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Transforming Childhood: Nutrition Interventions in the First 1000 Days of Life to Prevent Stunting and Enhance IQ Children in Trenggalek

Intervensi Gizi Spesifik pada 1000 Hari Pertama Kehidupan oleh Agen Perubahan untuk Mencegah Stunting, Meningkatkan Perkembangan dan IQ Anak di Kabupaten Trenggalek

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ABSTRACT

Background: The prevalence of stunting in Trenggalek Regency is high, i.e. 38.63%. This problem occurred in ten villages from various sub-districts and affected over 500 children. Various intervention methods have been implemented to address stunting, but the education for midwives and *posyandu* cadres as agents of change remains relatively uncommon.

Objectives: To assess the impact of specific nutritional interventions carried out by cadres and village midwives on the prevalence of stunting, child development (behavioral, mental, and psychomotor), and Intelligence Quotient (IQ) of children over 24 months in Trenggalek.

Methods: The research used a quasi-experiment design with a pre-test – post-test approach. Specific nutrition interventions were provided to the agents through nutrition education and training based on balanced nutrition guidelines and breastfeeding counseling from the World Health Organization (WHO). Assistance was also provided to pregnant women during their first trimester. The collected data included the growth, development, and IQ of children aged 0-24 months.

Results: The nutrition knowledge of the agent improved after the intervention, with an average score of 63.0±16.2 before the intervention and 76.8±14.7 after. The prevalence of stunting in selected health centers has decreased to 7.5%. This contributes to achieving a low stunting "green" status for the regency.

Conclusions: This study shows that increasing the knowledge of change agents can effectively reduce stunting. Stunting prevention can be achieved through proper maternal and childcare practices, including early initiation of breastfeeding, exclusive breastfeeding, appropriate complementary feeding, and complete immunization.

INTRODUCTION

The issue of stunting has garnered increasing attention in developing countries like Indonesia. According to the Asian Food and Nutrition Security Report 2021, Indonesia ranks third among ten Asian countries regarding stunting prevalence. In 2019, the stunting rate among Indonesian children under five was 28%, significantly higher than Thailand's rate of 13%[1]. Indonesia's stunting rate surpasses that of other Southeast Asian countries. Stunting can result from long-term nutritional deficiencies, such as low height-for-age[2]. Stunting begins in the womb and continues until age two, known as the First 1000 Days of Life (F1000DL) or the golden period[3], profoundly impacting a child's physical and mental development. Malnutrition, infections, and inadequate parenting are the primary factors contributing to stunting. Insufficient protein and essential amino acid consumption further exacerbate this issue[4–6]. Research shows that stunted children tend to consume more snacks and plant-based proteins[7].

The importance of nutrition during pregnancy is often overlooked by the community[8]. Meeting nutritional needs during this period is crucial for fetal brain development. Protein-energy deficiency during pregnancy can affect the development of the fetus's head and nerves, leading to permanent intellectual development impairments[9,10]. Various specific nutritional interventions have been implemented by the government, such as the provision of iron supplements, supplementary food, and immunizations as specific

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interventions[11]. These efforts also involve capacity building for village midwives and *posyandu* cadres and assistance for pregnant women through balanced nutrition education. This assistance is carried out in three phases: intensive, strengthening, and independent, with evaluations focusing on nutrition knowledge and the nutritional status of children[2]. Stunting can be reduced by up to 27% if interventions focusing on food consumption and hygiene are applied[12]. Nutritional improvement requires cross-sector collaboration, with the health sector focusing on specific interventions while the non-health sector ensures the availability of food, clean water, and economic support[13]. In Trenggalek, the high prevalence of stunting has drawn special attention from the government to address this issue, with more than 500 children diagnosed with malnutrition[14].

In 2012, malnutrition began affecting hundreds of children under five in Trenggalek. Cases of malnutrition in the region continued to rise, exceeding provincial and national averages. Currently, more than 500 children under five in Trenggalek have been diagnosed with malnutrition. Contributing factors include a high poverty rate and limited knowledge among *posyandu* cadres as agents of change, who play a role in addressing 60% of health issues. With a stunting prevalence of 22%, the regency is classified as a stunting area, and ten villages within its territory are even designated as stunting villages[14]. This issue is primarily attributed to inadequate nutritional intake among children under five. In 2018, as part of efforts to accelerate stunting reduction, the government designated 100 regencies and cities in Indonesia, including Trenggalek, as priority areas for stunting eradication programs[15].

