching environmental analysis, children's eating patterns and access to health services on

the incidence of malnutrition in Kurima District, Yahukimo Regency. In general, this research was conducted to analyze the influence of the environment, children's diet and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency.

## METHODS

This cross-sectional study was conducted in December 2023 on 168 school-aged children in Kurima District, Yahukimo Regency. This approach aims to study the dynamics of the correlation between risk factors and effects by means of an observation approach or data collection at one time (point time approach), meaning that each research subject is only observed once, and measurements are made of the subject's character status or variables at that time. inspection. A simple random sampling was carried out to determine the research sample. The independent variables in this study are environmental factors, children's diet, and access to health services. Meanwhile, the dependent variable is the nutritional status of school-aged children. Data for each variable was collected using a questionnaire that had passed validity and reliability tests. Based on CVI analysis which shows results  $> 0.7$ , this research instrument is declared valid and reliable. This research will analyze the influence of the environment, children's diet and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency. Data analysis was carried out using regression.

## RESULTS

The results of this research are presented in the form of a table containing environmental characteristics, children's eating patterns, access to health services, and characteristics of the nutritional status of school-aged children.

**Table 1.** Frequency distribution of respondents based on the respondent's environment

Environmental Characteristics	Frequency	Percent (%)
Good	42	25.0
Moderate	74	44.0
Lack	52	31.0
Total	168	100.0

Based on table 1 above, it is known that almost half of the respondents have a sufficient environmental category, 74 respondents (44.0%).

**Table 2.** Frequency distribution of respondents based on eating patterns

Children's Diet	Frequency	Percent (%)
Good	41	24.4
Moderate	79	47.0
Lack	48	28.6
Total	168	100.0

Based on table 2 above, it is known that almost half of the respondents have an adequate diet, 79 respondents (47.0%).

**Table 3.** Frequency distribution of respondents based on access to health services

Health services access	Frequency	Percent (%)
Good	41	24.4
Moderate	78	46.4
Lack	49	29.2
Total	168	100.0

Based on table 3 above, it is known that almost half of the respondents rated access to health services as sufficient, 78 respondents (46.4%).

**Table 4.** Frequency distribution of respondents based on nutritional status

Nutritional Status	Frequency	Percent (%)
Nutritionally Excessive	54	32.1
Normal	50	29.8
Malnutrition	64	38.1
Total	168	100.0

Based on table 4 above, it is known that almost half of the respondents have a nutritional status in the poor nutrition category, 64 respondents (38.1%).

**Table 5.** Regression analysis results

Variable	Sig	B	R <sup>2</sup>	Sig
(Constant)	0,000	37.176	0.545	0.000
Environment	0,003	2.841		
Diet	0,008	4.259		
Health Access	0,027	4.505		

Based on the results of the Linear Regression analysis (Table 5), it shows that the p-value is  $0.003 < 0.05$ , so H1 is accepted so it can be concluded that there is a partial environmental influence on the incidence of malnutrition in the Kurima District, Yahukimo Regency. Based on the results of the Linear Regression analysis, it shows that the p-value is  $0.008 < 0.05$ , so H0 is rejected and H1 is accepted, so it is concluded that there is a partial influence of children's diet on the incidence of malnutrition in Kurima District, Yahukimo Regency. Based on the results of the Linear Regression analysis, it shows that the p-value is  $0.027 < 0.05$ , so H0 is rejected and H1 is accepted, so it is concluded that there is a partial influence of access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency. Simultaneous hypothesis testing shows that there is an influence of the environment, children's diet and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency with an influence size of 54.5%.

