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Mother's knowledge of nutrition and protein intake in stunted children aged 12-36 months in Indonesia

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Abstract

The objective of the study is to analyze the effect of mothers' knowledge before and after counseling on nutrition and protein intake in stunting toddlers aged 12-36 months. This study used a quasi-experimental design with a two-group pretest-posttest design from May to August 2022 in Batujajar and Cihampelas Subdistricts, West Bandung Regency, Indonesia. Subjects consisted of 124 mothers who had stunted toddlers and were divided into 2 groups: control and treatment, with 62 toddlers each, with simple random sampling. In the 1st and 4th months, nutritional measurements of protein intake were carried out using the Food Frequency Questionnaire using the 2007 Nutrisurvey software. The statistical analysis included a t-test (comparison) for each pair of variables and tests for independence using the correlation coefficient and chi-square. Pretest nutrition knowledge in the majority control group was in the sufficient category at 38.7%. Meanwhile, in the treatment group, it was in the good category at 54.8%. Nutrition knowledge showed that the posttest control (15.45 ± 3.55) and the treatment (18.53 ± 1.49) groups were significantly different ($p < 0.01$). Protein intake pretest and posttest (1st, 2nd, 3rd, and 4th month protein) between the control and treatment groups were also significantly different ($p < 0.05$). There was a significant posttest effect on mother's knowledge about nutrition and protein intake in stunted toddlers. Health workers are expected to continue to provide health education gradually and repeatedly to increase mothers' knowledge so the risk of stunting can be minimized.

Keywords: Knowledge of nutrition, Nutrition health education, Protein intake, Risk factor, Stunting, Toddlers.

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Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Institutional Review Board Statement: The Ethical Committee of the Universitas Padjadjaran, Indonesia has granted approval for this study on 22 March 2022 (Ref. No. 276/UN6.KEP/EC/2022).

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1. Introduction

Height for an age less than two standard deviations (-2 SD) below the medium is a sign of malnutrition [1, 2]. Stunting increases the risk of acute diarrheal diseases and acute respiratory infections, which can kill infants, and affects cognitive development, the immune system, diabetes, hypertension, cancer, cardiovascular disease, and mental health [3-5]. Stunting harms national development and income [6, 7]. The World Health Organization (WHO) reported 21.3% of stunted children under five in 2019. The World Health Assembly (WHA) wants to cut short toddlers by 40% by 2025 [8, 9]. Southeast Asia's stunted 5-year-olds dropped from 38.5% to 24.7%. This demonstrates that stunting is reducing every year, but it is still within WHO criteria of less than 20%; therefore, stunting prevention planning remains a priority. Stunted children have decreased by 10% in six years, but the frequency remains high. Accelerate efforts to halve child stunting by 2030 [10, 11].

Based on research conducted in an Indian city in 2019, among low-income families, 22 percent of children ages 6-8 were stunted or underweight [12]. The Global Nutrition Report places Indonesia at number seventeen due to its high level of wasting, obesity, and childhood stunting. Based on data from the 2022 Indonesian Nutrition Status Survey (INSS), the current prevalence of stunting is still 24.4% [13-15]. According to a preliminary study by researchers, West Bandung Regency has the highest stunting rate, which is 29.5%. Based on data obtained through registers in two sub-districts of Batujajar and Cihampelas, the highest cases of stunting were found in toddlers aged 12-36 months. From these facts, in RI Presidential Regulation No. 72 of 2022, stunting is of particular concern in Indonesia and is a target for accelerating the reduction of stunting [16]. Nutrition intervention is one of the programs given to stunting toddlers in the community [17, 18]. Researchers in 2021 found that maternal nutrition education and awareness can help reduce rates of stunting and malnutrition in children. Some nutrients, both macro (like fiber) and micro (like vitamin C), are still not being consumed at levels that meet the recommended daily allowance (RDA) [19]. A similar study conducted in Nigeria in 2019 also stated that a mother's knowledge has a significant relationship with the incidence of stunting in toddlers [20].

Research in 2023 reported that mothers who have low knowledge about nutrition have a 2.7 times higher chance that their children will experience stunting compared to mothers who have high knowledge about nutrition [21]. In a similar study, there were 68.3% of mothers who had less knowledge about stunting toddler nutrition, and the chance that their children would experience stunting was 4.8 times greater than that of mothers of toddlers who had good knowledge about toddler nutrition [22]. This causes one of the basic deficiencies of animal and vegetable protein sources for toddlers to decrease. The Indonesian government conducted the National Socioeconomic Survey (Susenas) in 2022. The survey results showed that the average consumption of protein per capita per day was 62.21 grams (above the standard of 57 grams), but the consumption of eggs and milk was 3.37 grams, meat was 4.79 grams, and fish, shrimp, squid, and shellfish was around 9.58%. This indicated that protein consumption per capita is still relatively low.

