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The effect of dietary patterns on the incidence of illness in early childhood in the Special Region of Yogyakarta : A cross-sectional study using logistic regression analysis

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ABSTRACT

Background: Diet plays a crucial role in maintaining health status and boosting immune system of young children against different illnesses. The context based on ongoing pediatric illness due to suboptimal feeding patterns. An inadequate diet can depress the child's resistance and his ability to fight off illness.
***Objectives*:** This research aimed to analyse the effect of diet on child morbidity in Yogyakarta Special Region.
Methods: This research was a quantitative study with a cross-sectional approach. The study population was all children aged 0–7 years in the Special Region of Yogyakarta, with a sample of 366 children selected using multistage cluster random sampling. Data analysis was performed using logistic regression analysis to determine the extent of the influence of diet on the incidence of illness.
Results: The results showed that the majority of children had sufficient dietary patterns (51.9%), followed by good dietary patterns (44.3%) and poor dietary patterns (3.6%), while illness incidence was found in 48.6% of respondents. Logistic regression analysis indicated that dietary patterns significantly affected illness incidence among early childhood children (p = 0.012). Children with poor dietary patterns had a 7.23 times higher risk of experiencing illness compared to children with good dietary patterns (OR = 7.23). The Nagelkerke R Square value of 0.039 indicated that dietary patterns contributed 3.9% to illness incidence, while the remaining proportion was influenced by other factors not examined in this study.
Conclusions: The conclusion of this study is that dietary patterns have a significant effect on the incidence of illness in early childhood, although the contribution is relatively small; therefore, strengthening other supporting factors for comprehensive child health is necessary.

KEYWORD: *child health; dietary patterns; early childhood; incidence of illness*

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INTRODUCTION

Dietary patterns are one of the important factors that contribute to maintaining health conditions and strengthening the immune system of early childhood (1). Children aged 0-7 years are in a phase of very rapid growth and development, requiring balanced, high-quality, and age-appropriate nutritional intake to meet their physiological needs (2). A mismatch between nutritional needs and actual food intake can weaken the immune system, inhibit growth, and increase vulnerability to various diseases (3). Therefore, dietary patterns play a strategic role not only in fulfilling energy needs but also as a fundamental basis for maintaining overall child health (4).

Morbidity among children in Indonesia is still high, especially those of preschool age group, and is dominated by infectious diseases. Furthermore, the 2023 Indonesia Health Survey (SKI) also noted that the prevalence of ARI in children <5 years had increased from 12.8% as previously reported to be as high as 34.2%. Furthermore, the proportion of diagnosed and symptom-based pneumonia among children under five years was 15.0%, continuing to be a substantial burden of respiratory illnesses. By contrast, the prevalence of diarrhea at the national level among all age groups was 4.3% and further examination of the SKI identified a prevalence for this indicator with 7.4% in children under five years old. The prevalence of these infectious diseases shows that early childhood is defensible as the immune system is immature. Such situations can be growth and developmental limiting in adverse health or the episodes are recurrent over a longer time span (5,6).

The high incidence of illness in early childhood is influenced by various contributing factors, one of which is dietary pattern (7,8). Data from the Ministry of Health indicate that 50.1% of children aged 3-4 years consume sweet foods more than once a day. In addition, the consumption of unhealthy snacks in the school environment continues to show an upward trend. These conditions reflect the low implementation of balanced nutrition among children. Habitual consumption of foods high in sugar, low in fiber, and deficient in micronutrients can impair nutritional status and weaken the immune system, making children more susceptible to disease (9,10). The same situation can also be observed in the Special Region of Yogyakarta (Daerah Istimewa Yogyakarta), where the childhood population is relatively large and child morbidity remains a significant public health