Nutritional status, health, and education significantly impact the quality of human resources in Indonesia. Indonesia's Human Development Index (HDI) has shown improvement, although it still lags behind other Southeast Asian countries. Adequate nutrition dramatically influences the intellectual development, health, and activity of children under five, all closely linked to the balance between nutritional needs and intake. This study examines the impact of specific dietary interventions on the prevalence of stunting and child development in Trenggalek. Based on the background described, this research analyzes the types of nutritional interventions that can be implemented by agents of change in Trenggalek to prevent stunting during the critical 1000 Days of Life (F1000DL) period.

METHODS

This study used a quasi-experimental design with a pre-test–post-test approach from April to October 2021 (2nd year) in Trenggalek Regency. The research sample consisted of agents of change, including village midwives and *posyandu* cadres assisting the 1000 Days of Life (F1000DL) group (pregnant women, breastfeeding mothers, and children aged 0–24 months). The sample was 20 individuals, comprising nine village midwives and 11 *posyandu* cadres. The F1000DL target group consisted of 40 individuals, with each midwife and cadre assisting two F1000DL targets. The agents of change were referred to as primary subjects, while the F1000DL group members were secondary subjects.

The study was carried out in three phases: pre-intervention, intervention, and post-intervention. The intervention involved building capacity for village midwives and *posyandu* cadres through education and training, then mentoring two first-trimester pregnant women each. The materials delivered included three-day balanced nutrition education based on the Balanced Nutrition Guidelines (Regulation of the Minister of Health of the Republic of Indonesia No. 41 of 2014). The topics on the first day focused on Balanced Nutrition for Pregnant Women, the second day on Balanced Nutrition for Breastfeeding Mothers, and the third day on Balanced Nutrition for Infants/ Children Aged 0–24 Months, Balanced Nutrition for Addressing Malnutrition, and Accelerating Stunting Reduction. Additionally, 24-hour breastfeeding counseling based on WHO guidelines was provided over two days, covering infant and young child feeding (IYCF) practices and clean and healthy living behaviors (CHLB).

The mentoring of primary subjects to secondary subjects was conducted in three phases. First is the intensive phase, during which secondary subjects were visited by primary subjects daily for one week (days 1–7). Second was the reinforcement phase, where secondary subjects were visited twice weekly for one week (days 8–14). Third was the independent phase, which lasted two weeks (days 15–29). On the 30th day, the primary subjects, together with the researchers, evaluated the mentoring outcomes, which included: a) maternal nutrition knowledge; b) knowledge of infant and young child feeding (IYCF); c) knowledge of sick child care; d) knowledge of clean and healthy living behaviors (CHLB); e) dietary patterns and nutrient intake levels (using a 2x24-hour Food Recall method in weeks 3 and 4); and f) nutritional status (weight-for-length or height index). Monitoring and evaluation of the growth and development of infants/ children aged 0–24 months were conducted monthly at *posyandu* using the Developmental Pre-screening Questionnaire (KPSP) method. Furthermore, a psychologist assessed children's intelligence levels at 24 months of age.

Every six months, infants' weight was monitored to determine nutritional status using the weight-for-age (W/A) index according to the National Center for Health Statistics (NCHS) standards and the Nutrisoft application. The results were then compared with WHO/NCHS to determine the Z-score. According to WHO (1995), the stunting category is measured based on height by age with reference to the WHO growth standard: Not stunting height by age greater than -2 standard deviation (SD); Stunting: height by age between -2 SD and -3)[16]. The Food Composition Table (FCT) transformed food consumption data measured in grams or Household Measurements (HM). Nutrient intake levels were calculated by comparing consumption data with the Recommended Dietary Allowances (RDA). The level of nutritional adequacy was used to calculate the food consumption quality score (FCQS). The comparison between consumption and needs was expressed as a percentage and grouped into four categories: very poor (< 55%), poor (55–69%), adequate (70–84%), and good (≥ 85%)[17].