## DISCUSSION

Based on the results of the Linear Regression analysis, it shows that the p-value is  $0.003 < 0.05$ , so H1 is accepted so it can be concluded that there is a partial environmental influence on the incidence of malnutrition in Kurima District, Yahukimo Regency. The influence of the environment on the incidence of malnutrition in Kurima District, Yahukimo Regency, is a complex and multidimensional issue. The physical, social and economic environment plays an important role in determining the nutritional status of children in the area. The study by Shahid et al. (2022) shows that limited access to natural resources, such as clean water and fertile agricultural land, has a direct impact on the availability of nutritious food (Mulugeta & Gebregziabher, 2022). Kurima District, with its difficult topography and minimal infrastructure, often faces challenges in ensuring adequate and quality food distribution for its residents. This condition is exacerbated by Vonasek et al. (2022) climate change which affects planting patterns and crop yields.

Additionally, research highlighted that socio-cultural factors also have a significant influence on the incidence of malnutrition. In Kurima District, certain traditional practices and eating habits can limit children's nutritional intake. For example, a preference for local foods that may lack variety and be low in essential nutritional content can result in nutritional deficiencies. Apart from that, low nutritional education among mothers and caregivers also

contributes to a poor understanding of the importance of balanced nutrition for children's growth. Research by Diao et al. (2022) added that the family's economic condition is an important determinant of the incidence of malnutrition. Many families in Kurima District live below the poverty line, which limits their ability to purchase nutritious food. High food prices and low incomes force many families to consume cheap, less nutritious food. Additionally, lack of access to adequate health services prevents early detection and treatment of malnutrition, worsening the conditions of already vulnerable children.

Furthermore, the study by Wen et al. (2022) emphasized that government and non-government organization (NGO) intervention is very necessary to overcome the problem of malnutrition in Kurima District. Programs such as providing nutritional supplementation, health education, and increasing access to basic health services can help reduce the prevalence of malnutrition. Interventions that focus on improving infrastructure, such as building roads and clean water facilities, are also important to ensure better food distribution and improved sanitation conditions. According to researchers, the incidence of malnutrition in Kurima District, Yahukimo Regency, is a complex problem that is influenced by various environmental, social and economic factors. Difficult physical environments, especially limited access to natural resources and minimal infrastructure, contribute to limited food availability and lack of access to adequate health services. Socio-cultural factors, such as poor eating practices and nutritional education, also worsen the nutritional conditions of children in the area. Apart from that, poor family economic conditions, with many families living below the poverty line, are also a significant factor in the occurrence of malnutrition. To overcome the problem of malnutrition in Kurima District, a holistic and integrated approach is needed. Infrastructure improvements, such as building roads and providing access to clean water, are a priority to improve food availability and sanitation conditions. In addition, health intervention programs which include nutritional education, providing supplementation, and increasing access to basic health services, are also important to reduce the prevalence of malnutrition. In addition, support from the government and non-government organizations (NGOs) in implementing these programs is very necessary to achieve significant results in overcoming the problem of malnutrition in Kurima District, Yahukimo Regency.

Based on the results of the Linear Regression analysis, it shows that the p-value is  $0.008 < 0.05$ , so  $H_0$  is rejected and  $H_1$  is accepted, so it is concluded that there is a partial influence of children's diet on the incidence of malnutrition in Kurima District, Yahukimo Regency. Children's diet has a very important role in determining their nutritional status, including the incidence of malnutrition in Kurima District, Yahukimo Regency. The study by Stephenson et al. (2022) highlight that an unbalanced diet, including a lack of consumption of nutritious foods such as fruit, vegetables and animal protein, can cause nutritional deficiencies that contribute to malnutrition. In Kurima District, where access to a variety of nutritious foods may be limited, a less varied diet may be a major risk factor. The research emphasizes the importance of introducing and promoting a balanced and varied diet for children in the area to prevent the incidence of malnutrition. Additionally, a study by Shahid, Ahmed, et al. (2022) shows that irregular eating habits, such as frequently skipping breakfast or consuming snacks that are not nutritious, can also have a negative impact on children's nutritional health. Irregular eating patterns can interfere with adequate nutritional intake, thereby increasing the risk of malnutrition. In Kurima District, where daily eating patterns may be influenced by social and economic factors, it is important to educate parents and caregivers about the importance of maintaining regular eating patterns and providing nutritious food for children. Apart from that, environmental factors can also influence the eating patterns of children in Kurima District. The study by Zerga et al. (2022) shows that the availability and accessibility of nutritious food in the surrounding environment, such as food