concern. According to the 2024 Health Profile of the Special Region of Yogyakarta, infectious diseases among children continue to show increasing trends. Pneumonia cases among children under five reached 86% case detection and management coverage in 2024, showing a substantial increase compared to 61% in 2023. In addition, Dengue Hemorrhagic Fever (DHF) cases increased sharply from 701 cases in 2023 to 4,027 cases in 2024, indicating that infectious diseases remain a serious health challenge in the region. These conditions demonstrate that early childhood children in Yogyakarta are still highly vulnerable to various infectious diseases despite ongoing promotive and preventive health efforts. On the other hand, dietary problems among children in Yogyakarta are also still evident both at home and in school environments. The increasing consumption of unhealthy snacks, sweet foods, and low-fiber diets reflects the suboptimal implementation of balanced nutrition practices among children. Furthermore, the prevalence of protein-energy malnutrition among children under five in Yogyakarta increased from 10.0% in 2023 to 10.7% in 2024, while stunting prevalence remained relatively high at 17.4% in 2024. These nutritional problems may weaken children's immune systems and increase susceptibility to illness. Therefore, these conditions strengthen the assumption that dietary patterns may contribute to morbidity among early childhood children in the Special Region of Yogyakarta (11,12). Various previous studies have demonstrated an association between nutritional status, dietary patterns, and the incidence of infectious diseases in children. Children with poor dietary patterns tend to experience health problems more frequently than those with good dietary patterns (13,14). However, most previous studies have primarily focused on nutritional status or on general toddler-age groups, while studies that specifically analyze the effect of dietary patterns on the incidence of illness among early childhood with coverage in the Special Region of Yogyakarta remain limited. This condition indicates the existence of a research gap that needs to be further explored to obtain more specific and contextual empirical evidence.

Based on the above description, this study is important to strengthen scientific evidence regarding the role of dietary patterns on the incidence of illness among early childhood, particularly in the Special Region of Yogyakarta. Therefore, this study aims to describe dietary patterns and the incidence of illness, examine the relationship between dietary patterns and the incidence of illness, and analyze the effect of dietary patterns on the incidence of illness among young children in the Special Region of Yogyakarta. The results of this study are expected to serve as a basis for policymaking and for strengthening promotive and preventive programs in the field of child health.

MATERIALS AND METHODS

This research applied a quantitative cross-sectional design and put priority to the measurement of independent variables and dependent variable, simultaneously within one observation period. This research was conducted in 2025, at the Special Region of Yogyakarta. The study population was all children aged 0–7 years living in Yogyakarta (4,354 children). The Slovin formula was used to calculate the sample size, and 366 children were obtained as respondents. Research Sampling technique: The sampling method applied was multistage cluster random sampling that conducted on a number of stages, among others the regency/city area step, the early childhood education institute election and lastly sample respondent elections randomly.

Diet was the independent variable and occurrence of sickness was the dependent variable in this research. The quality of dietary pattern was classified into three ranks, good diet quality, enough and poor diet quality. Incidence of illness was defined as children that had or did not have illness during a given period. Data were collected using a structured self-administered questionnaire completed by parents or guardians of the children. The dietary pattern instrument was a self-developed questionnaire consisting of 15 items that assessed children's eating habits, including meal frequency, breakfast habits, consumption of fruits and vegetables, intake of sugary foods and beverages, snack consumption, and dietary diversity. The illness incidence questionnaire consisted of 10 items related to the history of common childhood illnesses experienced by the children within a specific observation period, including diarrhea, acute respiratory infections (ARI), fever, and other infectious diseases.

Prior to data collection, the instruments were tested for validity and reliability among respondents with characteristics similar to the study population. The validity test was conducted using Pearson Product Moment correlation analysis, which showed that all questionnaire items had r-count values higher than the r-table value (0.361), indicating that all items were valid for measuring the intended constructs. Reliability testing using Cronbach's Alpha demonstrated good internal consistency, with a value of 0.824 for the dietary pattern questionnaire and 0.791 for the illness incidence questionnaire. These results indicate that both instruments were reliable and appropriate for use in the Indonesian early childhood context.

Statistical analysis Data were analyzed to describe the distribution of each research variable, test the Spearman correlation relationship between dietary patterns and illness incidence, and utilize logistic regression analysis to explore how dietary patterns play a role in controlling the incidence rate of illness. All collected

data were analyzed by the Statistical Package for Social Science (SPSS) software package.

RESULTS AND DISCUSSION

The study conducted among early childhood in the Special Region of Yogyakarta (DIY) involving 366 respondents revealed variations in respondent characteristics based on sex, gestational age at birth, distribution of residential location, history of early initiation of breastfeeding (EIB), and history of breastfeeding practices. The distribution of respondents' characteristics based on sex is presented in detail in **Figure 1**.