The score representing overall food quality and

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diversity was calculated using the Expected Food Pattern (EFP) approach. The EFP also highlights the differences between food adequacy (energy) and consumption within each food group. Food types, units, and forms vary significantly at the household level. Therefore, conversion is required to produce uniform units across all commodities. Subsequently, daily per capita energy consumption per food group was calculated, and the EFP score was then determined and categorized into four groups: good (≥ 85%), adequate (70–84%), poor (55–69%), and very poor (< 55%). The Fisher-Price IQ Test was used to measure the intelligence levels of children or infants aged 6–12 months. Classification of IQ scores used: Superior 130 and above; Above average 120-129; Average 90-109; Below average 80-89; Borderline/Low 70-79 This test observes children's reactions and brain development. The results provide insights into how intelligence might develop in the future.

Tables and/or figures were used to present the research results. The relationship between variables was studied using Pearson and Spearman correlation tests. The effect of the intervention on stunting reduction was analyzed using multiple logistic regression tests. This research protocol has been approved by the Health Research Ethics Committee (KEPK) of Malang Health Polytechnic with registration number 657/KEPK-POLKESMA/2020, 30 November 2020 and has received permission from the Health Office of Trenggalek Regency. Research subjects provided informed consent before the study was conducted.

RESULTS AND DISCUSSIONS

Medical professionals such as doctors, midwives, nurses, and others have diverse roles. Still, according to Potter and Perry[4], all of these positions include communicators, which means someone who provides knowledge to those in need. Additionally, they serve as motivators, which refers to the ability of a healthcare professional to inspire others to take action. Another role is as a facilitator, someone who makes it easier to provide facilities to others who need them[4]. The age of the primary subjects ranged from 27 to 50 years, with an average age of 35.5 years, while the secondary subjects' age ranged from 15 to 30 years, with 67.5% of them falling between 20 and 30 years old. The intervention showed a significant increase in knowledge (p=0.016). The average score before the intervention was 63.0 ± 16.2, with scores ranging from 40 to 92, and after the intervention, the average score increased to 76.8 ± 14.7, with scores ranging from 52 to 94.

Table 1. Standard dietary pattern of third-trimester pregnant women before and after intervention

Type of Food	Actual Consumption				Standard Requirement for Consumption *)			
	Energy	% Energy	Weight	PPH Score	Energy	% Energy	Weight	PPH Score
Before								
Rice and Grains	305	43	0.5	243.3	1,075	50	0.5	25
Tubers	57	8	0.5	3.5	129	6	0.5	2.5
Animal Products	89	12	2	22	258	12	2	24
Oils and Fats	66	9	0.5	4	215	10	0.5	5
Fruits/Oily Seeds	29	4	0.5	1.5	64.5	3	0.5	1
Nuts	36	5	2	10	107.5	5	2	10
Sugar	50	7	0.5	3	107.5	5	0.5	2.5
Vegetables and Fruits	35	5	5	25	129	6	5	30
Others	52	7	0	0	64.5	3	0	0
Total	716	100		73.3	2,150	100		100
After								
Rice and Grains	486.9	36.8	0.5	18.1	1,075	50.0	0.5	25.0
Tubers	90.1	6.8	0.5	3.4	129	6.0	0.5	2.5
Animal Products	145.6	11.0	2	21.6	258	12.0	2	24.0
Oils and Fats	172.3	13.0	0.5	6.4	215	10.0	0.5	5.0
Fruits/Oily Seeds	88.0	6.7	0.5	3.3	64.5	3.0	0.5	1.0
Nuts	66.7	5.0	2	2.5	107.5	5.0	2	10.0
Sugar	50.3	3.8	0.5	1.9	107.5	5.0	0.5	2.5
Vegetables and Fruits	74.4	5.6	5	28.0	129	6.0	5	30.0
Others	148.3	11.2	0	0.0	64.5	3.0	0	0.0
Total	1,322.6	100.0		85.1	2,150	100.0		100.0

*) Average energy requirement standard for pregnant women
PPH = Standard Dietary Pattern

Table 1 shows that the dietary consumption patterns of pregnant women qualitatively improved. Before the intervention, the dietary consumption pattern of third-trimester pregnant women was categorized as very poor, with 33.3% of the nutritional adequacy target. The 2019 National Standard has a target of 92.5, while

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the PPH (*Pola Pangan Harapan*) quality score only met 79.24% or 73.3[18]. After the intervention, the PPH quality score reached 85.1 or 92.0%. However, food diversity has not been fully addressed. Energy consumption still does not meet the standard energy requirements. Table 2 shows the quantitative dietary consumption patterns of pregnant women. After the technical role of the *posyandu* cadres and village midwives, there was an improvement in the knowledge of third-trimester pregnant women, with the consumption level increasing from the very poor category to normal. However, iron and vitamin C intake was still found to be very insufficient (70% of AKG). Since stunting affects children aged between 0 and 24 months, the intervention needs to continue.

