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ORIGINAL PAPER

Association of food security and dietary diversity with stunting among toddlers in Gunungkidul regency, Indonesia

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Abstract

Background: Stunting is impaired child growth due to prolonged undernutrition. In 2022, Indonesia's stunting prevalence was 21.46% (SSGI), with Gunungkidul regency in Yogyakarta, Indonesia experiencing the highest rate at 23.5%. food security and dietary diversity can influence the occurrence of stunting in toddlers.

Objective: This study aims to determine the association of food security and dietary diversity with stunting among toddlers in Gunungkidul Regency.

Methods: This cross-sectional study was conducted in the Wonosari and Gedangsari District, Gunungkidul Regency. The sample of this study were 105 children from 6 *Posyandu* (integrated health care center), which were selected based on the stunting prevalence. The sample were selected using quota sampling techniques. Household food security was assessed using a questionnaire adapted from the 2012 USDA Household Food Security Survey Module, and dietary diversity was assessed using a questionnaire adapted from the 2011 Food and Agriculture Organization (FAO) guidelines. Data were analyzed using the Chi-Square test.

Results: More than 30% of the children were stunted (31.4%), 51.5% had dietary diversity in the low and medium categories, and 44.8% of respondents come from food insecure families. There was a significant relationship between dietary diversity and stunting ($p<0.05$), however the relationship with food security was not statistically significant ($p>0.05$).

Conclusion: Dietary diversity is significantly associated with stunting among toddler however food security is not related to stunting. Caregiver education promoting diverse toddler diets, especially local foods, is needed.

Keywords: food security, dietary diversity, stunting, toddlers, nutrient intake

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Introduction

Early childhood is a period for children under the age of 5, a period of growth with important developments to consider[1]. During early childhood, the formation of the basics of the senses, thinking, speaking, and mental growth occurs. In early childhood, there is a very rapid process of growth and development, making it very important

to pay attention[2]. The process of child growth and development is greatly influenced by nutritional status. Inadequate nutritional intake in children will result in children suffering from nutritional problems such as stunting[3].

Stunting is a condition of impaired growth and development in children caused by chronic undernutrition, resulting in short stature[4]. In addition to dietary intake, stunting can also be caused by infectious diseases. Infectious diseases in children can reduce appetite and increase nutritional needs, which, if left untreated, can contribute to stunting[5]. The long-term effects of stunting include decreased cognitive ability and learning achievement, a weakened immune system leading to frequent illnesses, and a high risk of developing diabetes, obesity, heart disease, cancer, stroke, and disabilities in old age. Additionally, stunting becomes a major nutritional problem that impacts social and economic life within communities[6].

Stunting remains a persistent health issue that needs to be continuously addressed. The national target for the prevalence of short and very short toddlers (stunting) in 2024 is 14%[7]. According to the SSGI data for the year 2022, the prevalence of short and very short toddlers (stunting) in Indonesia is 21.46%[8]. The highest prevalence of short and very short toddlers (stunting) is in the Special Region of Yogyakarta, specifically in Gunungkidul District with a prevalence of 23.5%[9].

Household food security is a global health issue. Food security is a prerequisite for the availability of sufficient food for everyone so that everyone always has physical and economic access to food. The focus of food security is not only on the provision of food at the local level, but also on the availability and consumption of food at the regional and household levels, as well as at the individual level in meeting nutritional needs[10]. Food security is closely related to household income and expenditure[11]. Low family income is the root of malnutrition problems, due to low purchasing power for food[12]. Stunting is closely linked to food insecurity and poverty. Factors such as household food expenditure and household food security are associated with the occurrence of stunting[13]. Household food security is a global health issue. Food security can be defined as an economic and social condition at the household level that has limited or uncertain access to an adequate amount of food[14]. According to a study conducted in the Sedayu District of Yogyakarta Special Region[15], Socioeconomic factors such as low household expenditure on food can affect the occurrence of stunting in children aged 6-23 months. Household food security is one of the main causes of nutritional deficiencies in children. Based on previous research conducted in N'Djamena on children aged 12-59 months, children from households experiencing severe food insecurity are at higher risk of stunting compared to children from food-secure households[16]. In addition, according to the research conducted in the Sedayu District of Yogyakarta Special Region on children aged 6-23 months[17], The research results indicate that household food security is related to the occurrence of stunting in infants aged 6-23 months.

