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Correlation between Individual Dietary Diversity and Children 2-5 Years Old Nutrition Status in Batur Village, Getasan Regency, Semarang District

Hubungan Keragaman Pangan Individu dan Status Gizi Anak 2-5 Tahun di Desa Batur, Kecamatan Getasan, Kabupaten Semarang

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ABSTRACT

Background: In the rural area, food security problem tends to be a challenge. This situation arose because of the lack of dietary diversity and impacted family nutrition, especially for infants.
Objectives: This study aimed to determine the correlation between individual food diversity and the nutritional status of children 2-5 years in Batur Village, Semarang District, Indonesia.
Methods: Observational research with a cross-sectional design was carried out. The respondents were families with toddlers aged 2-5 years and members of the Integrated Service Post (Posyandu) in Batur Village, Getasan Health Center. This research instrument used a food recall questionnaire 1x24-h and was processed based on the Individual Dietary Diversity Score (IDDS). Sampling was done by simple random sampling technique for 95 toddlers.
Results: There was a significant correlation between food diversity and children's nutritional status under five. The HAZ correlation value is r=0.618; p<0.001. The WAZ correlation value is r=0.545; p<0.001; the WHZ correlation value is r=0.325; p=0.001. A significant correlation was found between the variety of foods in the IDDS and the nutritional status of the HAZ (r=0.618).
Conclusions: Food diversity is one of the factors associated with the occurrence of nutritional problems for infants in Batur Village.

INTRODUCTION

Diverse food consumption patterns are still a problem faced at the family level in urban and rural areas. In rural areas, the problem of food diversity arises due to imbalances in food security in terms of production and availability, distribution, and consumption[1]. Food diversity can be used as an indicator of food security and is one of the crucial components to be measured, which helps assess quality and quality food consumption patterns. Consuming various foods can fulfill the need for a person's nutritional intake. Increased consumption of various foodstuffs shows food diversity and can meet complete nutritional needs because there is no single food ingredient with complete nutritional content[2]. Need to consume various types of food ingredients to meet nutritional needs.

Food diversity can affect individual nutritional status, especially in children under five. Family consumption patterns that are less diverse can impact the nutritional needs of children under five are not met. Consumption of food with good quantity and quality is significant to meet the nutritional needs of toddlers because toddler age is a golden period of growth and development. During this period, providing a variety of foods with balanced nutrition is needed to support the optimal growth and development of children[3]. On the contrary, according to the results of Anindita's research (2012), the low quality of food consumption and nutritional intake can hinder the potential for growth and development of children and is also related to the cause of chronic nutritional problems, namely short nutritional status (stunting) in toddlers[4].

Globally, there are 155 million stunting and hindering their growth in toddlers. Malnutrition accounts for around 45% of deaths among children under five, mostly in low- and middle-income countries[5]. Meanwhile, at the national level of Indonesia (2018), the prevalence of stunting was still very high (30.8%)[6]. This number is still far from the target of the World Health Organization (WHO), which is 20%. In addition to increasing the risk of morbidity and mortality, malnutrition at an early age has long-term health effects when children enter adolescence and adulthood, namely the risk of developing chronic or degenerative diseases, increasing susceptibility to infectious diseases, and poor cognitive and psychomotor development[3,7]. Based on the

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research in Bangladesh and Africa, the nutritional status indicators of height/age Z-Score (HAZ) were significantly related to the diversity in food consumption in children under five[7,8]. Other studies in Indonesia also found similar results. There was a significant relationship between food diversity and the proportion of food expenditure with the nutritional status indicator Weight for Height Z-Szore (WHZ) or wasting, which reflects acute nutritional problems[9].

Departing from efforts to meet nutritional intake and improve nutritional status in toddlers, one method that can be applied to form healthy and nutritious eating habits in children is increasing family food diversity. Family food diversity exists when it can meet balanced nutritional intake by consuming various foodstuffs for all family members. No one type of food contains all nutrients, so consuming various types of food is expected to meet one's nutritional intake needs[10]. In Indonesia, the pattern of food consumption in most people so far is still not diverse and focuses on efforts to meet energy needs only. Understanding food consumption sometimes depends on staple food sources of carbohydrates dominated by the grain group[11]. Therefore, the concept of food diversity requires not only being fixated on one type of staple food but also applying consumption patterns to various types of food[12].

