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Paternal occupation and maternal misperceptions of sweetened condensed milk as key determinants of stunting among toddlers in Yogyakarta, Indonesia

Pekerjaan ayah dan kesalahpahaman ibu tentang susu kental manis sebagai faktor utama penentu stunting pada balita di Yogyakarta, Indonesia

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Abstract

Sweetened condensed milk (SCM) is often misperceived as a suitable milk substitute for toddlers despite its composition. This study aimed to analyze the relationship between socio-demographic characteristics, SCM consumption, and stunting incidence. A cross-sectional study was conducted between May and September 2023 in Yogyakarta, involving 942 mother-toddler pairs using simple random sampling. Socio-demographic characteristics, maternal knowledge, understanding of SCM, and SCM consumption were collected through a structured questionnaire. Stunting was measured using height-for-age z-scores (HAZ). Data were analyzed using chi-square tests and binary logistic regression. The prevalence of stunting was 28.6%, and 5.1% of toddlers consumed SCM as a milk substitute. Several factors were associated with stunting ($p<0.05$), including mother's age, parental education and occupation, family income, mother's knowledge of nutrition, mother's knowledge of sweetened condensed milk, child's age, low birth weight (LBW), immunization history, history of infectious diseases, dietary diversity, reason for giving SCM, and understanding of SCM. Fathers' occupation was identified as the dominant factor (p-value = <0.001; OR = 1.820), indicating that children of fathers working as laborers had a higher risk of developing stunting. In conclusion, these findings highlight the importance of improving parental understanding of SCM and strengthening fathers' involvement in childcare.

Keywords: Parental perception, parental occupation, socio-demographic determinants, stunting, sweetened condensed milk

Abstrak

Susu kental manis (SKM) di Indonesia sering disalahpahami sebagai pengganti susu yang cocok untuk balita meskipun komposisinya berbeda. Penelitian ini bertujuan untuk menganalisis hubungan antara karakteristik sosiodemografis, konsumsi SCM, dan kejadian stunting. Studi potong lintang dilakukan pada Mei-September 2023 di Yogyakarta yang melibatkan 942 pasangan ibu-balita menggunakan simple random sampling. Karakteristik sosiodemografis, pengetahuan ibu, pemahaman tentang SCM, dan konsumsi SCM dikumpulkan melalui kuesioner terstruktur. Stunting diukur menggunakan z-score tinggi badan menurut usia (HAZ). Data dianalisis menggunakan uji chi-square dan regresi logistik biner. Prevalensi stunting adalah 28,6%, sedangkan 5,1% balita mengonsumsi SCM sebagai pengganti susu. Beberapa faktor dikaitkan dengan stunting ($p<0,05$), termasuk usia ibu, pendidikan dan pekerjaan orang tua, pendapatan keluarga, pengetahuan ibu tentang nutrisi, pengetahuan ibu tentang susu kental manis, usia anak, berat badan lahir

rendah (LBW), riwayat imunisasi, riwayat penyakit menular, keragaman diet, alasan pemberian susu kental manis, dan pemahaman tentang susu kental manis. Pekerjaan ayah diidentifikasi sebagai faktor dominan (nilai p = <0,001; OR = 1,820), menunjukkan bahwa anak-anak dari ayah yang bekerja sebagai buruh memiliki risiko stunting yang lebih tinggi. Kesimpulan, pentingnya meningkatkan pemahaman orang tua tentang susu kental manis dan memperkuat keterlibatan ayah dalam praktik nutrisi anak.

Kata Kunci: Faktor sosiodemografis, stunting, susu kental manis, persepsi orang tua, pekerjaan orang tua

Introduction

Growth and optimal development in children are crucial for ensuring community well-being (Martín-Rodríguez et al., 2022). Nutrition, especially animal protein, plays a significant role in supporting physical growth, brain mass development, and enhancing the immune system of children (Cohen et al., 2021; Cusick & Georgieff, 2016). Deficiencies in nutrition, particularly during the Complementary Feeding period, can have serious implications, including the risk of growth failure or stunting (International Food Policy Research Institute (IFPRI), 2016; Oktorina, 2018). In 2025, approximately 150.2 million children under the age of five, or around 23.2 percent of the global child population, were affected by stunting worldwide (United Nations Children's Fund (UNICEF) et al., 2025). According to the 2024 Indonesian Nutritional Status Survey, the prevalence of stunting in Indonesia is 19.8% in 2024 and 17.4% in the Special Region of Yogyakarta Province (Kemenkes RI, 2025). The highest number of stunted growth is caused by several habits, one of which is parenting. Every parent has a different education, which leads to different parenting styles.

Various sources of animal protein, such as milk, eggs, fish, and meat, have been proven to contribute positively to child growth and development. Children who consume animal protein, especially milk, tend to exhibit better physical growth than those who do not. Ernawati et al. (2016) indicated that toddlers with stunting or malnutrition had a lower intake of animal protein, especially from milk and its derivatives, than toddlers with a good nutritional status.