Based on the report of the Agriculture and Food Office in 2023, Gunungkidul Regency faces unresolved issues in food security and dietary diversity. Stabilization of food prices and food supply remains suboptimal. Dietary diversity is still limited, with most varieties available only during harvest seasons. Several types of food, such as animal protein, vegetables, and fruits, are still under consumed by the people of Gunungkidul. The issue of dietary diversity in Gunungkidul Regency that still needs to be improved lies in fulfilling the diversity of animal-based food. The report indicates that the target score for animal-based food in Gunungkidul is 24.0, but the Achievement of Expected Food Pattern (Pola Pangan Harapan/PPH) score is only 18.9[18].

Nutrient intake can be concluded based on the quantity and quality. Quantitatively, nutrient intake can be seen in terms of its adequacy level, and qualitatively, it can be seen through dietary diversity[19]. Dietary diversity is the sufficiency of food consumption based on food groups. Sufficient consumption of a variety of foods is an indicator of achieving optimal nutritional status, thus reducing the risk of malnutrition[20]. It is very important to consume a variety of foods, as no single food contains all the nutrients needed to ensure growth and child health [21]. Diversity of food has an impact

on balancing children's food intake. Imbalance in children's food intake is one of the factors causing stunting[22]. According to previous research, children who consume a diverse range of foods are less likely to experience stunting compared to children who consume limited varieties of food[23].

Methods

Research design

This research was an observational study using cross-sectional design. Cross-sectional research was a study conducted by collecting data from a group of people at one specific point in time. This research was conducted from September to October 2024.

Research subjects

The subjects of this study were children aged 12-59 months in Gunungkidul Regency. The selected districts were Wonosari and Gedang Sari District, based on the prevalence of stunting. The sample of this study were 105 children from 6 *Posyandu* (integrated health care center), which were selected based on the stunting prevalence. The sample were selected using quota sampling techniques. Village selection was based on the top 3 highest prevalence of stunting among toddlers, while *posyandu* selection was based on the high prevalence of stunting and the *posyandu* implementation schedule. Each of the selected *posyandu* had an average of 25 toddlers participating. The sampling process is presented in **Figure 1**.

The sample selection followed the inclusion criteria: (1) children aged 12-59 months in Wonosari and Gedangsari District; (2) children who live with parents; and (3) mothers who agree to be respondents. The exclusion criteria were mothers or children who had incomplete data. Sampel size calculation using the Lemeshow formula with 95% confidence level indicated a minimum sample size of 96. To avoid potential dropouts, an additional 10% was added to the calculated sample size, resulting in a final sample of 107 respondents. After data cleaning, the final sample size was 105 respondents.

Data collection/materials and tools

This study had received ethical approval from Alma Ata University, Indonesia. Ethics approval number was KE/AA/VIII/10111999/EC/2024. The first data collection method in this research was to obtain secondary data in the form of a list of toddlers in the Wonosari and Gedangsari Districts. Next, primary data collection was carried out by measuring the height of the children, interviewing household food security, and assessing children's dietary diversity.

Anthropometric measurements were conducted directly to assess childhood stunting. Stunting was defined as a height for age ZScore <-2 SD below the 2020 Child Growth Standards median[24]. Household food security was assessed using a questionnaire adapted from the 2012 USDA Household Food Security Survey Module, which has been validated and tested for reliability in a previous study conducted in Panaguan Village, Proppo District, Pemekasan Regency[25]. Food security scores were categorized as food secure (scores 1-2) and food insecure (scores 3-18). Dietary diversity among 12-23-month-old children was assessed using a questionnaire adapted from the 2021 WHO and UNICEF indicators for assessing infant and young child feeding practices, based on eight food groups: breast milk, grains and tubers, legumes, milk and dairy products, fresh foods, eggs, vitamin A-rich fruits and vegetables, and other fruits and vegetables[26]. Meanwhile, dietary diversity among 24-59-month-old children was assessed using a questionnaire adapted from the 2011 Food and Agriculture Organization (FAO) guidelines, based on 12 food groups, including cereals and tubers, animal-source foods, milk and dairy products, eggs, legumes, vitamin A-rich fruits and vegetables, other fruits, other vegetables, and oils and fats[27]. Dietary diversity was assessed based on the food security score threshold, which was categorized as diverse (≥5 food groups) and not diverse (<5 food groups)[26].