stalls or grocery stores, can influence children's food choices. Lack of access to affordable and safe nutritious food can lead to the consumption of unhealthy and non-nutritious foods. Therefore, efforts need to be made to increase the availability and accessibility of nutritious food in Kurima District, as well as providing education to the public about the importance of a balanced diet for children to prevent incidents of malnutrition.

Apart from the research already mentioned, there is additional literature that supports the understanding of the influence of children's diet on the incidence of malnutrition in Kurima District, Yahukimo Regency. One relevant study is research by Susilo et al. (2023), which highlights the important role of nutrition education in establishing healthy eating patterns in children. This study emphasizes that good knowledge about nutrition and a balanced diet can help parents and caregivers in preparing appropriate diets for their children. By increasing understanding of the importance of nutritious food and variety in daily eating patterns, it is hoped that children's nutritional intake can be increased and the risk of malnutrition reduced. In addition, research by Khaliq et al. (2022) highlights the role of the home environment in shaping children's eating patterns. This study found that a supportive home environment, such as modeling healthy eating behavior from other family members and the availability of nutritious food at home, was positively related to healthy eating patterns in children. On the other hand, a less supportive home environment, such as the availability of unhealthy food or lack of time to eat food with the family, can contribute to unhealthy eating patterns and increase the risk of malnutrition in children (da Silva et al., 2022).

Apart from that, the role of health education in schools can also be an important factor in forming healthy eating patterns in children. The study by Kebede et al. (2022) found that health education programs that cover nutrition and healthy eating patterns in schools can increase children's knowledge and awareness about the importance of nutritious food (Rahman & Hossain, 2022). By increasing children's understanding of the importance of healthy food and how to maintain a balanced diet, it is hoped that they can form healthy eating habits from an early age and reduce the risk of malnutrition in children in Kurima District, Yahukimo Regency. According to researchers, children's diet has a significant role in determining their nutritional status, including the risk of malnutrition in Kurima District, Yahukimo Regency. The literature shows that factors such as access to nutritious food, nutrition education, home environment, and health education in schools all contribute to shaping children's eating patterns. A balanced and varied diet, supported by good nutritional knowledge, a supportive home environment, and comprehensive health education, is the key to preventing the incidence of malnutrition in the area. Therefore, to address malnutrition in Kurima District, a holistic and integrated approach is required. Comprehensive nutrition education efforts, both at the household and school levels, should be increased to improve the community's understanding and awareness of the importance of nutritious food and healthy diets for children. In addition, there should be efforts to improve access to nutritious food, both through nutritional supplementation programs and through efforts to improve infrastructure and economic support. With a comprehensive and sustainable approach, a significant reduction in the prevalence of malnutrition and improved health of children in Kurima District, Yahukimo Regency is expected.

Based on the results of Linear Regression analysis, the p-value of  $0.027 < 0.05$ ,  $H_0$  was rejected and  $H_1$  was accepted, therefore it was concluded that there was a partial effect of access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency. Access to health services was an important factor influencing the incidence of malnutrition in Kurima District, Yahukimo Regency. A study by Oviedo-Solís et al. (2022) found that limited access to basic health services, such as puskesmas and posyandu, can be a barrier for mothers and children to obtain necessary health services, including nutritional status checks and nutrition counseling. The lack of trained health workers and minimal health