According to Food and Agriculture Organization (FAO) statistics for 2019, consumption of eggs, meat, milk, and their derivative products in Indonesia was among the lowest in the world. In the 12- to 23-month age period, there was a 1.8-fold increase in stunting, which was caused by low intake of food sources of animal protein in complementary foods for breast milk [23]. Fitria's research stated that out of 57 toddlers, 13 or 37.1% consumed less protein, 51.4% consumed fewer animal side dishes, and 71.4% rarely consumed vegetable side dishes [24]. Hence, it is imperative to strive for the enhancement of maternal nutrition education by means of nutritional counseling, with a focus on the prevention of stunting through the promotion of optimum protein intake.

2. Materials and Methods

2.1. Study Design, Setting, and Procedure

This study used a quasi-experimental approach with a pre-and post-test for the sample groups. Nutritional counseling and knowledge assessment came first, while protein consumption was measured later using the Food Frequency Questionnaire (FFQ). At the commencement of experiment, an evaluation of nutritional knowledge was conducted in both groups. Subsequently, the monthly measurement of protein consumption in children was carried out for duration of four months, and the obtained data was compared to levels seen before to the intervention. The intervention group received nutrition counseling, while the control group received just flyers. The study was carried out in Batujajar and Cihampelas Subdistricts in the West Bandung Regency Working Area, Indonesia, from May to August 2022.

2.2. Population, Sample Size, and Sampling Techniques

The target population in this study was all mothers who had stunted toddlers aged 12-36 months in Batujajar and Cihampelas Subdistricts. There were 178 stunted toddlers. By using the proportion test formula: $1 = n2 = \frac{(Z\alpha \sqrt{2PQ} + Z\beta \sqrt{P1Q1 + P2Q2})^2}{(P1 - P2)^2}$, A total of 124 children were included in the study, with 62 children assigned to the control group and 62 children assigned to the intervention group. The employed sample approach was simple random sampling. The study's inclusion criteria encompassed toddlers between the ages of 12 and 36 months who were not currently using any drugs that could potentially impact their condition. Additionally, the study focused on toddlers residing in the Batujajar and Cihampelas Subdistricts, from birth until the present. Conversely, toddlers with disproportionate pathological abnormalities identified through physical examination were excluded from the study.

2.3. Data Collection, Measurement, and Data Analysis

This study employed primary and secondary data. Register book data was secondary for recording toddlers in the subdistricts who were stunted aged 12-36 months. Primary data collection consisted of two stages, i.e., in the first stage, the measurement of a toddler's height by body length and microtoise with an accuracy of 0.1 cm. Researchers were assisted by three enumerators who had received training on measuring height beforehand, so that the expected results were in accordance with the research objectives. The anthropometric status of the child was determined using the Z-score from the WHO Standard. Variable measurements were nominal, ordinal, and ratio. The questionnaire used was on the mother's knowledge about nutrition, including 20 questions with true or false answers. A score of one was given for a correct answer, and a score of zero was given for an incorrect answer when determining the level of knowledge possessed by the individual. In the category of knowledge, there are three possible scores: Good (80-100%), Fair (65%-79%) and Poor (65%). The results of the Food Frequency Questionnaire (FFQ), which was computed with the help of the Nutrisurvey software in 2007, were used to assess the amount of protein that was consumed on a daily basis by toddlers. During the examination of the data, a T-test, as well as the Mann-Whitney and Wilcoxon tests, was utilized. The Pearson product moment correlation and the Cronbach's alpha test are used to determine validity and reliability [25].

2.4. Ethics Approval of Research

This research passed the ethical test number 276/UN6.KEP/EC/2022 at the Center for the Study of Health Systems and Education Innovation for Health Workers, Faculty of Medicine, Padjadjaran University, Indonesia.

3. Results

3.1. Distribution of Respondent Characteristics

Based on the characteristic data in Table 1, both in the control and treatment groups, the majority gender of children under five was female (54.8%).

Table 1.
Distribution of respondent characteristics.