Data analysis

The data analysis performed includes univariate analysis and bivariate analysis. Univariate analysis in this study describes the characteristics of children and parents as well as the variables related to independent and dependent variables. Bivariate analysis used Chi-Square test to examine the relationship between food security and dietary diversity with stunting status. P-values <0.05 were used to indicate statistical significance.

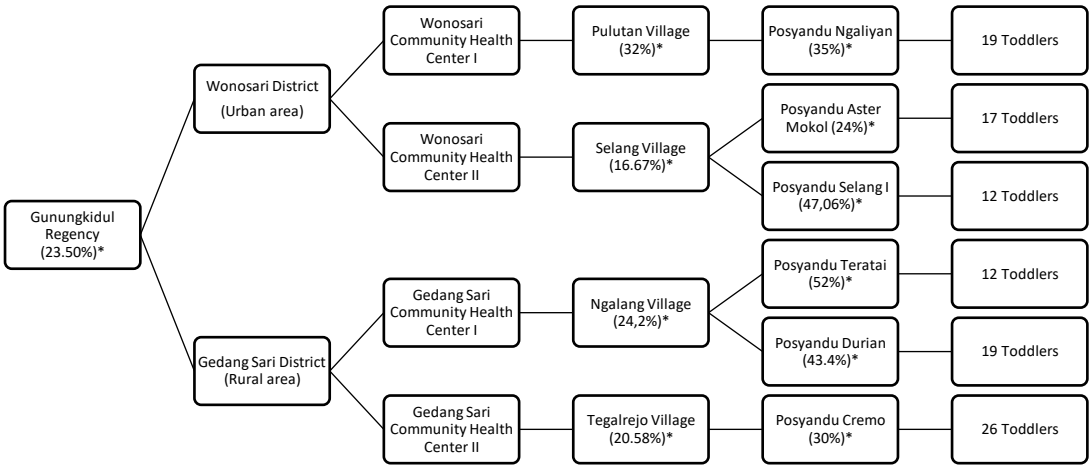

Figure 1. Sampling process
*) *stunting prevalence*

Results

The respondents in this study were children aged 12-59 months residing in Gunungkidul Regency. **Table 1** shows that the majority of respondents were aged 24-59 months, accounting for 78.1%. The majority of respondents were male, with a percentage of 58.1%. Based on residence data, 45.7% resided in Wonosari District and 54.3% resided in Gedang Sari District. Most fathers had an education level of junior high school/equivalent, with a percentage of 37.1%, while the majority of mothers had an education level of junior high school/equivalent and high school/equivalent, with a percentage of 37.1%. The majority of fathers worked as daily laborers, with a percentage of 38.1%, while the majority of mothers were housewives, with a percentage of 81.9%. In Gedang Sari District, the majority of families had an income below the Gunungkidul Minimum Wage, with a percentage of 63.8%. The majority of respondents did not receive any assistance, with a percentage of 38.1%. Most families had ≥4 dependents, with a percentage of 89.5%.

Based on primary data regarding the nutritional status of patients, 31.4% of children are classified as stunted, while 68.6% are not stunted. Household food security impacts the availability of food within the family. Stunting in children can result from an imbalance in food intake. The distribution of food security shows that 44.8% of families were categorized as food insecure, and 48.6% of children were categorized as having not diverse food intake; 51.4% were categorized as having diverse food intake.

The bivariate analysis of food security and stunting in **Table 2** shows that food security is not significantly associated with the occurrence of stunting. The p-value for the bivariate analysis between food security and stunting is 0.454. The percentage of stunting was slightly higher in the food secure category. Dietary diversity and stunting had significant relationship with the p-value was 0.012. The lowest percentage of stunting was found in the group with high dietary diversity.