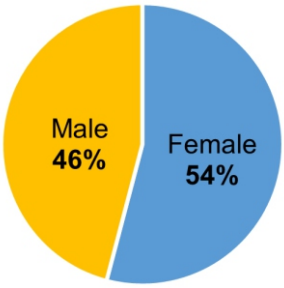

Figure 1. Characteristics of respondents based on sex

The distribution of respondents by sex indicates that the percentage of female children was slightly higher than that of male children, with 54% female and 46% male. This condition reflects a relatively balanced distribution between the two sexes. Sex differences may influence susceptibility to disease, as biologically, there are differences in immune system development between male and female children (15,16). In addition to sex, the detailed distribution of respondents' characteristics based on the residential location is presented in **Figure 2.**

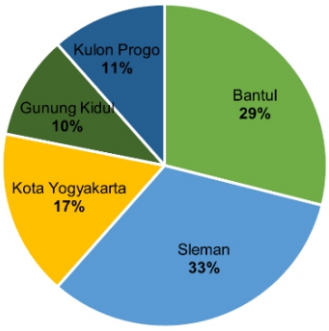

Figure 2. Characteristics of respondents based on residential location distribution

The geographical distribution of survey participants indicates that the majority are located in Sleman at 33%, then Bantul at 29%, Yogyakarta City at 17%, Kulon Progo at 11%, and Gunung Kidul at 10%. This spread of participants across urban and rural areas demonstrates the variation in the children 39 s living environment, which may vary in terms of health services, food, and family income. These differences can affect the children 39 s health status (17,18). Additionally, besides their geographic locations, the distribution of survey respondents by Inisiasi Menyusu Dini (IMD) history is shown in **Figure 3**.

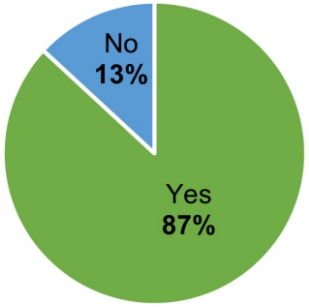

Figure 3. Characteristics of respondents based on Inisiasi Menyusu Dini (IMD)

Results show that most of the children had IMD 87%, and 13% did not have IMD. The rate of IMD is good and this means most parents are aware of how important it is for babies to start breast milk early. IMD helps improve babies immune systems because the first milk is full of colostrum, which has lots of antibodies. This can help prevent some illnesses in early life. The study also agrees with the past studies that say that exclusive breastfeeding is also very important for making children immune system stronger (19). In addition, data about respondents' info by exclusive breastfeeding are shown in **Figure 4**.

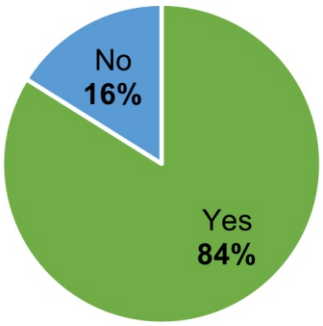

Figure 4. Characteristics of respondents based on Exclusive Breastfeeding

The majority of children in this study received exclusive breastfeeding, accounting for 84%, while 16% of children did not receive exclusive breastfeeding. The high rate of exclusive breastfeeding reflects relatively good parenting practices in fulfilling children's early nutritional needs (20). Exclusive breastfeeding plays an important role in supporting optimal growth, enhancing the immune system, and reducing the risk of infectious diseases in early childhood (21).

Overall, the characteristics of respondents in this study indicate that children's health conditions are influenced not only by dietary patterns but also by various early-life and environmental factors, including breastfeeding history, residential conditions, and access to health-related resources. The variation in respondent characteristics across urban and suburban areas in Yogyakarta also suggests differences in environmental exposure, sanitation quality, healthcare access, and family socioeconomic conditions, which may collectively contribute to childhood morbidity.

Therefore, these characteristics provide important contextual understanding that children's health outcomes should be interpreted within a broader ecosystem of child health determinants rather than being explained solely by dietary factors.

Description of Dietary Patterns and Incidence of Illness among Early Childhood in the Special Region of Yogyakarta

The description of dietary patterns among early childhood in the Special Region of Yogyakarta is presented based on the frequency distribution shown in **Table 1.**

Table 1. Dietary patterns of early childhood in the Special Region of Yogyakarta

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Good	162	44.3	44.3	44.3
	Sufficient	191	52.2	52.2	96.4
	Poor	13	3.6	3.6	100.0
	Total	366	100.0	100.0	

Based on **Table 1**, the majority of early childhood in the Special Region of Yogyakarta had dietary patterns categorized as sufficient (52.2%), followed by good (44.3%), and only a small proportion fell into the poor category (3.6%). These findings indicate that, in general, children's dietary patterns are at a moderate level; however, there remains a small group of children whose dietary patterns are suboptimal and thus at greater risk of health problems.