Characteristics	Group		Total	P-value
	Control	Treatment		
Gender				
Man	30 (48.4%)	28 (45.2%)	58 (46.8%)	0.719
Woman	32 (51.6%)	34 (54.8%)	66 (53.2%)	
Mother's age				
<20 years	6 (9.7%)	3 (4.8%)	9 (7.3%)	0.768
20-29 years	23 (37.1%)	25 (40.3%)	48 (38.7%)	
30-39 years	24 (38.7%)	24 (38.7%)	48 (38.7%)	
40-49 years	9 (14.5%)	10 (16.1%)	19 (15.3%)	
Education				
Primary school	13 (21.0%)	13 (21.0%)	26 (21.0%)	0.796
Junior high school	23 (37.1%)	22 (35.5%)	45 (36.3%)	
Senior high school	26 (41.9%)	26 (41.9%)	52 (36.3%)	
University	0 (0.0%)	1 (1.6%)	1 (1.6%)	
Employment				
Employed	14 (22.6%)	9 (14.5%)	23 (18.5%)	0.248
Unemployed	48 (77.4%)	53 (85.5%)	101 (81.5%)	
Type of work				
Housewife	48 (77.4%)	53 (85.5%)	101 (81.5%)	0.037
Teacher	0 (0.0%)	1 (1.6%)	1 (0.8%)	
Employee	14 (22.6%)	5 (8.1%)	19 (15.3%)	
Farmer	0 (0.0%)	3 (4.8%)	3 (2.4%)	
Child care				
Mother	47 (75.8%)	54 (87.1%)	101 (81.5%)	0.282
Grandmother	5 (8.1%)	5 (8.1%)	10 (8.1%)	
Aunt	6 (9.7%)	1 (1.6%)	7 (5.6%)	
Household assistant	3 (4.8%)	1 (1.6%)	4 (3.2%)	
Daycare	1 (1.6%)	1 (1.6%)	2 (1.6%)	
Source person				
Mother	42 (67.7%)	45 (72.6%)	87 (70.2%)	0.806
Father	11 (17.7%)	11 (17.7%)	22(17.7%)	
Grandmother	4 (6.5%)	2 (3.2%)	6 (4.8%)	
Grandfather	2 (3.2%)	3 (4.8%)	5 (4.0%)	
Aunt	2 (3.2%)	1 (1.6%)	3 (2.4%)	
Daycare	1 (1.6%)	0 (0.0%)	1 (0.8%)	

Source: Chi square test.

The majority of mothers were in the categories of 20-29 years (40.2%) and 30-39 years (38.7%). Most of the mother's education was in high school (41.9%) in both the control and treatment groups. The majority of mothers who participated in this study were housewives (85.5%). Children are parenting, and most of the source respondents were mothers themselves, i.e., 87.1% and 72.6%.

3.2. Frequency Distribution of Knowledge and Protein Intake in Control and Treatment Groups

Table 2 shows the frequency distribution of nutrition information. Most people in the control group (38.7%) knew enough about nutrition before the test, while most people in the treatment group (54.8%) knew a lot about nutrition. The number of people in the treatment group who knew good things about diet after the test was 93.5%.

Table 2.

Frequency distribution of mother's knowledge in the control and treatment groups.

Knowledge	Group		Total
	Control (N=62)	Treatment (N=62)	
Pre nutrition knowledge			
Good	20 (32.3%)	34 (54.8%)	54 (43.5%)
Sufficient	24 (38.7%)	19 (30.6%)	43 (34.7%)
Not sufficient	18 (29.0%)	9 (14.5%)	27 (21.8%)
Post nutrition knowledge			
Good	29 (46.8%)	58 (93.5%)	87 (70.2%)
Sufficient	23 (37.1%)	4 (6.5%)	27 (21.8%)
Not sufficient	10 (16.1%)	0 (0.0%)	10 (8.1%)

Source: Frequency distribution.

3.3. Comparison of Mother's Knowledge of Nutrition in Stunted Toddlers in the Control and Treatment Groups

Based on the results in Table 3, the pretest nutritional knowledge scores between the control and treatment groups were not significantly different, while the posttest had a significant increase. Protein intake pretest and posttest at month 1, 2, 3 and 4 between the control and treatment groups was significantly different ($p < 0.01$).

Table 3.

Frequency distribution of knowledge and protein intake in the control and treatment groups.