Table 1. Characteristics of the respondents

Characteristics	n	%
Child's Age		
12-23 months	23	21.9
24-59 months	82	78.1
Gender		
Male	61	58.1
Female	44	41.9
Residence		
Wonosari District	48	45.7
Gedang Sari District	57	54.3
Father's Education		
Did not complete elementary school	3	2.9
Completed elementary school	22	21.0
Completed junior high school	35	33.3
Completed senior high school	39	37.1
Completed diploma/D3	3	2.9
Completed bachelor's degree or higher	3	2.9
Mother's Education		
Did not complete elementary school	1	1.0
Completed elementary school	16	15.2
Completed junior high school	39	37.1
Completed senior high school	39	37.1
Completed diploma/D3	4	3.8
Completed bachelor's degree or higher	6	5.7
Father's Occupation		
Farmer	3	2.9
Factory worker	6	5.7
Farm laborer	16	15.2
Private employee	17	16.2
Government employees/military/police	3	2.9
Entrepreneur	13	12.4
Daily laborer	40	38.1
Others	7	6.7
Mother's Occupation		
Farmer	1	1.0
Factory worker	1	1.0
Private employee	2	1.9
Government employees/military/police	3	2.9
Entrepreneur	3	2.9
Housewife/Unemployed	86	81.9
Daily laborer	1	1.0
Others	8	7.6
Family Income		
<Regional Minimum Wage of Gunungkidul (IDR 2,188,041,-)	67	63.8
≥Regional Minimum Wage of Gunungkidul (IDR 2,188,041,-)	38	36.2
Government Assistance		
Did not receive assistance	40	38.1
Receive assistance (PKH/BLT/BPNT)*	35	33.3
Receive more than one type of assistance	18	17.2
Others	12	11.4
Number of Family Dependents		
≥ 4 dependents	94	89.5
< 4 dependents	11	10.5

Characteristics	n	%
Distribution of Stunting		
Stunted	33	31.4
Normal	72	68.6
Food Security Status		
Food Insecure	47	44.8
Food Secure	58	55.2
Dietary Diversity Status		
Not Diverse (IDDS <5)	51	48.6
Diverse (IDDS ≥5)	54	51.4

*) *assistance program from the Indonesian Government in the form of subsidized money to help poor families*

Table 2. Association of food security and dietary diversity with stunting among toddlers

	Stunting Status				*p-value*	OR (95% CI)
	Stunted		Normal			
	N	%	N	%		
Food Security						
Food Insecure	13	27.7	34	72.3	0.454	0.73 (0.314-1.679)
Food Secure	20	34.5	38	65.5		
Dietary Diversity						
Not Diverse	22	43.1	29	56.9	0.012	2.97 (1.251-7.033)
Diverse	11	20.4	43	79.6		

Discussion

The results of this study showed that most of the 105 households in Gunungkidul Regency were categorized as food insecure. A majority of the food-insecure households were headed by daily laborers and had a lower socioeconomic status compared to food-secure households. According to UNICEF's conceptual framework of malnutrition, limited availability and control of resources influence household food access[28]. Regarding dietary diversity, the study found that most respondents had a moderate level of dietary diversity. Dietary diversity is a critical factor in determining the nutritional quality of a child's diet[29]. Children's dietary diversity can be influenced by family income[30]. Family income is closely linked to household food security, making household food security a key factor in achieving dietary diversity.

Household food insecurity is a condition where households have limited access to food, resulting in poor dietary quality[31]. Poor dietary quality is a nutritional health issue that needs attention[32]. This study also evaluated the relationship between household food security and stunting among children aged 12 to 59 months in Gunungkidul Regency. The results showed no significant association between food security and stunting in Gunungkidul. These findings are consistent with previous research conducted in Sekela District, Western Ethiopia, which also found no significant association between food security and stunting[33]. This study aligns with previous research in Maharashtra, India, which indicated no significant association between food security and stunting in both rural and urban areas[34]. Additionally, this study aligns with previous research conducted in East Siau and West Siau Subdistricts on Makalehi Island, indicating that there was no significant correlation between food security and stunting[35]. Stunting can be caused by various factors such as inadequate dietary intake, caregiving practices, and child health[28]. Previous research on food security conducted in areas with a low prevalence of stunting at the Dawe Community Health Center in Kudus Regency showed that most were food secure (74.4%) and food insecure (25.6%)[36]. While household food security is one factor contributing to stunting, there are numerous other factors involved, suggesting that stunting is not solely driven by food security.