Several studies have discussed food diversity with the nutritional status of toddlers. A study has been conducted on malnutrition in children under five due to not fulfilling non-nutritious and diverse food intake in food-insecure and low-income households in rural and urban areas[13,14]. However, few studies still discuss food diversity and the nutritional status of children under five at the household level living in rural areas that have implemented sustainable farming systems. This study aims to analyze food diversity based on Individual Dietary Diversity Score (IDDS) with the nutritional status of children 2-5 years based on indicators of WHZ, HAZ, and weight for age Z-Score (WAZ) in Batur Village, Semarang Regency, Indonesia, which is known as one of the areas that have implemented a sustainable farming system.

METHODS

This research was an observational study with a cross-sectional design carried out in October 2020 - February 2021 at the Posyandu in Batur Village, the work area of the Getasan Health Center, Getasan District, Semarang Regency, Indonesia. This research has obtained ethics approval with No. 037/KOMISIETIK/EC/X/2020 from the ethical institute of Satya Wacana Christian University, Indonesia. The sample for this study was toddlers aged 2-5 years who were members of the Batur Village Posyandu, the working area of the Getasan Health Center, whose data were obtained with the help of village cadres and midwives who served at each Posyandu. The sample was selected based on a simple random sampling technique. As many as 95 toddlers who fit the criteria were selected to be the research sample, with mothers of toddlers as respondents. The inclusion criteria for this study were mothers/caregivers with children aged 2-5, mothers who provided family meals independently, and mothers willing to be interviewed.

Meanwhile, the exclusion criteria were children who were sick or were taking routine medication. After getting the respondents and research subjects, the researchers collected anthropometric data, including measurements of the toddler's height and weight, which were used as nutritional status assessment data. Then, interview mothers regarding toddler food consumption for food diversity data.

This study consisted of the dependent and independent variables, with the nutritional status of toddlers as the dependent variable. Nutritional status data were obtained from anthropometric measurements of body weight and height. Body weight data were obtained by direct measurement using a digital scale with a precision of 0.1 kg, and height measurements were measured with a microtoise with an accuracy of 0.1 cm. The nutritional status of toddlers is then assessed according to the WAZ, HAZ, and WHZ indexes based on the Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2020 concerning Child Anthropometric Standards[15]. The indicators for WAZ were categorized into (Severe underweight, Moderate underweight, Normal weight, and Overweight), HAZ (Severe stunting, Moderate stunting, and Normal), and WHZ (Severe wasting, Moderate wasting, Normal, At the risk of overnutrition, Overweight, and Obesity). The independent variable in this study was the level of food diversity obtained using the 1x24-hour food recall instrument and processed based on the IDDS. IDDS consists of 9 food groups, including cereals and tubers, meat and fish, offal, eggs, milk and their processed products, legumes, vitamin A vegetables and fruits, dark green leafy vegetables, and others. The consumption of the nine food groups is then classified into three categories, namely low category consumption when consuming ≤ 3 types of foodstuffs[16].

The data collected was then processed by editing, coding, processing, and cleaning. The univariate analysis aimed to describe the distribution of variables based on percent and mean. Furthermore, before bivariate analysis was conducted, the data were tested for normality using the Kolmogorov-Smirnov test. Spearman's correlation test was carried out to analyze two variables (bivariate analysis) to analyze the relationship between food diversity and the nutritional status of children under five with a confidence level of 95%.

RESULTS AND DISCUSSION

Characteristics of Respondents and Research Subjects

The research found that as many as 95 toddlers had measured their height and weight during January 2021 at the Integrated Service Post (Posyandu), which is spread in Batur Village, Getasan District. Dissemination of health information is an essential component in providing information. This study found that the education of most mothers who were still in primary education did not prevent them from obtaining information about health and meeting the nutritional needs of their children. Mothers of children under five obtained knowledge and information about child nutrition through the information they obtained, either socialization or

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counseling from cadres and village midwives or from the results they found and read information from the media, such as health posters in Posyandu. When mothers take their toddlers to the Posyandu, they often ask and seek advice from the village midwife for monitoring growth and development and efforts to improve toddler health.