Variable	Category	Group		P-value
		Control (N=62)	Treatment (N=62)	
Knowledge score	Pre nutrition (Max=20)	14.48±3.10	15.76±3.61	0.110 ^c
	Post nutrition (Max=20)	15.45±3.55	18.53±1.49	0.001 ^d
P-value		0.003 ^a	0.001 ^b	
Protein intake	Pretest protein intake	6.01±4.34	8.00±3.72	0.001 ^d
	Month 1 protein intake	6.61±0.98	11.93±9.15	0.001 ^d
	Month 2 protein intake	6.86±0.70	12.82±2.76	0.001 ^d
	Month 3 protein intake	7.12±2.180	15.03±21.73	0.001 ^d
	Month 4 protein intake	7.72±4.74	15.70±2.69	0.001 ^d
P-value		0.033 ^a	0.000 ^a	

Note: a=Wilcoxon test, b=Paired t-Test, c=Independent t-Test, d=Mann Whitney test, CI95% α5%.

3.4. Relationship between Nutrition Knowledge and Protein Intake

The results in Table 4 show a fairly strong relationship between nutritional knowledge and protein intake in the treatment group.

Table 4.

Relationship between nutrition knowledge and protein intake.

Variable	Correlation coefficient	P value
Control group		
Nutrition knowledge score → Protein intake	-0.035	0.789 _a
Treatment group		
Nutrition knowledge score → Protein intake	0.609	0.001 _a

Note: a=Rank spearman correlation, CI95% α5%.

4. Discussion

According to Table 1, mothers of toddlers had the highest age range of 30-49 years (38.7%). The highest mother's education was senior high school (26.0%), which affects child development. According to Papua research, stunting is more likely in children of low-educated mothers. High school graduates have 1.122 times more stunted children than women with tertiary education [26]. Good education opens parents up to outside information about parenting, children's health, education, and other vital topics [27].

Based on the employment of the respondents, it was revealed that many respondents work as housewives, i.e., 77.4% in the control group and 85.5% in the treatment group. The parental work status has the potential to impact the parenting practices of toddlers who experience stunting. The practice of house wife job enables moms to utilize informal leaflets and educational modules to acquire knowledge that has been provided to participants. This empowers them with more prospects to effectively apply this knowledge towards the development of their undernourished young children. Therefore, the two groups have equality in terms of work and can be compared with each other. Mothers who do not work have a lot of time at home. They are more focused on caring for their toddlers so there is no reason that their children are not given nutritious food [28].

According to the study's findings, 54.0% of the sample had biological mothers who raised them. The mother's role is as a care giver and regulator of family food consumption, especially for toddlers. Mothers will have less time to devote to their toddlers since they will be busier with their employment and other responsibilities, including taking care of themselves and their family. Due to time constraints, many women leave their toddlers in the care of others, such as grandparents, helpers, relatives, and friends. Because a mother's love isn't as great as other people's affection, it's not a good idea to get into the habit of feeding toddlers on a regular basis. [29].

There exists a correlation between inadequate dietary habits and variations in parenting approaches. Mothers of non-stunting toddlers understand intakes that are rich in nutrients and useful for children's bodies and are more patient in controlling children's dietary habits. Meanwhile, the parenting style of mothers with stunting toddlers frees children to choose what foods their children like, although these foods have less nutritional value. Mothers of toddlers who are not stunted prefer to take care of their children directly [30].

Understanding leads to knowledge, which is attained after someone detects an event. The majority of information is gained through the senses of sight and hearing [31]. Table 3 shows that the average nutrition knowledge of mothers in the control and treatment groups was not substantially different in the pretest. However, in the posttest results, both groups increased, with the treatment group increasing significantly more than the control group. The percentage of questionnaires completed by mothers revealed that the most errors in post-nutrition knowledge in the control group were related to the definition of nutrition and a balanced menu, where the mother's opinion was that colorless vegetables had a high nutritional content. A total of 16.1% of participants provide responses that were found to be incorrect. The prevailing belief was that nutrition solely pertained to bodily health, and a balance diet was not related to a diverse range of foods, but rather appealed to nutritional requirements necessary for cellular repair within the body. This study succeeded in making a good increase in knowledge in the treatment group with an average value of 15.76 ± 3.61 because providing counseling in stages over 4 months produced scores in the good category. This can ensure that the treatment group gained more knowledge from experts and was monitored by local cadres to check every diet given to children and help mothers solve difficulties during the research period. The knowledge given to mothers through two-way communication interactions, figures from the module book, and self-awareness in wanting to increase their own knowledge makes it easy to apply knowledge in everyday life [29].