Increasing the consumption of animal foods, in this case milk, can reduce the risk of stunting, as well as micronutrient deficiencies and high-quality protein (Haile & Headey, 2023). However, not all milk-based products provide equivalent nutritional benefits to the consumer. Sweetened condensed milk (SCM), which contains high levels of added sugar and lower protein content than fresh milk, is often perceived as a substitute for milk in many households. The prevalence of sweetened condensed milk consumption in Indonesia is very high, with Susenas 2024 data showing that approximately 68.1% of households (63.7 million) consume packaged sweetened drinks, with sweetened condensed milk being the choice for 20.3% (Center for Indonesia's Strategic Development Initiatives, 2025). According to the 2020 data from the Central Statistics Agency (BPS), the average milk consumption in Indonesia is 16.27 kg per capita per year, which is significantly lower than that in neighboring countries such as Malaysia (26.20 kg) and Thailand (22.2 kg) (Direktorat Jenderal Peternakan dan Kesehatan Hewan (Ditjen PKH), 2021).

Stunting arises from improper food intake, such as the excessive consumption of sugar (glucose). Children with high sugar intakes may be at risk of developing issues and malnutrition. Yunitasari et al. (2022) used focus group discussions (FGD) to identify sweetened condensed milk consumption as a primary cause of malnutrition in children. The research conducted by Rahmadina et al. (2023) indicated that the frequency of condensed milk consumption is negatively correlated with height-for-age z-scores (HAZ); the more frequently toddlers consume condensed milk, the more likely it is for their HAZ to decrease. Previous studies have examined milk intake and stunting; however, limited evidence exists on how parental misperceptions of sweetened condensed milk influence child growth outcomes. Furthermore, this research can contribute to better parenting in society and prevent ongoing misperceptions.

This study focuses on sweetened condensed milk consumption within families in marginalized communities in the province of DI Yogyakarta. In this context, the role of sweetened condensed milk, a frequently consumed dairy product, requires further exploration. This study aimed to understand the extent to which sweetened condensed milk consumption correlates with stunting incidence in toddlers, providing deeper insights into the sociodemographic factors that might contribute to this health issue, especially in the stunting studies area.

Based on this objective, this study hypothesizes that toddlers who consume sweetened condensed milk regularly have a higher risk of experiencing stunting than those who do not consume it. Additionally, socio-demographic factors are expected to be significantly associated with the incidence of stunting.

Methods

The cross-sectional study conducted from May to September 2023 in the Special Region of Yogyakarta covered the districts of Bantul, Sleman, Kulon Progo, and Gunung Kidul. Participants were selected using simple random sampling from the four cities. These four cities were chosen because of the high number of stunted populations.

The number of participants was determined using a single proportion sample test with a two-sided alternative hypothesis (Formula 1). The assumptions included a significance level of 5%, 90% power, a stunting rate of 32.16% in urban Indonesia (P_0) based on previous research, and P_a 25% lower than P_0, referring to the stunting data in the Special Region of Yogyakarta in 2022. An additional 10% was added to anticipate participant dropout during the study. Thus, the minimum calculated sample size was 942 mother-child pairs, distributed as follows: Bantul with 238 pairs, Sleman with 227 pairs, Kulon Progo with 250 pairs, and Gunung Kidul with 227 pairs. The selection of districts for data collection was based on the national prevalence of stunting in children. The chosen districts had stunting prevalence above the national stunting reduction target set by the government, which is 14. Marginalized communities in this study were community groups in areas with a high prevalence of stunting who had limited access to health services, nutrition, and other supporting resources. The selection of districts for data collection was based on national stunting prevalence data, where the chosen districts had stunting prevalence above the national reduction target set by the government (14%), ensuring that the study focused on areas with a higher burden of stunted growth.

Mother-toddler pairs who met the inclusion and exclusion criteria were accepted. The inclusion criteria were as follows: 1) mothers at least 19 years old with children aged 0-59 months, 2) mothers residing for at least one year in the research location, and 3) infants born at the appropriate time (37-42 weeks of gestation) without identified congenital defects since birth. The exclusion criteria included toddlers with serious illnesses, including cancer and COVID-19, requiring isolation or intensive healthcare.

Data collection was carried out by enumerators trained in public health nutrition and data collection techniques and procedures. Validation and reliability tests for this questionnaire were conducted among mothers with appropriate characteristics residing in other districts (excluding the study locations), with a sample size of 10% of the total participants (10% of 942, rounded to 95). The analysis was performed using Pearson's product-moment correlation and item-total correlation. The calculated r-values were compared with the product moment r-table (0.2845) at a significance level of 5% using a two-tailed approach (df=n-2, i.e., 93). The corrected item-total correlations for each question were between 0.713 and 0.778 (the calculated r-value was greater than the r-table), and Cronbach's alpha was 0.877.