Table 2. Dietary consumption of third-trimester pregnant women before and after intervention

Energy and Nutrients	Consumption Level								p-value
	Before				After				
	Mean ± SD			%	Mean ± SD			%	
Energy (Calories)	716	±	271	65	1,323	±	281	93	0.001*
Carbohydrates (g)	199	±	54	69	270	±	26	93	0.035*
Protein (g)	65	±	22	108	71	±	26	118	0.041*
Fat (g)	31	±	13	44	62	±	18	90	0.027*
Iron (mg)	6	±	3	40	10	±	5	69	0.019*
Vitamin C (mg)	37	±	18	38	60	±	63	60	0.017*

*) Significant difference at α = 0.05; paired t-test

The research findings revealed that the majority (77.5%) of mothers have a Junior High School education or equivalent, the majority (90%) are housewives, and the majority (80%) of the sample's income is categorized as non-poor. One of the elements contributing to stunting is maternal factors, such as low nutritional understanding, not providing exclusive breast milk, and incorrect strategies for giving complementary feeding to breast milk. These factors have a significant impact on the nutritional status of children[15]. Inadequate dietary intake before, during, and after pregnancy can increase the risk of stunted growth, poor brain development, low productivity, and chronic disorders in adulthood[19]. Breast milk production is influenced by dietary intake during pregnancy. Breast Milk (ASI) is the main food, making its provision very important. Babies who are fed ASI (Breast Milk) grow into healthy adults with high IQs, pleasant personalities, and optimal health. This occurs because docosahexaenoic acid (DHA) is found in ASI[20]. Previous research using the DDST (Denver Development Screening Test) indicates that babies with exclusive ASI (Breast Milk) tend to have higher intellectual levels and follow age-appropriate development, which is not the case for babies fed with formula milk[21].

There is a tendency for specific nutritional interventions to serve as a preventive measure with the technical roles of *posyandu* cadres and village midwives. A total of 100% of stunted babies were low birth weight babies. This prevalence is high compared to stunted babies with normal birth weight, which is 2.6%. The risk of stunting in low-birth-weight babies is five times greater[22]. Birth weight can predict development, responsiveness to stimuli, environmental factors, and the likelihood of survival. Stunting occurs in children when intrauterine growth retardation (IUGR) happens, which causes growth retardation or growth inhibition when the child is still in the womb. Poverty, illness, and nutritional deficiencies are the root causes of IUGR. This indicates that low birth weight babies (BBLR) born to malnourished mothers from the first trimester of pregnancy until delivery are at high risk of experiencing stunting later in life. Malnutrition during pregnancy poses the risk of having a low-birth-weight baby (BBLR) who will grow into an adult experiencing stunting. Stunted children as a result of growth retardation are caused by low birth weight (BBLR), inadequate nutrition, inadequate access to healthcare services, and recurrent diseases during the growth phase[23].

As many as 2.6% of babies with normal birth weight experience stunting. This occurrence is due to other variables impacting, such as economic status, illness, and food consumption. Socioeconomic factors influence access to sanitation facilities and clean water sources. This is related to toddlers contracting infectious diseases, which can increase the risk of stunting. Access to food is also influenced by socioeconomic status. The ease of food access affects the nutritional adequacy of families, especially mothers and toddlers. Therefore, if the nutritional adequacy of a family falls within food insecurity, it will cause nutritional problems in toddlers, including stunting[24]. Previous research indicates that family income is a factor affecting stunting incidence[7]. A total of 100% of babies who received exclusive breastfeeding and appropriate complementary feeding (MP-ASI) had a non-stunted nutritional status. Babies are 61 times more likely to experience stunting if they are not given exclusive breastfeeding (ASI)[25]. In addition, improper complementary feeding practices can increase the risk of stunting by 7.87 times. Inappropriate feeding practices include starting too early (< 6 months), not following the schedule (< 3 times a day), and providing amounts that do not meet the nutritional needs[26].