Most of the children in this study were categorized as having high dietary diversity. However, most stunted children had a moderate level of dietary diversity. The results showed a significant negative correlation ($p<0.05$) between dietary diversity and stunting in Gunungkidul Regency. This indicates that higher dietary diversity scores were associated with better child height and a lower risk of stunting. Conversely, lower dietary diversity scores were linked to lower height-for-age. These findings align with previous research conducted in Dessie and Combolcha, Ethiopia, which demonstrated a significant association between dietary diversity and stunting[37]. Study in Semarang Regency, Indonesia, found a similar significant relationship between dietary diversity and stunting[38]. Additionally, this research aligns with a study in Bogor, indicating a significant correlation between dietary diversity and stunting[39]. Previous research on dietary diversity conducted in areas with a low prevalence of stunting in West Sumba Regency showed that most had adequate dietary diversity (98.31%) and inadequate dietary diversity (1.69%)[40]. Dietary diversity is crucial for child growth as consuming only one type of nutrient is insufficient to meet all the nutritional needs, especially during childhood[41]. The more varied the diet, the more nutritional needs are met[42]. A diverse diet can support the growth and development of children under five years of age[43].

This study has certain limitations that may have influenced the results. A deeper exploration of potential confounding variables was lacking. For instance, the duration of government assistance for food-insecure households was not thoroughly investigated and could be a confounding factor in the relationship between food security and stunting.

Conclusion

Dietary diversity is a factor that can cause stunting in children. However, food security is not the only factor determining the occurrence of stunting. The results of this study show that there was no significant relationship between food security and stunting in Gunungkidul Regency, but significant relationship was seen between dietary diversity and stunting. Based on the research findings, providing a diverse diet is crucial for child feeding. It is important for caregivers of toddlers to provide good parenting, including offering dietary diversity, especially those based on local ingredients.

Conflict of interest

The authors declared no conflict of interest regarding this article.

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References

1. Mahardhika F, Malonda NS., Kapantow NH. Hubungan Antara Usia Pemberian Makanan Pendamping Asi (MP-ASI) Pertama Kali dengan Status Gizi Anak Usia 6-12 Bulan di Wilayah Kerja Puskesmas Kombos Kota Manado. Fakultas Kesehatan Masyarakat Universitas Sam Ratulangi. 2018;7(3):1–7.
2. Khulafa'ur Rosidah L, Harsiwi S. *Hubungan status gizi dengan perkembangan balita usia 1-3 tahun* (*Di Posyandu Jaan Desa Jaan Kecamatan Gondang Kabupaten Nganjuk*). Jurnal Kebidanan. 2019;6(1):24–37.
3. Catur Utami D, Nur Azizah A, Nur Azizah A. *Hubungan Status Gizi Dengan Perkembangan Balita Usia 1-5 Tahun Di Wilayah Kerja Puskesmas Kutasari*. Avicenna: Journal of Health Research. 2023;6(1):28.