Table 1. Characteristics of toddlers at Integrated Service Post (Posyandu) in Batur Village, Getasan District, Semarang City, Indonesia

Characteristics	N=95	%
Gender		
Male	49	51.6
Female	46	48.4
Maternal Education		
Basic education	89	93.7
Higher education	6	6.3
Maternal job		
Work	72	70.8
Does not work	23	24.2

Based on the community's ability to obtain this information, education is not a significant factor but support for receiving and absorbing information. Not infrequently, mothers experience difficulties in implementing this information in everyday life. Consumption data shows that mothers with elementary school education levels (< high school) tend to consume a variety of foods that do not vary compared to toddlers whose mothers have a higher education level. Mothers often obey their toddlers by buying snacks sold in stalls and at itinerant vendors who trade around their homes. The mother does this because the toddler is not fussy and crying. In addition, in infants who rarely eat, mothers also work around this by giving formula milk because it can be considered to replace food intake and meet the nutritional needs of toddlers. This condition occurs because mothers with lower education do not know the nutritional intake needs of toddlers, so mothers often provide foods that toddlers only want, such as snacks and formula milk. The provision of a poor diet that is carried out continuously will certainly also have an impact on the nutritional status of toddlers.

People with an educational background will be better able to absorb new knowledge and have a more comprehensive level of knowledge. This advantage is also very much needed in efforts to fulfill child nutrition because the community will better understand the needs of children. This statement was also explained by Nurhayati & Hidayat (2019) that a higher level of education would be followed by a deeper level of knowledge and understanding so that it will be more accurate to receive and absorb information and participate in helping to overcome health problems for himself and his family[17]. In other words, the mother's education is one aspect that plays a role in providing nutritious food for children. The higher the mother's education, the better the nutritional intake children will obtain.

Consumption of Food Groups

The results for the consumption of the toddler food group in Batur Village can be seen in Figure 1. The quality of IDDS consumption is seen from the various foods consumed at the individual level. In general, food consumption is information about the type and amount of food consumed by an individual with a specific purpose. According to the Food and Agriculture Organization (FAO) in 2010, individual food diversity can reflect individual nutritional intake and directly affect nutritional status. Therefore, sufficient, complete, and balanced food consumption is one of the critical components supporting individuals' health and nutritional status of individuals[16].

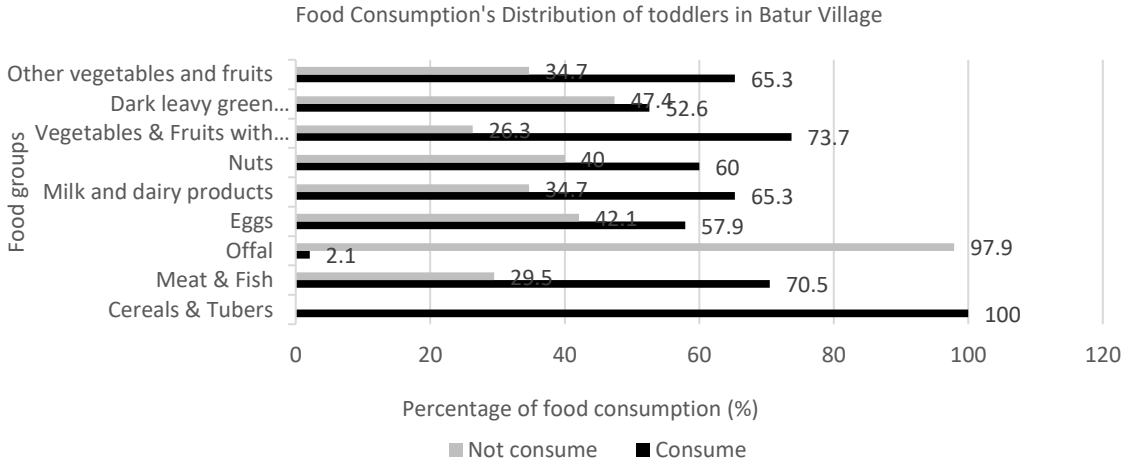

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Figure 1. Consumption distribution of toddler food groups based on IDDS at Integrated Service Post (Posyandu), Batur Village, Getasan Regency, Semarang District, Indonesia

Figure 1 shows data on food groups consumed by toddlers in Batur village. It 1 illustrates that the majority of toddlers consume a variety of foods. This result is inseparable from the role of the family, especially mothers, as caregivers and have more responsibility in providing family food, including for toddlers. The role of the mother in providing diverse food for toddlers is vital, which is reflected in the behavior and perspective of the mother regarding the provision of diverse and nutritious eating habits to achieve good nutritional status for toddlers. Toddlers consume all essential nutrients to optimize early life and long-term processes toward education, work potential, and health in the future. Fulfilling the consumption of these primary nutrients includes intake of macro-carbohydrate nutrients, protein, and fat, which provide energy, as well as support for the formation of tissues and anatomy of the body in carrying out its functions. In addition, the need for micronutrients, namely vitamins and minerals, primarily obtained from vegetables and fruits, is also significant for toddlers. These nutrients act on cognitive and motor development as antioxidants to strengthen the body's immunity and avoid infectious diseases often found in toddlers.