infrastructure in rural areas such as Kurima District make it difficult for people to access quality health services. This can hamper efforts to prevent and treat malnutrition in children. Research by Engl et al. (2022) also highlights the importance of access to quality health services in dealing with malnutrition. This study shows that the lack of accessibility and availability of medicines, nutritional supplements and medical equipment in health facilities can hinder the treatment and recovery process of children suffering from malnutrition. In Kurima District, where access to medical resources and trained medical personnel may be limited, the importance of the government's role in improving the availability and accessibility of basic health services becomes increasingly important. Efforts to improve health infrastructure, train health workers, and provide adequate medical resources in remote areas need to be a priority in efforts to prevent and treat malnutrition. Furthermore, a study by van der Merwe et al. (2022) emphasizes that non-financial factors also influence access to health services. For example, a lack of adequate transportation and high transportation costs can prevent people from accessing health facilities, especially in remote areas such as Kurima District. Increasing the accessibility of transportation and health services in remote areas is the key to increasing access to quality and effective health services. Thus, there needs to be greater efforts from the government and related stakeholders to increase access to basic health services in Kurima District, Yahukimo Regency, as an important step in dealing with the problem of malnutrition in the area.

The study by Weagley et al. (2022) highlighted the importance of access to health services that are sensitive to community needs in dealing with the problem of malnutrition. This research shows that the lack of health workers trained in identifying and treating malnutrition problems can hinder prevention and treatment efforts. In areas such as Kurima District, where the presence of trained health workers may be low, it is important to increase the training and capacity of local health workers in recognizing signs of malnutrition and providing appropriate care. In addition, research by Daniel et al. (2022) highlights the important role of the health system in providing affordable and quality health services for the community. This study shows that policies that support equitable and inclusive health service delivery, such as health cost subsidies or health insurance programs, can increase people's accessibility to necessary health services, including nutrition-related services. Therefore, implementing policies that support access to comprehensive health services is important in addressing the problem of malnutrition in remote areas such as Kurima District. The study by Abi Khalil et al. (2022) also highlights the important role of a community approach in increasing access to health services. This research shows that through participatory programs that involve the community directly in the planning and implementation of health services, a system that is more responsive and affordable can be created for people living in remote areas. By actively involving the community in efforts to prevent and treat malnutrition, it is hoped that solutions that are more sustainable and appropriate to local needs can be created in Kurima District, Yahukimo Regency. According to researchers, access to health services plays a crucial role in determining the incidence of malnutrition in Kurima District, Yahukimo Regency. Factors such as the availability of health facilities, trained health personnel, accessibility of services, and health policies are key in ensuring that people have adequate access to nutrition services and the prevention of malnutrition. The importance of collaboration between government, non-government organizations and communities in increasing access to basic health services, especially in remote areas such as Kurima District, is a fundamental conclusion. With strong support from all relevant parties, it is hoped that a supportive environment can be created to prevent and treat malnutrition, thereby improving the health and welfare of children in the area.

In addition, researchers highlight the importance of a holistic and integrated approach in addressing the problem of access to health services. Efforts that include improving health

infrastructure, training health workers, supporting policies, and active community participation in planning and implementing health programs, are key to achieving equitable and inclusive access to health. Thus, increasing access to health services is not only the responsibility of the government, but also requires involvement and support from all levels of society. Only with solid cooperation and strong commitment from all parties, the problem of access to health services and the incidence of malnutrition in Kurima District can be addressed effectively.

Based on the results of the Multiple Linear Regression analysis, it shows that with a p-value of  $0.000 < 0.05$ , H1 is accepted so it can be concluded that there is a simultaneous influence of the environment, children's diet and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency with an influence size of 54.5%. Research on the incidence of malnutrition in Kurima District, Yahukimo Regency, highlights the complex role of environmental factors, children's diet, and access to health services in determining the nutritional status of children in the area. The study by Wahana et al. (2023) shows that the difficult physical environment in remote areas such as Kurima can limit access to natural resources that are important for children's growth and development. Limited access to nutritious food and clean water is a significant risk factor for malnutrition in this area. Apart from that, children's diet is also an important factor that influences the incidence of malnutrition. The study by Shahid, Cao, Shahzad, et al. (2022) shows that unbalanced eating patterns and a lack of variety in the consumption of nutritious foods can increase the risk of malnutrition in children. Factors such as a preference for less nutritious local foods and irregular eating practices can lead to nutritional deficiencies that contribute to malnutrition problems.