The dominance of the “sufficient” dietary pattern category indicates that most children receive a relatively adequate food intake but do not yet fully meet the principles of balanced nutrition optimally. A sufficient dietary pattern suggests that food variety, meal frequency, and nutritional quality are not consistently fulfilled. In line with previous studies, such conditions may potentially lead to nutritional imbalances which, in the long term, can affect children's immune resistance (8,22). Although the number is small, children with poor dietary patterns still require special attention, as they face a higher risk of experiencing health disorders, delayed growth, and increased vulnerability to infectious diseases. In addition, the current food environment in urban and suburban areas of Yogyakarta may influence children's dietary behaviors. Increased exposure to processed foods, sugary snacks, and low-fiber diets both at home and in school settings may contribute to less balanced eating patterns among children. Therefore, improving dietary quality and strengthening balanced nutrition practices remain important components of child health promotion programs in the region. Based on data analysis, the description related to the incidence of illness among early childhood in the Special Region of Yogyakarta is presented in **Table 2**.

Table 2. Incidence of illness among early childhood in the Special Region of Yogyakarta

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not ill	188	51.4	51.4	51.4
	ill	178	48.6	48.6	100.0
	Total	366	100.0	100.0	

Based on **Table 2**, 48.6% of children experienced illness, while 51.4% did not. This finding indicates that childhood morbidity remains relatively high among early childhood children in the Special Region of Yogyakarta. Frequent illness episodes during early childhood may interfere with children's growth, appetite, physical activity, and overall developmental outcomes (23,24).

The relatively high incidence of illness among children may be influenced by multiple interconnected factors, including dietary quality, environmental sanitation, hygiene behavior, immunization status, housing conditions, and exposure to infectious diseases. In the context of Yogyakarta, the increasing trend of infectious diseases such as pneumonia and dengue fever reported in regional health statistics further indicates that environmental and public health factors continue to contribute to childhood morbidity (24). These findings suggest that child health problems should not only be viewed from a nutritional perspective but also through broader environmental and behavioral determinants of health. Therefore, integrated health promotion efforts involving nutritional improvement, clean and healthy living behaviors, environmental sanitation, immunization programs, and parental health education are needed to reduce illness incidence among early childhood children in the Special Region of Yogyakarta.

Relationship between Dietary Patterns and Incidence of Illness among Early Childhood

The relationship between dietary patterns and the incidence of illness among early childhood in the Special Region of Yogyakarta is presented in **Table 3**, which illustrates the association between dietary pattern categories and illness status.

Table 3. Relationship between dietary patterns and incidence of illness

Dietary Pattern	Not ill	ill	Total
Good	92 (56.8%)	70 (43.2%)	162
Sufficient	94 (49.2%)	97 (50.8%)	191
Poor	2 (15.4%)	11 (84.6%)	13
Total	**188 (51.4%)**	**178 (48.6%)**	**366**

The analysis presented in **Table 3** demonstrates that children with good dietary patterns tended to experience lower illness incidence compared to children with sufficient or poor dietary patterns. Among children with good dietary patterns, 56.8% were categorized as not ill, whereas the proportion of illness increased substantially among children with poor dietary patterns, reaching 84.6%. These findings indicate that poorer dietary quality may be associated with greater vulnerability to illness during early childhood. The results of the Chi-Square analysis examining the

Table 4. Chi-square analysis of the relationship between dietary patterns and incidence of illness

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.999	2	.011
Likelihood Ratio	9.630	2	.008
Linear-by-Linear Association	6.330	1	.012
N of Valid Cases	366		

relationship between dietary patterns and illness incidence are presented in **Table 4**. Based on **Table 4**, the Chi-Square analysis showed a statistically significant relationship between dietary patterns and illness incidence among early childhood children (p = 0.011). These findings indicate that dietary patterns are associated with children's health conditions, where healthier dietary practices may contribute to lower susceptibility to illness.