Diverse food patterns for the majority of toddlers in Batur Village are shown in the types of food consumed, namely staple food groups (cereals and tubers), animal protein (meat, fish, milk, and their processed products), vegetable protein (legumes), minerals and vitamins (vegetables and fruit) (Figure 1). Consumption of various foods is very much needed in toddlers, as it is known that toddlers must consume a variety of foods to obtain all balanced nutrients to help their growth and development process[3]. Even so, there are still toddlers in Batur Village who have been unable to meet nutritional intake due to a lack of variety in food consumption. Poor eating habits are one aspect of low consumption of various foods in toddlers. This result aligns with the data from interviews regarding food consumption, which found that food consumption was simply an effort to fulfill energy intake for physical activity, so consumption patterns were often limited to certain foods such as staple food sources of carbohydrates, animal protein, and paid little attention to food types.

Besides that, this study also found that animal food groups such as chicken/fish meat, dairy products, and eggs also had a large percentage of foodstuffs consumed by toddlers in Batur village. This result is in line with Andadari & Mahmudiono's research (2017), which found that food groups containing animal protein sources were consumed more than vegetable protein food groups in toddlers in agricultural areas[18]. The high level of consumption of animal protein food in toddlers in Batur village is influenced by the toddler's favorite factor. Food preferences refer to acceptance, which can be seen in the eating habits of toddlers who like to consume chicken, eggs, and milk in the food menu that is often served.

Nutritional Status of Toddlers

In this study, most toddlers had normal (good) nutritional status based on the WHZ (82.1%), although respondents had moderate wasting (1.05%) and severe wasting status (1.05%). Based on the HAZ, although most respondents had normal nutritional status, 18 were stunted children. In line with the two nutritional status indicators, based on the WAZ, most respondents have good nutritional status (normal weight), but toddlers are still severely underweight, moderately underweight, and overweight. Toddlers who experience malnutrition are caused by insufficient intake of nutrients. On the other hand, toddlers with excess nutrition occur due to excess intake of nutrients. Moreover, based on Andadari & Mahmudiono (2017), the intake of nutrients consumed should be complete and balanced, neither less nor more, because it can cause nutritional problems[18].

Table 2. Distribution of nutrition status for WAZ, HAZ, and WAZ of toddlers at Integrated Service Post (Posyandu), Batur Village, Getasan Regency, Semarang District, Indonesia

Children's Nutritional Status	n (N=95)	%
Weight for Height Z-Score (WHZ)		
Severe wasting	1	1.05
Moderate wasting	1	1.05
Normal	78	82.1
At the risk of overnutrition	7	7.4
Overweight	6	6.3
Obesity	2	2.1
Height for Age Z-Score (HAZ)		
Severe stunting	8	8.4
Moderate Stunting	11	11.6
Normal	76	80
Weight for Age Z-Score (WAZ)		
Severe underweight	3	3.2
Moderate underweight	6	6.3
Normal weight	79	83.1
Overweight	7	7.4

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This study found that the higher the variety of food for toddlers, the more normal the assessment of nutritional status would be. In contrast, the low diversity of food impacts the emergence of malnutrition problems in toddlers. Even though most toddlers have normal nutritional status, the problem of malnutrition is also experienced by toddlers in Batur Village, especially toddlers with stunting. Stunting is still a severe nutritional problem and has become a concern of the Semarang Regency government, which has also been designated as one of the focus locations for integrated stunting reduction interventions at the national level. The problem of stunting is related to the stunted growth and development of children under five due to a long-term process of chronic malnutrition from the beginning of life. It usually develops during the first two years and persists into childhood, adolescence, and adulthood, resulting from chronic nutritional problems and physical and cognitive development obstacles. According to Atin Nurmayasanti & Trias Mahmudiono (2019), stunting is caused by several factors, such as inadequate nutritional intake for toddlers[19]. Toddlers in Batur Village also experience a similar situation; the low consumption of food diversity impacts not fulfilling the nutritional intake needed by toddlers, resulting in malnutrition problems. Lower food diversity was found in toddlers who experienced malnutrition problems compared to toddlers with normal nutritional status.