Apart from that, access to health services also has a significant impact on the incidence of malnutrition in Kurima District. Research by Sotiraki et al. (2022) highlighted that lack of access to basic health services, such as community health centers and posyandu, can hinder efforts to prevent and treat malnutrition. Limited health infrastructure and a lack of trained health workers in remote areas make it difficult for people to get quality health services. Apart from that, non-financial factors such as lack of adequate transportation can also be an obstacle for people in accessing health facilities. Therefore, the importance of increasing access to basic health services, both through improving infrastructure and strengthening human resources in the health sector, is the focus in efforts to prevent and treat malnutrition in Kurima District, Yahukimo Regency. Apart from the literature mentioned previously, several other studies also strengthen understanding of the role of the environment, children's diet, and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency. A study by Seboka et al. (2022) highlights the impact of the social and economic environment on children's health, including the problem of malnutrition. This study found that poor family economic conditions, such as low income and access to decent work, can limit a family's ability to meet children's food and health needs. Environmental factors such as poor sanitation and limited access to health services are also associated with a high risk of malnutrition.

In addition, research by Feng et al. (2022) emphasizes the important role of education and public awareness in overcoming the problem of malnutrition. This study shows that low knowledge about healthy nutrition and good eating patterns can lead to unhealthy eating behavior and ultimately contribute to the incidence of malnutrition. Therefore, health education programs aimed at increasing public awareness about the importance of nutritious food and a balanced diet need to be increased in Kurima District. By increasing public understanding of the importance of good nutrition and healthy eating patterns, it is hoped that it can reduce the prevalence of malnutrition in the area. In addition, a study by Carvalho-Salemi et al. (2023) highlights the important role of the family in shaping children's eating



patterns. This research found that nutritional education provided by parents and a family environment that supports nutritious food can have a significant impact on children's health. By providing appropriate nutritional education to parents and providing support to provide nutritious food at home, we can help reduce the risk of malnutrition in children in Kurima District, Yahukimo Regency.

According to researchers, the incidence of malnutrition in Kurima District, Yahukimo Regency, is influenced by various complex, interrelated factors. The role of the environment, including the availability of access to natural resources, sanitation, and the socio-economic environment, has a significant impact on the availability of nutritious food and the living conditions of children in the area. In addition, children's diets also play an important role in determining their nutritional status, with unbalanced diets and a lack of variety in nutritious foods increasing the risk of malnutrition. Finally, limited access to health services is also an inhibiting factor in preventing and treating malnutrition in Kurima District, given the lack of health infrastructure and trained health workers in remote areas. Therefore, to overcome the problem of malnutrition in Kurima District, a holistic and integrated approach is needed. Steps such as increasing access to nutritious natural resources, raising public awareness about the importance of nutrition and healthy eating patterns, and strengthening basic health infrastructure in remote areas are top priorities. Collaboration between government, non-government organizations, communities and the private sector also needs to be improved to create an environment that supports the healthy growth and development of children in Kurima District. In this way, it is hoped that a significant reduction in the prevalence of malnutrition and improvement in children's health in the area can be achieved.

## CONCLUSION

Based on the research results, it can be concluded that there is an environmental influence on the incidence of malnutrition in Kurima District, Yahukimo Regency, there is an influence of children's diet on the incidence of malnutrition in Kurima District, Yahukimo Regency, there is an influence of access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency, There is an influence of the environment, children's diet and access to health services on the incidence of malnutrition in Kurima District, Yahukimo Regency.

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