Novianti, et al. [30] discovered that moms in the treatment group had much more nutrition knowledge than those in the control group. All respondents experienced changes in knowledge after receiving therapy [32]. If the intervention is carried out in stages each month, the mother's knowledge will improve significantly. Several studies [32-40] have found that offering education to moms has a substantial influence. In this study, health education was delivered in four stages over four months. Repeated health education and counseling can improve mothers' knowledge of the optimal diets for stunted children. This is consistent with Das, et al. [41] finding that counseling can improve mothers' nutrition knowledge and raise their awareness of the necessity of meeting their children's nutritional needs. As a result, the mother will be more eager to supply meals that will improve the child's nutritional state.

The risk of stunting can be reduced if health workers keep educating mothers about preventative care. Protein is essential for the development and repair of living tissues and for the generation of new cells to replace old or damaged ones. Nutritional deficiencies and slowed development could arise from not eating enough protein when the body is still developing [42]. Due to the importance of amino acids in muscle development, inadequate protein quality might have a severe effect on children's growth and health [43-45].

In line with the Ramdlaniyah and Afifah [27] study, this study also measured protein intake. Nevertheless, this study used a quasi-experimental design and provided interventions to two groups of stunting toddlers, with the first group providing interventions with leaflets and the second providing health education. This research was also conducted for 4 months on 124 toddlers. The importance of choosing the type of food for stunted toddlers can have a positive long-term impact. Observations were made for 4 months, and in the first month, the treatment group was only given food in the form of snacks, sweet drinks, eggs, porridge, rarely vegetables, and flour. After counseling was performed in stages, the food consumed contained more animal and vegetable protein, including milk, eggs, chicken, and soybeans, colored vegetables, milk biscuits, and fish. However, it was different from the control group, which tended to be flat every month if no information or counseling was given. From these two findings, the results of protein intake looked better in the group that was given regular counseling for 4 months than that was only given leaflets without being taught by the experts.

Research conducted in 2019 related to animal protein intake showed that animal protein intake, particularly consumption of milk ≥ 300 mL, had a significant relationship with stunting (Odd Ratio) [OR] 0.36, 95% Confidence Intervals [CI] 0.17 - 0.73, $p = 0.005$ and became one of the factors preventing stunting (OR 0.28, 95% CI 0.13 - 0.63, $p = 0.002$) [40]. In agreement with a study conducted in Bangladesh in 2020, the result of animal protein intake for 15-17 months was positively related to Body Length for Age (BL/A) of toddlers at 18 months of age ($p = 0.003$) [41]. This is also in line with the study of Mahfuz et al. (2019) which found that the intervention group with egg and milk supplementation experienced a change in body length for age +0.23 (95% CI: 0.18; 0.29; $p < 0.001$) [42].

Research in 2020 showed that counseling on feeding practices for toddlers, i.e., the consumption of animal protein foods in the form of milk, meat, and eggs given to toddlers aged 6-23 months, had a significant relationship to reducing stunting ($p = 0.030$) [43]. This finding is in agreement with the research of Herber et al. [44] who found that milk had a relationship with a decrease in the likelihood of stunting in toddlers by 1.9% (95% CI -0.02, -0.01) [44]. Plant-based foods contain lower levels of micronutrients than animal protein, so a higher intake of animal-based foods is associated with reduced stunting [45].

5. Conclusions

Nutrition and health education increased stunted toddler mothers' knowledge and protein intake. The provision of interventions providing knowledge about nutrition and protein intake simultaneously for 4 months showed significant results. This method can be applied by health workers, especially midwives, nurses, and nutritionists, to provide better access to food nutrition and increase parents' knowledge and skills in providing balanced nutrition. These efforts are expected to reduce and prevent stunting in children in Indonesia.