Not only malnutrition problems of excess nutrition, such as the risk of overnutrition, overweight, and obesity, are also still found in toddlers in Batur Village (Table 2). From the results of a food consumption survey with a 1x24-hour food recall, toddlers with more nutritional status have excess nutrient intake levels and high consumption of high-sugar/fat snacks and formula milk. Excessive provision of snacks and formula milk can be a factor causing the problem of overweight (overweight and obesity) due to the relatively high energy-dense and fat content, which risks disrupting the body's metabolism and triggering obesity. If left unchecked, the problem of excess nutrition in toddlers can impact the emergence of the risk of other degenerative diseases such as hypertension, obesity, and diabetes mellitus[20].

Food Diversity

Access to food is one factor that influences the diversity of household food consumption. Food diversity is one of the benchmarks for an individual's diet quality. Food diversity is considered a parameter in assessing household or individual food access, utilization, and quality. The FAO has recommended guidelines for measuring individual dietary diversity in nine food groups[16]. Food diversity in this study was calculated based on the IDDS, shown in Table 3 below.

Table 3. Food diversity distribution of toddlers at Integrated Service Post (Posyandu) in Batur Village, Getasan Regency, Semarang District, Indonesia

Diversity of Food Consumption	N=95	%
Low ≤ 3 groups of food	9	9.5
Moderate 4-5 groups of food	42	44.2
Height ≤6 groups of food	44	46.3

Various food consumption can determine the quality of a person's diet. The economic, social, and cultural conditions of society can influence the diversity of food consumption at the household and individual levels. The eating pattern that does not vary is one of the many causes of various nutritional problems in toddlers[21]. As seen in Table 3, this study found that the distribution of toddlers living in Batur Village showed a food diversity score in the medium and high categories. The higher the food diversity score, the more it will help meet all the nutritional needs of toddlers and create an ideal nutritional status.

This research shows that the diversity of food consumption is supported by the ease of physical access to food, especially in several types of food groups, such as vegetables. These conditions can also increase the diversity of family food[21]. The variation in vegetable consumption among toddlers in Batur Village occurs because most of the population living in rural areas primarily work as farmers. They cultivate a variety of vegetables so that the vegetables they consume come from their garden crops. Easy access and the availability of food ingredients from garden produce make vegetable consumption in toddlers diverse and sufficient. Batur Village toddlers consume carrots, broccoli, spinach, kale, mustard greens, cabbage/cabbage, pumpkin, green beans, and fennel vegetables.

In addition to the consumption of vegetable food types, the high food diversity among toddlers in Batur village is the consumption of animal foods such as chicken meat and eggs. Eggs are a nutrient-dense animal food source that is easy to obtain, and the price is very affordable compared to other animal-based food sources. Eggs are often consumed because the processing method is relatively easy, practical, and has many variations in presentation[22]. This animal and vegetable food contains a high source of protein, mineral, and vitamin nutrients, so toddlers must consume what is needed to support optimal growth and development. The types of food sources of protein, minerals, and vitamins should be presented in the daily household food menu so that toddlers get a balanced intake of nutrients.

Analysis of Diversity of Food Consumption with Nutritional Status

In this study, most toddlers have normal nutritional status and moderate and high food diversity scores (Table 2; Table 3). Based on the correlation test between IDDS food diversity and toddler nutritional status, the higher the food diversity score, the better the Z-score value for toddlers. This finding proves that various feeding practices positively impact the nutritional status of toddlers in Batur Village. Providing a variety of foods will help meet all the nutritional needs necessary

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for toddlers because no one type of food contains all nutrients. The diversity of food shown in Graph 1 shows that most children under five have consumed vegetables and fruits. Besides being a source of vitamins and minerals, Micronutrients found in vegetables and fruit can also prevent toddler malnutrition. The ease of access in Batur Village also supports the ease of consumption of fruits and vegetables for toddlers.