Toddlers are less likely to experience stunting if they have completed basic immunization. A total of 100.0% of stunted toddlers have incomplete basic immunization. The risk of a baby experiencing stunting is six times higher if basic immunization is incomplete[27]. Humans benefit from immunization, which enhances immunity, particularly during vulnerable early stages of life when they are more susceptible to diseases. Malnutrition is a side effect of common and simple diseases. Since the initial response to illness is loss of appetite, babies and toddlers will lose body energy more quickly due to infectious diseases if they do not have

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immunity against them. As a result, they will refuse the food offered[28].

A child's brain begins to grow at the age of two, and because the brain is sensitive to energy intake and nutrition, its development will slow down if there is a deficiency at this age[29]. By the time the child reaches five years old, their brain is about 90% of the size of an adult brain. Therefore, proper intake is essential for cognitive development. Most children with developmental delays experience stunting (5%), much higher than the 2.5% of children who do not experience stunting, while children with appropriate development do not experience stunting (77.5%). The data can be seen in Table 3.

Table 3. Prevalence of stunting and developmental status of infants and children aged 7 – 24 Months

Development	Case of Stunting				Total	
	Stunting		Not Stunting			
	n	%	n	%	n	%
Appropriate	0	0.0	31	77.5	31	77.5
Doubtful	1	2.5	5	12.5	6	15.0
Deviations	2	5.0	1	2.5	3	7.5
Total	3	7.5	37	92.5	40	100.0

Table 3 indicates that 77.5% of babies and toddlers who do not experience stunting and are between 7-24 months old fall into the group with appropriate development. However, the development of babies and children who experience stunting and are between 7-24 months old is 0.0% in the proper group. There is a strong correlation (p-value=0.001) between the prevalence of stunting and the developmental status of babies and children aged 7-24 months, as they tend to have an intake in the deficient category (< 90% of the Recommended Nutritional Intake).

Since birth, the process of growth and development is a cumulative result. A strong foundation for future health lies in providing nutritious food to toddlers today. Growth and developmental disorders will arise in children at risk of unmet energy and protein needs[30]. Infants and toddlers can explore and utilize their skills by developing motor, cognitive, and social functions. When development reaches an ideal level, the next phase will have strong growth and development. This is how early experiences shape the quality of infant/child development in the future. Similar to the early detection of stunting indications, early intervention can be carried out to enhance growth and development. This aims to improve the living standards of infants and children in the future, thus producing toddlers with good motor, intellectual, and social functions.

The role of primary subjects as agents of change during the 1000 HPK (First 1,000 Days of Life) period indicates that toddlers in Bendungan Subdistrict, Trenggalek Regency, possess an average intelligence level categorized as intelligent, above average to superior, with 92.5% falling into these categories and only 7.5% in the below-average to low categories. Meanwhile, the stunting prevalence was only 7.5%, as shown in Table 4. The results of this study indicate that enhancing the capacity of primary subjects will influence the improvement of knowledge among secondary subjects, subsequently affecting the determinants of stunting prevalence. These determinants include birth weight, early initiation of breastfeeding (EIB), exclusive breastfeeding success, feeding practices during the introduction of complementary foods (MP-ASI), and completing basic immunizations. Improvements in the determinants of stunting prevalence impact the growth, development, and intelligence levels of children aged 24 months.

Table 4. IQ and stunting incidence in children (> 24 months)

Intelligence Level	Case of Stunting				Total	
	Stunting		Not Stunting			
	n	%	n	%	n	%
Superior	0	0.0	5	12.5	5	12.5
Above Average	0	0.0	12	30.0	12	30.0
Average	1	2.5	20	50.0	21	52.5
Below Average	1	2.5	0	0.0	1	2.5
Low	1	2.5	0	0.0	1	2.5
Total	3	7.5	37	92.5	40	100.0