Children with poor dietary patterns were found to have a substantially higher risk of illness compared to those with good dietary patterns. Based on the cross-tabulation analysis, children with poor dietary patterns were 7.23 times more likely to experience illness than children with good dietary patterns (OR = 7.23). This finding suggests that inadequate dietary intake may significantly increase children's vulnerability to infectious diseases and other health problems during early childhood. These results are consistent with previous studies showing that balanced dietary intake contributes to maintaining immune function and reducing the risk of infectious diseases among children (25,26). Adequate intake of protein, vitamins, minerals, fruits, and vegetables plays an essential role in supporting immune defense mechanisms and promoting optimal child health (27,28). Conversely, unhealthy eating habits such as excessive consumption of sugary foods, low dietary diversity, and irregular meal patterns may reduce nutritional quality and weaken children's immune resistance (29). However, dietary patterns should not be interpreted as the sole determinant of childhood morbidity. The occurrence of illness among children is influenced by multiple interconnected factors, including environmental sanitation, hygiene behavior, immunization status, family socioeconomic conditions, housing quality, and exposure to infectious diseases. This finding supports the view that child health outcomes are shaped by a broader ecosystem of nutritional, environmental, and behavioral determinants.

In the context of Yogyakarta, increasing trends of infectious diseases such as pneumonia and dengue fever may also contribute to the relatively high incidence of illness among children. Therefore, improving children's dietary quality should be integrated with broader public health strategies, including

strengthening sanitation, promoting clean and healthy living behaviors, improving parental health literacy, and expanding preventive child health services.

Effect of Dietary Patterns on the Incidence of Illness among Early Childhood

The relationship between dietary patterns and incidence of illness identified in the previous analysis indicates that dietary patterns are associated with children's health conditions. These findings were further strengthened through logistic regression analysis to determine the magnitude of the effect of dietary patterns on the incidence of illness among early childhood in the Special Region of Yogyakarta, as presented in **Table 5**.

Table 5. Logistic regression analysis of the effect of dietary patterns on the incidence of illness

Parameter	Value
Omnibus Test (p-value)	0.012
Cox & Snell R Square	0.03
Nagelkerke R Square	0.039
Model Classification Accuracy	54.6%

Based on the logistic regression analysis presented in **Table 5**, dietary patterns had a statistically significant effect on illness incidence among early childhood children ($p = 0.012$). Children with poor dietary patterns were found to have a higher likelihood of experiencing illness compared to children with good dietary patterns. However, the Nagelkerke R Square value of 0.039 indicates that dietary patterns explained only 3.9% of the variation in illness incidence, while the remaining 96.1% was influenced by other factors not examined in this study. In addition, the model classification accuracy of 54.6% suggests that the predictive ability of dietary patterns alone remains relatively limited.

The relatively small contribution of dietary patterns indicates that childhood morbidity is multifactorial and influenced by a broader ecosystem of health determinants. Although adequate nutrition is essential for supporting immune function and maintaining children's health, illness incidence among children is also strongly influenced by environmental sanitation, access to clean water, hygiene behavior, housing conditions, immunization status, physical activity, and exposure to infectious diseases. In the context of the Special Region of Yogyakarta, increasing trends of infectious diseases such as pneumonia and dengue fever reported in regional health statistics may also contribute substantially to childhood morbidity.

These findings are consistent with studies conducted in suburban and semi-urban areas in developing regions, which reported that dietary quality significantly contributes to children's health but represents only one component within a broader system of environmental and social determinants (31,32). Household sanitation, parental education, socioeconomic status,

healthcare access, and parenting practices are often reported to have stronger influences on illness incidence than dietary factors alone. Therefore, dietary patterns should not be interpreted as the sole determinant of children's health outcomes (33). Nevertheless, the quality and balance of children's dietary intake remain important for strengthening immune resistance and reducing susceptibility to infectious diseases. Adequate intake of protein, vitamins, minerals, fruits, and vegetables has been shown to support immune defense mechanisms and improve children's resistance to illness (25,34). Conversely, inadequate nutritional intake may impair immune function and increase children's vulnerability to recurrent illness and growth problems.