Table 4. Relationship between food diversity based on IDDS and nutritional status for WHZ, HAZ, and WAZ of toddlers at Integrated Service Post (Posyandu) in Batur Village, Getasan Regency, Semarang District, Indonesia

Variable	WHZ		HAZ		WAZ	
	r	p-value	r	p-value	r	p-value
Food Diversity/IDDS	0.325	0.001*	0.618	<0.001*	0.545	<0.001*

Spearman correlation test; *) Significantly related (p<0.05)

This study also found that a lower food diversity score was found in toddlers who experienced malnutrition problems. The problem of malnutrition in toddlers that still occurs is that the indicators for WHZ (wasting) and WAZ (underweight) have a lower prevalence than the prevalence in toddlers who experience stunting (Table 2). The results of the correlation test found that there was a positive relationship (p<0.05) between IDDS food diversity and wasting (p=0.325) and underweight toddlers (p<0.001), which showed a reasonably strong correlation with the value (r=0.325; r= 0.545) on each indicator of nutritional status. The relationship between IDDS and wasting and underweight toddlers shows that the nutritional intake obtained from the food diversity consumption survey is relatively lower when compared to toddlers with normal nutritional status. A low intake of limited essential micronutrients can cause this condition[23]. Toddlers who experience severe or moderate wasting due to lack of weight for height (WHZ) illustrate a substantial decrease in body weight in children, which a low intake of acute nutrients or disease can cause. Deficiencies of micronutrients are caused by inadequate food intake and increased needs. This condition is very relevant for toddlers because they are in a growth and development phase, so they have varying nutritional needs according to the more significant growth stage[23,24].

In addition, this study also found that IDDS food diversity was significantly positively related (p<0.001) to HAZ in toddlers in Batur Village and showed a strong correlation with value (r=0.618). In this case, the higher the food diversity score, the better the toddler's height and will reduce the possibility of stunting. In contrast, the lower the food diversity score, the lower the Z-score for toddlers. Food diversity is vital to maintaining the nutritional status of toddlers, including preventing stunting[8]. The high stunting rate at the same time also reflects the problem of chronic or long-term undernutrition that starts early in a child's life.

On the other hand, the problem of stunting illustrates the retardation of child growth due to the accumulated effects before and after birth. Stunting experienced by toddlers is a state of malnutrition in the past, which is reflected in the HAZ below -2 SD. The risk of stunting that occurs requires prevention from the beginning of pregnancy until the child enters the age of 2 years, which is referred to as the first 1000 days of life and when the child begins to follow the family diet, namely after the toddler is over two years old by providing a variety of diets.

CONCLUSIONS

This study shows a significant relationship between IDDS food diversity and the nutritional status of children aged 2-5 based on WHZ, HAZ, and WAZ indicators. The more variety of food consumed, the better the nutritional status of children. A strong correlation level is shown between dietary diversity and indicators of nutritional status at height/age.

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REFERENCES

1. Aziza, T. N. & Rustan. Kompleksitas Penanganan Penguatan Ketahanan Pangan. *J. Borneo Adm.* **4**, (2008).
2. Jayati, L. D., Madanijah, S. & Khomsan, A. Pola Konsumsi Pangan, Kebiasaan Makan, dan Densitas Gizi pada Masyarakat Kasepuhan Ciptagelar Jawa Barat. *Penelit. Gizi Makanan* **37**, 33–42 (2014).
3. Wahyuningsih, U., Anwar, F. & Kustiyah, L. Kualitas Konsumsi Pangan Kaitannya dengan Status Gizi Anak Usia 2-5 Tahun pada Masyarakat Adat Kesepuhan Ciptagelar dan Sinar Resmi. *Indonesia. J. Heal. Dev.* **2**, 1–11 (2020).
4. Anindita, P. Hubungan Tingkat Pendidikan Ibu, Pendapatan Keluarga, Kecukupan Protein & Zinc dengan Stunting (Pendek) pada Balita 6-35 Bulan di Kecamatan Tembalang Kota Semarang. **1**, 617–626 (2012).
5. HLPE. High-Level Panel of Experts. 2017. Nutrition and Food Systems. *Comm. o World Food Security.* **44**, 1–152 (2017).
6. Ministry of Health of Indonesia. Riset Kesehatan Dasar: Riskesdas 2018. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia. *Lap. Nas. Riskesdas 2018* **53**, 154–165 (2018).
7. Rah, J. H. *et al.* Low Dietary Diversity is a Predictor of Child Stunting in Rural Bangladesh. *Eur. J. Clin. Nutr.* **64**, 1393–1398 (2010).
8. Sié, A. *et al.* Dietary Diversity and Nutritional