The results presented in Table 4 are consistent with previous research[31], which found that 16.8% of school-aged children experienced stunting, compared to children with average to superior IQ levels, which accounted for only 29.34%—significantly lower than the intelligence level of children supported by the technical roles of *posyandu* cadres and village midwives during the 1000 HPK (First 1000 Days of Life) period, at 92.5%[31]. In contrast, the intelligence levels of children and the incidence of stunting without the technical roles of *posyandu* cadres and village midwives during the 1000 HPK period were different, as reported by UNICEF[8], which states that the average IQ of children aged 6 to 9 years who experienced malnutrition during early childhood was 13.7 points lower than children who did not suffer from undernutrition during the same period. Furthermore, Gunasari's study[31] explains that in the Nanggalo subdistrict, children entering elementary school for the first time in Padang City demonstrated a strong correlation (p-value=0.013)[31]. The intelligence

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level of stunted children tends to be below average, which, in the long term, risks reducing productivity, hindering economic growth, and increasing poverty[32]. The prevalence of stunting in Trenggalek Regency in 2018 was 32.81%, compared to the National Medium-Term Development Plan (RPJMN) target for 2019 of 28%. Meanwhile, the prevalence of stunting in the Bendungan subdistrict, Trenggalek Regency, was 7.5%—significantly lower. This prevalence of only 7.5% in 2021 contributed substantially to the reduction of stunting rates in Trenggalek Regency, earning it the "green" category designation with a stunting prevalence of 18.1%[33].

This study has limitations regarding the research subjects, which were confined to the working area of Bendungan Public Health Center. Based on the data, many other public health center working areas in Trenggalek Regency are still experiencing stunting cases. These areas are scattered randomly and possess different socio-cultural and demographic characteristics. The central government has designated Trenggalek Regency as a stunting area with slow growth and development issues among toddlers. Ten villages in this regency face stunting problems, with a total prevalence of 38.63%. These villages include Botoputih, Kayen, Cakul, Jajar, Dawuhan, Kedunglurah, Puru, Nglebo, Ngrandu, and Mlinjon, spread across several subdistricts[14]. This high prevalence may be closely related to inadequate nutritional intake among toddlers. However, the findings of this study may not be generalizable to other areas.

The strengths of this study include demonstrating that a simple method of providing specific nutritional interventions can serve as a practical preventive step in addressing stunting. Improving knowledge of balanced nutrition and breastfeeding practices among *posyandu* cadres, village midwives, and third-trimester pregnant women, as well as enhancing food consumption patterns, appears to be a key factor in breaking the cycle of stunting. Furthermore, this study supports the observed relationship between stunting and intelligence levels. Most babies who are not stunted have appropriate developmental progress, and vice versa. This highlights the importance of addressing stunting to support optimal child development. Most non-stunted children have IQs in the average to superior categories. This indicates that proper interventions have the potential to contribute to better-quality human resources in the future.

CONCLUSIONS

Nutritional education provided to posyandu cadres, village midwives, and 1000 HPK target groups significantly increased knowledge levels. The education covered balanced nutrition, WHO breastfeeding counseling, and ten nutritional messages. It improved dietary patterns of third-trimester pregnant women, shifting from poor to good. The study indicated that specific nutritional interventions helped prevent stunting, with a decline in Bendungan District's prevalence compared to Trenggalek Regency in 2018. Non-stunted babies showed normal development, while stunted children exhibited developmental delays. The low stunting prevalence in Bendungan Health Center's area in 2021 significantly contributed to reducing stunting, placing it in the "green" category.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

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AUTHOR CONTRIBUTIONS

All authors contributed significantly to the manuscript. AP: Conceptualization, substance, methodology, formal data analysis, accuracy and reliability of result interpretation, conclusion development. DS: Methodology, key elements of objectives, initial draft, interpretation. AM: Data structuring, consistency in analysis, editing, articulation of findings, research implications. YK: Editing, data visualization, review.