4. Yuliantini E, Kamsiah K, Maigoda TC, Ahmad A. *Asupan makanan dengan kejadian stunting pada keluarga nelayan di Kota Bengkulu*. AcTion: Aceh Nutrition Journal. 2022;7(1):79.
5. Eldrian F, Karinda M, Setianto R, Dewi BA, Guzmira YH. *Hubungan Riwayat Penyakit Infeksi Dengan Kejadian Stunting Pada Balita di Puskesmas Cipadung Kota Bandung*. Jurnal Manajemen Kesehatan. 2023;9(1):80–9.
6. Pratiwi R, Sari RS, Ratnasari F. *Dampak Status Gizi Pendek (Stunting) terhadap Prestasi Belajar*. Jurnal Ilmu-Ilmu Keperawatan. 2021;12(2):10–23.
7. Kementerian Sekretariat Negara Republik Indonesia. *Peta Jalan Percepatan Pencegahan Stunting Indonesia 2018-2024*. TP2AK Sekretariat Wakil Presiden Republik Indonesia. 2020;1–24.
8. Kementerian Kesehatan. *Hasil Survei Status Gizi Indonesia (SSGI) 2022*. Kementerian Kesehatan. 2022;1–150.
9. Dinas Kesehatan. *Profil Kesehatan D.I.Yogyakarta Tahun 2022*. *Dinas Kesehatan DIY*. 1859. 11–16 p.
10. Arlius A. *Hubungan Ketahanan Pangan Keluarga Dengan Status Gizi Balita* (*Studi Di Desa Palasari Dan Puskesmas Kecamatan Legok*. Jurnal Ketahanan Nasional. 2017;23(3):359–75.
11. Lestari TD, Gunarto T, Yuliawan D. Cigarette Consumption, Credit Access, And Determinants Household Food Security in Lampung Province. Jurnal Ekonomi Pertanian. 2023;16(2):139–48.
12. Riani. *Hubungan Pendapatan Keluarga dengan Status Gizi Balita di Desa Kualu Wilayah Kerja Puskesmas Tambang Kabupaten Kampar Tahun 2018*. Jurnal Ners. 2018;2(1):102-106.
13. Islamiah WE, Nadhiroh SR, Putri EBP, Farapti, Christiwan CA, Prafena PK. *Hubungan Ketahanan Pangan Dengan Kejadia Stunting Pada Balita dari Keluarga Nelayan*. Media Gizi Indonesia (National Nutrition Journal). 2022;17(1SP):83–9.
14. United Nations Children's Fund. The State of the World's Children A Fair Chang Every Child. United Nations Children's Fund. 2016.
15. Fedriansyah D, Paramashanti BA, Paratmanitya Y. *Faktor Sosial Ekonomi Dan Stunting Pada Anak Usia 6-23 Bulan*. Media Gizi Pangan. 2020;27(1):22–9.
16. Gassara G, Lin Q, Deng J, Zhang Y, Wei J, Chen J. Dietary Diversity, Household Food Insecurity and Stunting among Children Aged 12 to 59 Months in N'Djamena—Chad. Nutrients. 2023;15(3):1–14.
17. Masrin, Paratmanitya Y, Aprilia V. *Ketahanan pangan rumah tangga berhubungan dengan stunting pada anak usia 6-23 bulan*. Jurnal Gizi dan Dietetik Indonesia. 2014;2(3):103–15.
18. Dinas Pertanian dan Pangan. *Laporan Kinerja Instansi Pemerintah Dinas Pertanian dan Pangan Kabupaten Gunung Kidul Tahun 2023*. Dinas Pertanian dan Pangan. 2024;7(2).
19. Sari HP, Permatasari L, Putri WAK. *Perbedaan Keragaman Pangan, Pola Asuh Makan, dan Asupan Zat Gizi Makro pada Balita dari Ibu Bekerja dan Ibu Tidak Bekerja*. Amerta Nutrition. 2021;5(3):276.
20. Labadarios D, Mchiza ZJR, Steyn NP, Gericke G, Maunder EMW, Davids YD, et al. Food security in South Africa: A review of national surveys. Bull World Health Organ. 2011;89(12):891–9.
21. Pujiyanti BR, Anggraeni AD. *Hubungan Ketersediaan Keanekaragaman Pangan Dan Lingkungan Rumah Sehat Terhadap Status Gizi Pada Balita Usia 24-59 Bulan Di Desa Cindega Kec. Kebasen Kab. Banyumas*. Journal Health Research Science. 2022;2(02):155–65.
22. Munnawarroh F, Murni D, Susmiati S. *Sosio Ekonomi Dan Skor Keragaman Makanan Terhadap Kejadian Stunting*. Link. 2022;18(1):29–36.
23. Nirmala Sari MR, Ratnawati LY. *Hubungan Pengetahuan Ibu tentang Pola Pemberian Makan dengan Status Gizi Balita di Wilayah Kerja Puskesmas Gapura Kabupaten Sumenep*. Amerta Nutrition. 2018;2(2):182.
24. Kementerian Kesehatan RI. *Peraturan Menteri Kesehatan Republik Indonesia No. 2 Tahun 2020 tentang Standar Antropometri Anak. Kementerian Kesehatan RI. 2020*.
25. Nurfaradila T. *Status Ketahanan Pangan Rumah Tangga dan Pola Asuh Sebagai Faktor Risiko Kejadian Stunting Pada Balita Usia 24-59*. Repositori Universitas Jember. 2019–22.
26. World Health Organization and United Nations International Children's Emergency Fund. Indicators for assessing infant and young child feeding practices. Vol. WHA55 A55/, World Health Organization and the United Nations Children's Fund. 2021. 19 p.
27. Food and Agriculture Organization. Guidelines for measuring household and individual dietary diversity. FAO. 2011. 1–60 p.
28. United Nations Children's Fund. Conceptual Framework on Maternal and Child Nutrition. Nutr Child Dev Sect Program Gr 3 United Nations Plaza New York, NY 10017, USA. 2021;2–3.
29. World Health Organization. WHO Guideline for complementary feeding of infants and young children 6–23 months of age. WHO. 2023.
30. Solomon D, Aderaw Z, Tegegne TK. Minimum dietary diversity and associated factors among children aged 6-23 months in Addis Ababa, Ethiopia. International Journal Equity in Health. 2017;16(1):1–9.
31. Harper A, Rothberg A, Chirwa E, Sambu W, Mall S. Household Food Insecurity and Demographic Factors, Low Birth Weight and Stunting in Early Childhood: Findings from a Longitudinal Study in South Africa. Maternal Child Health Journal. 2023;27(1):59-69.
32. Lye CW, Sivasampu S, Mahmudiono T, Majid HA. A systematic review of the relationship between household food insecurity and childhood undernutrition. Journal Public Health (United Kingdom). 2023;45(4):e677–91.
33. Mulu E, Mengistie B. Household food insecurity and its association with nutritional status of under five children in Sekela District, Western Ethiopia: A comparative cross-sectional study. BMC Nutr. 2017;3(1):1–9.