References

- [1] P. Rueda-Guevara, N. Botero-Tovar, K. M. Trujillo, and A. Ramírez, "Worldwide evidence about infant stunting from a public health perspective: A systematic review," *Biomédica*, vol. 41, no. 3, pp. 541-554, 2021. <https://doi.org/10.7705/biomedica.6017>
- [2] T. Vaivada, N. Akseer, S. Akseer, A. Somaskandan, M. Stefopoulos, and Z. A. Bhutta, "Stunting in childhood: An overview of global burden, trends, determinants, and drivers of decline," *The American Journal of Clinical Nutrition*, vol. 112, no. Supplement_2, pp. 777S-791S, 2020. <https://doi.org/10.1093/ajcn/nqaa159>
- [3] N. Wali, K. E. Agho, and M. N. A. Renzaho, "Factors associated with stunting among children under 5 years in five South Asian countries (2014-2018): Analysis of demographic health surveys," *Nutrients*, vol. 12, no. 12, pp. 1-27, 2020. <https://doi.org/10.3390/nu12123875>
- [4] A. D. B. Febriani, D. Daud, and S. Rauf, "Risk factors and nutritional profiles associated with stunting in children," *Pediatric Gastroenterology, Hepatology & Nutrition*, vol. 23, pp. 457-463, 2020. <https://doi.org/10.5223/pghn.2020.23.5.457>
- [5] V. De Sanctis et al., "Early and long-term consequences of nutritional stunting: From childhood to adulthood," *Acta Biomedica*, vol. 92, no. 1, pp. 1-12, 2021. <https://doi.org/10.23750/abm.v92i1.11346>
- [6] WHO, "Levels and trends in child malnutrition Geneva: World health organization," Retrieved: <https://www.who.int/publications/i/item/9789240025257>. 2021.
- [7] R. Kirana, A. Aprianti, and N. W. Hariati, "The influence of health promotion media on mother's behavior in stunting prevention during the covid-19 pandemic (in Kuncup Harapan Banjarbaru Kindergarten children)," *Jurnal Inovasi Penelitian*, vol. 2, no. 9, pp. 2899-2906, 2022.
- [8] FAO, IFAD, and UNICEF, "The state of food security and nutrition in the world; safeguarding against economic slowdowns and downturns". Rome: FAO," Retrieved: <https://www.fao.org/3/ca5162en/ca5162en.pdf>. 2019.
- [9] UNICEF, "The situation of children in Indonesia Jakarta: UNICEF Indonesia," Retrieved: <https://www.unicef.org/indonesia/sites/unicef.org/indonesia/files/2020-07/Situasi-Anak-di-Indonesia-2020.pdf>. 2020.
- [10] M. V. Dhami, F. A. Ogbo, U. L. Osuagwu, Z. Ugbo, and K. E. Agho, "Stunting and severe stunting among infants in India: The role of delayed introduction of complementary foods and community and household factors," *Global Health Action*, vol. 12, no. 1, p. 1638020, 2019. <https://doi.org/10.1080/16549716.2019.1638020>
- [11] T. Huriah and N. Nurjannah, "Risk factors of stunting in developing countries: A scoping review," *Open Access Macedonian Journal of Medical Sciences*, vol. 8, no. F, pp. 155-160, 2020. <https://doi.org/10.3889/oamjms.2020.4466>