Another possible explanation for the relatively small contribution of dietary patterns in this study is that the majority of respondents were categorized as having sufficient dietary patterns rather than extremely poor dietary patterns. In addition, most children had relatively favorable histories of early breastfeeding initiation and exclusive breastfeeding, which may have partially strengthened immune resilience despite variations in dietary quality (35,36). These findings imply that efforts to reduce childhood morbidity should not focus solely on improving children's dietary habits. Public health interventions should also strengthen environmental sanitation, clean and healthy living behaviors, immunization coverage, parental health literacy, and community-based child health services. Integrated interventions combining nutritional improvement with broader preventive health programs are likely to produce more sustainable improvements in early childhood health outcomes.

CONCLUSION AND RECOMMENDATION

This study demonstrated that dietary patterns have a significant relationship with illness incidence among early childhood children in the Special Region of Yogyakarta. Children with poor dietary patterns were more likely to experience illness compared to those with good dietary patterns, indicating that adequate and balanced nutrition plays an important role in supporting children's immune systems and overall health. However, the relatively small contribution of dietary patterns to illness incidence suggests that childhood morbidity is influenced by multiple interconnected factors, including environmental sanitation, hygiene behavior, immunization status, healthcare access, and family living conditions.

These findings imply that efforts to reduce childhood morbidity should not focus solely on improving dietary intake but also require integrated public health interventions. Parents should pay greater attention to children's dietary quality by providing balanced and age-appropriate nutrition, particularly for children categorized as having “sufficient” dietary

patterns, in order to prevent deterioration into poor dietary status. Health workers at Puskesmas and community health centers should prioritize nutrition education and regular dietary monitoring for mothers and caregivers whose children remain in the “sufficient” dietary category, as this group is still vulnerable to nutritional imbalance and illness. Nutrition education programs should focus on improving dietary diversity, reducing excessive consumption of sugary snacks and processed foods, and promoting healthy eating habits both at home and in school environments.

In addition, teachers, healthcare professionals, and policymakers should strengthen clean and healthy living behavior (PHBS) programs, environmental sanitation, immunization coverage, and community-based preventive child healthcare services. Collaboration among families, schools, healthcare providers, and local governments is essential to support comprehensive and sustainable child health promotion programs in Yogyakarta. Future studies are recommended to include broader determinants of child health, such as socioeconomic status, sanitation conditions, parenting practices, physical activity, and immunization history, to better explain factors contributing to illness incidence among early childhood children.

REFERENCES

1. Ghosh D, Khan IA, Yadav DS, Bandyopadhyay DS. The Impact of Early Childhood Nutrition On Long-Term Health Outcomes: A Prospective Cohort Study. Journal of Population Therapeutics and Clinical Pharmacology. 2024 Mar; 31 (3):317-324.https://doi.org/10.53555/jptcp.v31i3.4789;
2. Huey SL, Finkelstein JL, Mehta S. Nutrition during the preschool years. In: Encyclopedia of Human Nutrition. Elsevier; 2023. p. 121–6. https://doi.org/10.1016/B978-0-12-821848-8.00037-8.
3. Ganguly I, Mondal E, Majumdar S, Ghosh S, Tewari S. Effects of Malnourishment on the immune system: a short review. Journal of Survey in Fisheries Science. 2023 May 31; 10(1):6111-6117;
4. Martín-Rodríguez A, Bustamante-Sánchez Á, Martínez-Guardado I, Navarro-Jiménez E, Plata-SanJuan E, Tornero-Aguilera JF, et al. Infancy Dietary Patterns, Development, and Health: An Extensive Narrative Review. Children. 2022 Jul 18;9(7):1072.
5. Kemenkes. Profil Kesehatan Indonesia . Jakarta; 2024.
6. Nasution N, Endriyani A, Wulandari DT, Mukhoirotin M, Aswan Y, Rangkuti NA, et al. Asuhan Kebidanan Bayi, Balita, dan Anak. Yayasan Kita Menulis. Yayasan Kita Menulis; 2023.
7. Cândido FM, Souza TO, Figueiredo RO. Influência Alimentar Na Primeira

Infância: Prevenção De Doenças Inflamatórias Crônicas Na Vida Adulta. Revista ft. 2024 Oct 4;30–1. https://doi.org/10.69849/revistaft/ar10202410040830.