REFERENCES

1. ASEAN, WFP & UNICEF. *ASEAN Food and Nutrition Security Report 2021*. vol. 2 (UNICEF, Jakarta, 2022).
2. Laili, U. & Andriani, R. A. D. Pemberdayaan Masyarakat Dalam Pencegahan Stunting. *J. Pengabdi. Masy. IPTEKS* **5**, 8 (2019). DOI: 10.32528/pengabdian_iptek.v5i1.2154.
3. Rahayu, A. *et al. Buku Ajar: Gizi 1000 Hari Pertama Kehidupan*. (CV Mine, Bantul, 2018).
4. UNICEF. Strategy for improved nutrition of children and women in developing countries. *Indian J. Pediatr.* **58**, 13–24 (1991). DOI: 10.1007/BF02810402.
5. Hoffman, D. J., Sawaya, A. L., Verreschi, I., Tucker, K. L. & Roberts, S. B. Why are nutritionally stunted children at increased risk of obesity? Studies of metabolic rate and fat oxidation in shantytown children from São Paulo, Brazil. *Am. J. Clin. Nutr.* **72**, 702–707 (2000). DOI: 10.1093/ajcn/72.3.702.
6. Umeta, M., West, C. E., Verhoef, H., Haidar, J. & Hautvast, J. G. A. J. Factors Associated with Stunting in Infants Aged 5–11 Months in the Dodota-Sire District, Rural Ethiopia. *J. Nutr.* **133**, 1064–1069 (2003). DOI: 10.1093/jn/133.4.1064.
7. Supariasa, I. D. N., Fajar, I., Khairuddin, K. & Adelina, R. Analyzing Nutritional Factors that Affect Toddler's Stunting in Malang Regency, Indonesia. *Open Access Maced. J. Med. Sci.* **11**, 59–69 (2023). DOI: 10.3889/oamjms.2023.10199.