- [12] R. Kemenkes, "Pocket book of survey results on the nutritional status of Indonesia (SSGI)," Retrieved: <https://kesmas.kemkes.go.id/assets/uploads/contents/attachments/09fb5b8ccfd088080f2521ff0b4374f.pdf>. 2022.
- [13] BKKBN, "Policies and strategies to accelerate stunting reduction in Indonesia Jakarta: BKKBN," Retrieved: https://lms-elearning.bkkbn.go.id/pluginfile.php/18037/mod_resource/content/1/4.%20Buku%20Kebijakan%20Dan%20Strategi%20Percepatan%20Penurunan%20Stunting%20Di%20Indonesia.pdf. 2021.
- [14] R. Kepmenkes, "No. 01.07/MENKES/1928/2022 concerning national guidelines for medical services for stunting," Retrieved: https://yankes.kemkes.go.id/unduh/fileunduhan_1673400525_335399.pdf. 2022.
- [15] A. Mardiah, R. Riyanti, and M. Marlina, "The effectiveness of counseling and audio visual media on knowledge and attitudes of mothers of malnourished toddlers at the medan sungga health center," *Jurnal Kesehatan Global*, vol. 3, no. 1, pp. 18-25, 2020. <https://doi.org/10.33085/jkg.v3i1.4549>
- [16] H. S. Mediani, "Predictors of stunting among children under five year of age in Indonesia: A scoping review," *Global Journal of Health Science*, vol. 12, no. 8, pp. 83-95, 2020. <https://doi.org/10.5539/gjhs.v12n8p83>
- [17] A. C. N. Marchianti, D. A. Rachmawati, I. S. W. Astuti, A. M. Raharjo, and R. Prasetyo, "The impact of knowledge, attitude and practice of eating behavior on stunting and undernutrition in children in the agricultural area of Jember District, Indonesia," *Jurnal Berkala Epidemiologi*, vol. 10, no. 2, pp. 140-150, 2022. <https://doi.org/10.20473/jbe.v10i22022.140-150>
- [18] O. Fadare, M. Amare, G. Mavrotas, D. Akerele, and A. Ogunniyi, "Mother's nutrition-related knowledge and child nutrition outcomes: Empirical evidence from Nigeria," *PloS One*, vol. 14, no. 2, p. e0212775, 2019. <https://doi.org/10.1371/journal.pone.0215110>
- [19] F. H. Palupi, Y. Renowening, and H. Mahmudah, "Mother's knowledge of nutrition related to stunting in toddlers age 24-36 months," *Jurnal Kesehatan Mahardika*, vol. 10, no. 1, pp. 1-6, 2023.
- [20] L. M. Murti, N. N. Budiani, and M. W. G. Darmapatri, "The relationship between mother's knowledge about toddler nutrition and the incidence of stunting in children aged 36-59 months in Singakerta Village, Gianyar Regency," *The Journal of Midwifery*, vol. 8, no. 2, pp. 62-69, 2020.
- [21] FOA, "The state of food and algriculture Rome: Food and algriculture organization of the united nations," Retrieved: <https://www.fao.org/3/ca6030en/ca6030en.pdf>. 2019.
- [22] W. Kurniawan and A. Agustini, *Health and nursing research methodology*. Cirebon: CV: Rumah Pustaka, 2021.
- [23] R. D. Wulandari, A. D. Laksono, I. Kusri, and M. Tahangnacca, "The targets for stunting prevention policies in Papua, Indonesia: What mothers' characteristics matter?," *Nutrients*, vol. 14, no. 3, pp. 1-10, 2022. <https://doi.org/10.3390/nu14030549>