8. De Sá AAL, Diniz GLS, Tomaz MP, Paixão PEM, Souza TQ, Abu-Allan YTK. Impacto da alimentação no crescimento e desenvolvimento infantil. Brazilian Journal of Health Review. 2023 Aug 29;6(4):18961–9. https://doi.org/10.34119/bjhrv6n4-387.
9. Santos AO, Pereira AIS, Dutra JWA, Ribeiro FAA, Neves JA, Paiva Júnior JB de O, et al. Consumo de alimentos e deficiência de micronutrientes. Contribuciones A Las Ciencias Sociales. 2024 Jun 12;17(6):e6606. https://doi.org/10.55905/revconv.17n.6-128.
10. Aulia JN. Masalah Gizi pada Anak Usia Sekolah. Jurnal Ilmiah Kesehatan Media Husada. 2022 Apr 26;11(1):22–5.https://doi.org/10.33475/jikmh.v11i1.290.
11. Rachma Dewi E, David Laksamana Caesar, Nadia Siti Nurfatma. The Correlation between Junk Food Consumptive Behavior and the Nutritional Statuses of Primary School Learners. Journal of Global Research in Public Health. 2023 Dec 29;8(2):216–23.https://doi.org/10.30994/jgrph.v8i2.478.
12. Dinas Kesehatan DIY. 2025. Profil Kesehatan Daerah Istimewa Yogyakarta Tahun 2024. DIY : Dinas Kesehatan Daerah Istimewa Yogyakarta
13. Sari RP, Agustin K. Analisis Hubungan Status Gizi Dengan Kejadian Penyakit Infeksi Pada Anak Balita di Posyandu Wilayah Puskesmas Colomadu I. Jurnal Ilmu Keperawatan dan Kebidanan. 2023 Feb 5;14(1):171–8. https://doi.org/10.26751/jikk.v14i1.1596.
14. Nurhastutik D, Susilaningrum R, Harumi AM, Rijanto. Hubungan Penyakit Infeksi Dengan Status Gizi Balita. Gema Bidan Indonesia. 2022 Mar 31;11(1): 36–45. https://doi.org/10.36568/gebindo.v11i1.
15. Feng Z, Liao M, Zhang L. Sex differences in disease: sex chromosome and immunity. J Transl Med. 2024 Dec 27;22(1):1150. https://doi.org/10.1186/s12967-024-05990-2.
16. Sharma S, Gibbons A, Saphire EO. Sex differences in tissue-specific immunity and immunology. Science. 2025 Aug 7;389(6760):599–603. https://doi.org/10.1126/science.adx4381.
17. Iqhrammullah M, Abshori NF, Rampengan DD, Qanita I, Ramadhan R, Adji AS, et al. Does urban living contribute to better nutrition? An ecological study on urban–rural disparities in Indonesia. Research

Square. 2025. https://doi.org/10.21203/rs.3.rs-7177814/v1.

18. Siramaneerat I, Astutik E, Agushybana F, Bhumkittipich P, Lamprom W. Examining determinants of stunting in Urban and Rural Indonesian: a multilevel analysis using the population-based Indonesian family life survey (IFLS). BMC Public Health. 2024 May 22;24(1):1371. https://doi.org/10.1186/s12889-024-18824-z.
19. Neu J. Immunoglobulins and their relevance in human milk. In: The Science of Human Milk. Elsevier; 2024. 15 (1);p. 43–55. https://doi.org/10.1016/j.advnut.2023.09.015.
20. Riza Yanti, Umi Faridah, Muhamad Jauhar. Exclusive Breastfeeding and Nutritional Status of Toddlers in a Community Health Center. Indonesian Journal of Health Research and Development. 2025 Jul 30;3(2):85–93. https://doi.org/10.58723/ijhrd.v3i2.373.
21. Figueiredo Silva Macedo U, Olivandro Duarte Oliveria J, de Sousa Gabriel I, Thayne Macêdo Sobreira P, Barros de Quental O. Relação Entre Aleitamento Materno Exclusivo E O Desenvolvimento De Doenças Alérgicas E Infecciosas. Revista interdisciplinar em saúde. 2023 Sep 12;10(Único):653–65.https://doi.org/10.35621/23587490.v10.n1.p653-665.
22. Bushra Akhtar, Ali, Sharif. Malnutrition in Children of Growing Age and the Associated Health Concerns. International Journal of Agriculture and Biosciences. 2023;2:153–61. https://doi.org/10.47278/book.oht%2F2023.55.
23. Marushko YuV, Marushko TV, Dmytryshyn OA, Bovkun OA, Iovitsa TV, Dmytryshyn BYa. Peculiarities of children's health status after acute respiratory viral infections: a look at the problem, ways to solve it. CHILD`S HEALTH. 2024 Nov 2;19(6):397–406. https://doi.org/10.22141/2224-0551.19.6.2024.1745.
24. Huysentruyt, K., Hulst, J., Gerasimidis, K., & Joosten, K.. Disease associated malnutrition in pediatrics – what is new?. Current Opinion in Clinical Nutrition and Metabolic Care.2025. 28, 289 - 296. https://doi.org/10.1097/mco.0000000000001115..
25. Ata AE, Alpcan A, Tursun S, Kandur Y. Nutritional support for immune health during infections. Journal of Controversies in Obstetrics & Gynecology and Pediatrics. 2024 Apr 29;2(2):37–42.https://doi.org/10.51271/JCOGP-0032.
26. Solorzano-Chuez JR, Toala-Reyes , Jhon Daniel. Desnutrición, sistema inmunológico y susceptibilidad a enfermedades infecciosas en niños menores de 5 años. MQRInvestigar. 2024 Sep 14;8(3):5238–59. https://doi.org/10.56048/MQR20225.8.3.2024