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8. UNICEF. UNICEF Indonesia: Ringkasan Kajian Gizi Ibu dan Anak. (2012).
9. Syari, M., Serudji, J. & Mariati, U. Peran Asupan Zat Gizi Makronutrien Ibu Hamil terhadap Berat Badan Lahir Bayi di Kota Padang. *J. Kesehat. Andalas* **4**, (2015). DOI: 10.25077/jka.v4i3.355.
10. Ekayanthi, N. W. D. & Suryani, P. Edukasi Gizi pada Ibu Hamil Mencegah Stunting pada Kelas Ibu Hamil. *J. Kesehat.* **10**, 312–319 (2019). DOI: 10.26630/jk.v10i3.1389 .
11. Tampubolon, D. Kebijakan Intervensi Penanganan Stunting Terintegrasi. *J. Kebijak. Publik* **11**, 25–32 (2020). DOI: http://dx.doi.org/10.31258/jkp.v11i1.7886.
12. Fink, G., Günther, I. & Hill, K. The effect of water and sanitation on child health: evidence from the demographic and health surveys 1986–2007. *Int. J. Epidemiol.* **40**, 1196–1204 (2011). DOI: 10.1093/ije/dyr102.
13. Kemenkes. Peraturan Presiden (Perpres) Nomor 42 Tahun 2013 tentang Gerakan Nasional Percepatan Perbaikan Gizi. (2013).
14. Dinas Kesehatan Kabupaten Trenggalek. *Buku Profil Kesehatan Kabupaten Trenggalek*. (2018).
15. Sekretariat Wakil Presiden RI. 100 Kabupaten/Kota Prioritas untuk Intervensi Anak Kerdil (Stunting). (2017).
16. World Health Organization. Physical Status: The Use and Interpretation of Anthropometry: Report of a WHO Expert Committee. (1995). https://iris.who.int/handle/10665/37003.
17. Hardinsyah & Briawan, D. *Penilaian Dan Perencanaan Konsumsi Pangan*. (IPB, Bogor, 1994).
18. Badan Perencanaan Pembangunan Nasional. *Rencana Aksi Nasional Pangan Dan Gizi Tahun 2015–2019*. (Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional, 2015).
19. Wati, S. K., Kusyani, A. & Fitriyah, E. T. Pengaruh faktor ibu (pengetahuan ibu, pemberian ASI-eksklusif & MP-ASI) terhadap kejadian stunting pada anak. *J. Health Sci. Community* **2**, 40–52 (2021).
20. Roesli, U. *Mengenal ASI Eksklusif*. (Niaga Swadaya, 2000).
21. Parwati, D. Perbedaan Hasil Tes DDST pada Bayi yang Diberi ASI Eksklusif dan Susu Formula di Wilayah Kerja Puskesmas Binanga Kabupaten Mamuju. *ProHealth J.* **20**, 8–16 (2023). DOI: 10.59802/phj.2023201104 .
22. Swathma, D., Lestari, H. & Ardiansyah, R. T. Analisis Faktor Risiko BBLR, Panjang Badan Bayi Saat Lahir Dan Riwayat Imunisasi Dasar Terhadap Kejadian StuntingPada Anak Usia 12-36 Bulan Di Wilayah Kerja Puskesmas Kandai Kota Kendari. *J. Ilm. Mhs. Kesehat. Masyarkat* **1**, 7 (2016). DOI: 10.37887/jimkesmas.v1i3.1088.
23. Administrative Committee on Coordination. Subcommittee on Nutrition. *Fourth Report on the World Nutrition Situation: Nutrition throughout the Life Cycle / ACC/SCN in Collaboration with International Food Policy Research Institute (IFPRI)*. vol. 4 (UN, Geneva, 2000).
24. Wardani, D. W. S. R., Wulandari, M. & Suharmanto, S. Hubungan Faktor Sosial Ekonomi dan Ketahanan Pangan terhadap Kejadian Stunting pada Balita. *J. Kesehat.* **11**, 287–293 (2020). DOI: 10.26630/jk.v11i2.2230.
25. Usman, S. & Ramdhan, S. Hubungan Faktor Pemberian ASI Eksklusif dengan Kejadian Stunting Pada Anak Balita. *J. Ilm. Kesehat. Sandi Husada* **10**, 285–289 (2021). DOI: 10.35816/jiskh.v10i1.547 .
26. Amalia, R., Ramadani, A. L. & Muniroh, L. Hubungan Antara Riwayat Pemberian MP-ASI dan Kecukupan Protein dengan Kejadian Stunting pada Balita di Wilayah Kerja Puskesmas Bantaran Kabupaten Probolinggo. *Media Gizi Indones. Natl. Nutr. J.* **17**, 310–9 (2022). DOI: https://doi.org/10.204736/mgi.v17i3.310–319.
27. Swathma, D., Lestari, H. & Teguh, R. Analisis Faktor Risiko BBLR, Panjang Badan Bayi Saat Lahir dan Riwayat Imunisasi Dasar Terhadap Kejadian Stunting pada Balita Usia 12-36 Bulan di Wilayah Kerja Puskesmas Kandai Kota Kendari Tahun 2016. *J. Ilm. Mahasiswa Kesehat. Masy.* **1**, 1–10 (2016). DOI: 10.37887/jimkesmas.v1i3.1088.
28. Anhari, E. *Pemberian Makanan Untuk Bayi: Dasar-Dasar Fisiologis*. (Binarupa Aksara, 2008).
29. Wachs, T. D., Georgieff, M., Cusick, S. & McEwen, B. S. Issues in the timing of integrated early interventions: contributions from nutrition, neuroscience, and psychological research. *Ann. N. Y. Acad. Sci.* **1308**, 89–106 (2014). DOI: 10.1111/nyas.12314.
30. Yunita, A., Asra, R. H., Nopitasari, W., Putri, R. H. & Fevria, R. Hubungan Sosial Ekonomi Dengan Kejadian Stunting Pada Balita Socio-Economic Relations with Stunting Incidents in Toddlers. in *Prosiding Seminar Nasional Biologi* vol. 2 812–819 (2022). DOI: https://doi.org/10.24036/prosemnasbio/vol2/519.
31. Gunasari, D. Hubungan Stunting dengan Tingkat Kecerdasan Intelektual (Intelligence Quotient-IQ) pada Anak Baru Masuk Sekolah Dasar di Kecamatan Nanggalo Kota Padang. (Universitas Andalas, 2016).

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32. Sholihah, N. F. & Adelina, R. Daya Terima dan Nilai Gizi Formula Pompom Potato Sebagai Pemberian Makanan Tambahan Balita Stunting. *Media Gizi Pangan* **28**, 9–16 (2021).

33. Widiyana, E. Tiga Daerah di Jatim Ini Sukses Tekan Stunting, Simak Inovasinya. *detikjatim* https://www.detik.com/jatim/berita/d-5965702/tiga-daerah-di-jatim-ini-sukses-tekan-stunting-simak-inovasinya (2022).

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