- [24] E. de Buhr and A. Tannen, "Parental health literacy and health knowledge, behaviours and outcomes in children: A cross-sectional survey," *BMC Public Health*, vol. 20, no. 1, pp. 1-9, 2020. <https://doi.org/10.1186/s12889-020-08881-5>
- [25] H. F. Aisyah, "Overview of parenting patterns for mothers with stunting and non-stunting toddlers in Tengah Village, Kramat Jati District, DKI Jakarta," *Perilaku dan Promosi Kesehatan: Indonesian Journal of Health Promotion and Behavior*, vol. 3, no. 2, pp. 71-78, 2021. <https://doi.org/10.47034/ppk.v3i2.4158>
- [26] N. K. S. Astari, N. M. Y. Gumala, and L. Cintari, "stunting differences based on mother's nutritional knowledge and Toddler Nutrition Intake in Ubud District," *Jurnal Ilmu Gizi: Journal of Nutrition Science*, vol. 8, no. 2, pp. 101-111, 2019.
- [27] R. A. Ramdhanian and C. A. N. Afifah, "The difference in protein and zinc intake in stunted and non-stunted toddlers in Dawarblandong District, Mojokerto," *Jurnal EduHealth*, vol. 14, no. 01, pp. 194-201, 2023.
- [28] A. Ramdhani, H. Handayani, and S. A., "Mother's knowledge relationship with the incidence of stunting national seminar proceedings," Retrieved: <https://semnaslppm.ump.ac.id/index.php/semnaslppm/article/view/122>. 2020.
- [29] F. Sirasa, L. Mitchell, R. Silva, and N. Harris, "Factors influencing the food choices of urban Sri Lankan preschool children: Focus groups with parents and caregivers," *Appetite*, vol. 150, p. 104649, 2020. <https://doi.org/10.1016/j.appet.2020.104649>
- [30] R. Novianti, H. Purnaweni, and A. Subowo, "The role of posyandu to handle stunting in Medini Village, Undaan District, Kudus Regency," *Journal of Public Policy and Management Review*, vol. 10, no. 3, pp. 378-387, 2021.
- [31] F. Wulandari, N. Juliana, and E. Sari, "Literature review: Correlation between mother's knowledge of nutrition and stunting incidence in Children," *Journal of Sciences and Health*, vol. 2, no. 2, pp. 78-84, 2022.
- [32] R. Jannah and N. Nurhamidi, "The relation of mother's knowledge, parenting patterns and household food security status with stunting case in children aged 6-23 months regional study of landasan ulin health center, Banjarbaru city," *Journal of Local Therapy*, vol. 2, no. 1, pp. 25-35, 2023. <https://doi.org/10.31290/jlt.v2i1.3388>
- [33] D. A. Rachmawati, R. P. C. Indraswari, and E. N. Sakinah, "The correlation between mother's knowledge about complementary feeding with the incidence of stunting in toddlers under two in Mayang, Jember," *Journal of Agromedicine and Medical Sciences*, vol. 8, no. 2, pp. 85-90, 2022. <https://doi.org/10.19184/ams.v8i2.25606>
- [34] Z. Nasution and I. Nurhayati, "The effectiveness of counseling and mung bean vigna radiata l premix cookies as complementary food to prevent stunting," *Current Nutrition & Food Science*, vol. 19, no. 3, pp. 317-323, 2023. <https://doi.org/10.2174/1573401318666220628102359>
- [35] D. N. Chandra, "Fueling growth and preventing stunting: The role of animal protein in achieving optimal nutrition - Indonesia's national nutrition day 2023 theme," *World Nutrition Journal*, vol. 6, no. 2, pp. 1-3, 2023. <https://doi.org/10.25220/wnj.v06.i2.0001>
- [36] H. R. B. Arini, V. Hadju, P. Thomas, and M. Ferguson, "Nutrient and food intake of Indonesian children under 5 years of age: A systematic review," *Asia Pacific Journal of Public Health*, vol. 34, no. 1, pp. 25-35, 2022.
- [37] P. Parikh *et al.*, "Animal source foods, rich in essential amino acids, are important for linear growth and development of young children in low-and middle-income countries," *Maternal & Child Nutrition*, vol. 18, no. 1, pp. 1-10, 2022. <https://doi.org/10.1111/mcn.13264>
- [38] M. K. Kusfiryadi and D. F. Nabilah, "Analysis of nutritional value, acceptability and organoleptic quality of mackerel fish waffle with additional Kelulut honey as an additional food alternative for stunting children," *Linguistics and Culture Review*, vol. 6, no. S4, pp. 182-190, 2022.
- [39] W. U. Sindhughosa and I. G. L. Sidiartha, "Intake of animal protein is associated with stunting in children aged 1-5 years in the work environment of the Nagi Health Center in Lantaka City, East Flores Regency," *Intisari Sains Medis*, vol. 14, no. 1, pp. 387-393, 2023.
- [40] D. R. Sjarif, K. Yulianti, and W. J. Iskandar, "Daily consumption of growing-up milk is associated with less stunting among Indonesian toddlers," *Medical Journal of Indonesia*, vol. 28, no. 1, pp. 1-7, 2019. <https://doi.org/10.13181/mji.v28i1.2607>
- [41] S. Das *et al.*, "Dietary magnesium, vitamin d, and animal protein intake and their association to the linear growth trajectory of children from birth to 24 months of age: Results from mal-ed birth cohort study conducted in Dhaka, Bangladesh," *Food and Nutrition Bulletin*, vol. 41, no. 2, pp. 200-210, 2020. <https://doi.org/10.1177/0379572119892408>
- [42] M. Mahfuz *et al.*, "Daily supplementation with egg, cow milk, and multiple micronutrients increases linear growth of young children with short stature," *The Journal of Nutrition*, vol. 150, no. 2, pp. 394-403, 2020. <https://doi.org/10.1093/jn/nxz253>
- [43] G. Hanley-Cook, A. Argaw, P. Dahal, S. Chitekwe, and P. Kolsteren, "Infant and young child feeding practices and child linear growth in Nepal: Regression-decomposition analysis of national survey data, 1996-2016," *Maternal & Child Nutrition*, vol. 18, no. Suppl 1, p. e12911, 2022. <https://doi.org/10.1111/mcn.12911>
- [44] C. Herber, L. Bogler, S. Subramanian, and S. Vollmer, "Association between milk consumption and child growth for children aged 6-59 months," *Scientific Reports*, vol. 10, no. 1, pp. 6730-6730, 2020. <https://doi.org/10.1038/s41598-020-63647-8>
- [45] Y. Kaimila, O. Divala, and S. E. Agapova, "Consumption of animal-source protein is associated with improved height-for-age z scores in rural malawian children aged 12(-)36 months," *Nutrients*, vol. 11, no. 2, pp. 1-21, 2019. <https://doi.org/10.3390/nu11020480>