.5238-5259.
27. Calder PC. Foods to deliver immune-supporting nutrients. Current Opinion in Food Science. 2022 Feb;43:136–45. https://doi.org/10.1016/j.cofs.2021.12.006.
28. Salome Carneiro Miranda fugolin Barbosa B, Santos Dias L, dos Santos AC, Cavalcante de Melo D, Pereira da Rocha C, Franco Martins H, et al. Prevenção De Doenças Crônicas Transmissíveis Na Infância Atravez da Alimentação. Periódicos Brasil Pesquisa Científica. 2024 Aug 6;3(2):804–15.https://doi.org/10.36557/pbpc.v3i2.121.
29. Warkentin S, Stratakis N, Fabbri L, Wright J, Yang T, Bryant M, et al. Dietary patterns among European children and their association with adiposity-related outcomes: a multi-country study. 2024. https://doi.org/10.1038/s41366-024-01657-6.
30. Risnah, Huriati, Hadrayani E, Arbianingsih, Muthahharah, Nurhidayah, et al. Irregular dietary habits as a predictor of stunting occurrence among children under 5 years of age: a literature review. Frontiers of Nursing. 2024 Mar 1;11(1):17–22.https://doi.org/10.2478/fon-2024-0002.
31. Qin, Y., Yue, A., Zhang, Y., Zhang, X., Gao, Y., Liang, S., Song, Q., & Qiao, N. Dietary diversity and development among early childhood children in rural China. Frontiers in Public Health,2024. 12. https://doi.org/10.3389/fpubh.2024.1485548.
32. Cândido FM, Souza TO, Figueiredo RO. Influência Alimentar Na Primeira Infância: Prevenção De Doenças Inflamatórias Crônicas Na Vida Adulta. Revista ft. 2024 Oct 4;30–1. https://doi.org/10.69849/revistaft/ar10202410040830.
33. Maromi C, Hasibuan R. The Role of Nutrition in Supporting Physical and Motor Development in Early Childhood. Journal of Islamic Education Students (JIES). 2025 May 30;5(1):113.https://doi.org/10.31958/jies.v5i1.14011.
34. Hafsan H, Anggraeni R, Pratiwi A. Microbiological Infection Risks Among Children in Sub-Urban Settlement Of Makassar. Jurnal Sipakalebbi. 2025 Jul 1;9(1):41–58. https://doi.org/10.24252/sipakallebbi.v9i1.56899.
35. Gao Y, Zhang Q, Wang Y, Gao Y, Xu Y. Association between physical activity based on wearables and self-reported health status among adolescents: NHANES 2011–2014. BMC Public Health. 2024 Oct 18;24(1):2876. https://doi.org/10.1186/s12889-024-20363-6.
36. Hossain, S., & Mihrshahi, S. Effect of exclusive breastfeeding and other infant and young child feeding

practices on childhood morbidity outcomes: associations for infants 0–6 months in 5 South Asian countries using Demographic and Health Survey data. International Breastfeeding Jounal.2024.19. https://doi.org/10.1186/s13006-024-00644-x.