34.Chandrasekhar S, Aguayo VM, Krishna V, Nair R. Household food insecurity and children's dietary diversity and nutrition in India. Evidence from the comprehensive nutrition survey in Maharashtra. Maternal Child Nutrition. 2017;13(January):1–8.
35. Sanggelorang Y, Sebayang FAA, Rumayar AA. *Kajian Ketahanan Pangan Rumah Tangga Dan Stunting Di Daerah Pedesaan Pesisir Dan Pulau Kecil Terluar*. Jurnal Kesehatan Masyarakat. 2024;8(April):1272–80.
36.Rahmatika T, Pangestuti DR, Asna AF. *Hubungan Ketahanan Pangan , Pola Asuh , dan Tingkat Kecukupan Gizi dengan Kejadian Stunting Balita 6-59 Bulan di Puskesmas Dawe , Kabupaten Kudus*. Amerta Nutrition. 2024;8(3):82–93.
37.Dinku AM, Mekonnen TC, Adilu GS. Child dietary diversity and food (in)security as a potential correlate of child anthropometric indices in the context of urban food system in the cases of north-central Ethiopia. Journal Health Population Nutrition. 2020;39(1):1–11.
38. Prasetyo A, Davidson SM, Sanubari TPE. Correlation between Individual Dietary Diversity and Children 2-5 Years Old Nutrition Status in Batur Village, Getasan Regency, Semarang District. Amerta Nutrition. 2023;7(3):343–9.
39.Prastia TN, Listyandini R. *Keragaman pangan berhubungan dengan stunting pada anak usia 6-24 bulan*. Jurnal Kesehatan Masyarakat. 2020;8(1):33–40.
40.Hendryanti DN, Andriani C, Indriani S, Gunawan L, Sibero MT. Dietary Diversity, Stunting, and the Impact of an Education Program on Parents' Knowledge and Attitudes in West Sumba, Indonesia. Jurnal Gizi dan Pangan. 2023;18(2):79–88.
41.Sie A, Tapsoba C, Dah C, Ouermi L, Zabre P, Barnighausen T, et al. Dietary diversity and nutritional status among children in rural Burkina Faso. International Health. 2018;10(3):157–62.
42.Kementerian Kesehatan RI. *Peraturan Menteri Kesehatan Republik Indonesia No. 41 tahun 2014 tentang pedoman gizi seimbang*. Kementerian Kesehatan RI. 2014.
43.Mank I, Vandormael A, Traore I, Ouedraogo WA, Sauerborn R, Danquah I. Dietary habits associated with growth development of children aged < 5 years in the Nouna Health and Demographic Surveillance System, Burkina Faso. Nutrition Journal. 2020;19(1):1–14.