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Status Among Children in Rural Burkina Faso. *Int. Health* **10**, 157–162 (2018).
9. Wirawan, N. N. & Rahmawati, W. Ketersediaan dan Keragaman Pangan serta Tingkat Ekonomi sebagai Prediktor Status Gizi Balita. *Indonesia. J. Hum. Nutr.* **3**, 80–90 (2016).
10. Priawantiputri, W. & Aminah, M. Keragaman Pangan dan Status Gizi pada Anak Balita di Kelurahan Pasirkaliki Kota Cimahi: Dietary Diversity and Nutrional Status of Under Five Children in Pasirkaliki Ditrict, Cimahi. *J. Sumberd. Hayati* **6**, 40–46 (2020).
11. Ministry of Forestry of Indonesia. Statistik Ketahanan Pangan , 2015. 1–20 (2015).
12. Hanafie, R. Peran Pangan Pokok Lokal Tradisional dalam Diversifikasi Konsumsi Pangan. *JSEP (Journal Soc. Agric. Econ.* **4**, 1–7 (2010).
13. Arlius, A., Sudargo, T. & Subejo, S. Hubungan Ketahanan Pangan Keluarga dengan Status Gizi Balita (Studi Di Desa Palasari dan Puskesmas Kecamatan Legok, Kabupaten Tangerang). *J. Ketahanan Nas.* **23**, 359–375 (2017).
14. Jayarni, D. E. & Sumarmi, S. Hubungan Ketahanan Pangan dan Karakteristik Keluarga dengan Status Gizi Balita Usia 2 – 5 Tahun (Studi di Wilayah Kerja Puskesmas Wonokusumo Kota Surabaya). *Amerta Nutr.* **2**, 44–51 (2018).
15. Ministry of Health of Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2020 tentang Standar Antropometri Anak. 1–78 (2020).
16. Food and Agriculture Organization. *Guidelines for Measuring Household and Individual Dietary Diversity*. *Fao* (2010).
17. Nurhayati, I. & Hidayat, A. R. Analisa Faktor yang Berhubungan dengan Status Gizi Balita di Kabupaten Sragen. *Interes. J. Ilmu Kesehat.* **8**, 1–8 (2019).
18. Andadari, D. P. P. S. & Mahmudiono, T. Keragaman Pangan dan Tingkat Kecukupan Energi serta Protein pada Balita. *Amerta Nutr.* **1**, 172–179 (2017).
19. Atin Nurmayasanti & Trias Mahmudiono. Status Sosial Ekonomi dan Keragaman Pangan Pada Balita Stunting dan Non-Stunting Usia 24-59 Bulan di Wilayah Kerja Puskesmas Wilangan Kabupaten Nganjuk . *Amerta Nutr.* **3**, 114–121 (2019).
20. Bhattacharjee, R., Alotaibi, W. H., Kheirandish-Gozal, L., Capdevila, O. S. & Gozal, D. Endothelial Dysfunction in Obese Non-Hypertensive Children Without Evidence of Sleep Disordered Breathing. *BMC Pediatr.* **10**, 1–8 (2010).
21. Baliwati, Y. F., Briawan, D. & Melani, V. Pengembangan Instrumen Penilaian Kualitas Konsumsi Pangan pada Rumah Tangga Miskin di Indonesia. *Gizi Indonesia.* **38**, 63–72 (2015).
22. Indrawan, I., Sukada, I. & Suada, I. Kualitas Telur dan Pengetahuan Masyarakat Tentang Penanganan Telur di Tingkat Rumah Tangga. *Indonesia. Med. Veterinus* **1**, 607–620 (2012).
23. Hailemariam, T., Girmay, T. & Girmay, G. Determinants of Individual Dietary Diversity Score of Children Less Than Five Years Old in the Southern Zone of Tigray, Ethiopia. *African J. Food, Agric. Nutr. Dev.* **18**, 13034–13051 (2018).
24. Gross, R., Schoeneberger, H., Pfeifer, H. & Preuss, H. The Four Dimensions of Food and Nutrition Security: Definitions and Concepts. *SCN News* **20**, 1–17 (2000).

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