The nutrition knowledge questionnaire comprised 11 questions covering stunting and four balanced nutrition principles, assessed based on the number of correct answers/11x100%. Thus, maternal nutrition knowledge was categorized as adequate (score < 80) and good (score ≥ 80). The sweetened condensed milk knowledge questionnaire consisted of 10 questions covering condensed milk consumption, content, and usage, evaluated based on the median value, categorized as adequate (score < 90) and good (score ≥ 90), as

no standardized cut-off exists; the median was used to ensure proportional group distribution and reduce classification bias. Maternal caregiving patterns in feeding encompass two dimensions: 1) demandingness (authoritative parenting) regarding how much parents control their child's eating behavior, and 2) responsiveness (supportive parenting) involving warmth in feeding practices. It consisted of nine questions using a 5-point Likert scale (never = 0, rarely = 1; sometimes = 2; often = 3; always = 4) with a total score range of 0-36. It was categorized based on the median value as adequate (score < 18) and good (score ≥ 18), following the common practice in behavioral research when validated thresholds are unavailable. Stunting status was assessed using the height-for-age/length-for-age anthropometric index (HAZ), with children classified as stunted if HAZ < -2 standard deviations (SD) according to the WHO Child Growth Standards.

Education level was categorized as low (no schooling to junior high school) and high (senior high school to higher education), following the classifications used in previous demographic and health studies in Indonesia. The mother's occupation was divided into two categories: not working/homemaker (housewife) and working. Father/husband's occupation was categorized as laborer or non-laborer. Family income was categorized based on the 2023 Yogyakarta Province Minimum Wage (PMW) of IDR 1,981,782, which represents a standardized economic threshold commonly used in socioeconomic analyses in Indonesia. In this study, sweetened condensed milk consumption among toddlers was defined as the direct provision of sweetened condensed milk as milk or as a food supplement. The frequency of consumption was categorized as ≥1 time per day (1 = consumption) or not at all (0 = no consumption).

Univariate analysis was used to assess the distribution of each variable using frequencies and percentages. Bivariate analysis used the chi-square test to examine the relationship between sociodemographic characteristics and sweetened condensed milk with stunting incidence, with a significance level of $p < 0.05$.

Variables that met the bivariate significance criterion ($p < 0.25$) were included in the multivariate analysis using binary logistic regression to identify the dominant factors associated with stunting incidence. Model selection was performed using a backward stepwise method, in which variables were sequentially removed based on statistical significance until the final model was obtained. Prior to the multivariate analysis, multicollinearity among independent variables was assessed using the Variance Inflation Factor (VIF), with a cut-off value of <10 indicating no significant multicollinearity. The goodness-of-fit of the final model was evaluated using the Hosmer–Lemeshow test, where a p-value >0.05 indicated that the model fit the data adequately. The final multivariate model reported adjusted Odds Ratios (OR), 95% Confidence Intervals (CI), and p-values <0.05 as indicators of statistical significance (Hastono, 2024).

This study was approved by the Research Ethics Commission of the Faculty of Medicine and Health, Universitas Muhammadiyah Jakarta (ethical approval number: 83/PE/KE/FKK-UMJ/V/2023).

Result and Discussion

The data obtained from four districts in the Special Region of Yogyakarta involved 942 mother-toddler pairs. Almost all respondents were native residents of the villages. Table 1 shows that the prevalence of stunting in this study was 28.6% (12.0% of children were severely stunted, and 16.6% were stunted) (Table 1).

Table 1. Categories based on stunting status in toddlers (n = 942)

Stunting Status	n	%
Severely stunted	113	12.0
Stunted	156	16.6
Normal	*654*	69.4
Hight	19	2.0

The prevalence of stunting in toddlers in the Special Region of Yogyakarta is 28.6%. This figure is higher than the national rate of 19.8% in 2024 and the provincial rate in the Special Region of Yogyakarta of 17.4% (Kemenkes RI, 2025).

Table 2 shows the sociodemographic characteristics of mothers and children and the consumption of sweetened condensed milk in households. The majority of mothers were aged ≥25 years (92.3%), had 2-4 children (multiparous) (68.5%), had a non-college education (74.8%), were either unemployed or housewives (69.2%), and had a family income above or equal to the PMW (57.3%). Fathers/husbands also had a non-college

education (83.2%), worked as laborers (40.8%), attended antenatal visits six times or more (86.9%), their partners gave birth in independent midwife clinics (36.8%), and the mothers provided primary care (87.8%). They possessed good knowledge of nutrition (74.7%) and sweetened condensed milk (86.7%) and practiced good parenting (54.7%).

The toddlers in this study were mostly male (51.0%), aged 24 months or older (71.4%), had a normal birth weight (≥ 2500 g) (90.9%), complete immunization history (87.7%), and no history of infectious diseases (70.4%). Most of them received Early Initiation of Breastfeeding (EIB) (80.1%), were introduced to complementary feeding after six months (92.8%), and had incomplete food diversity (55.1%).

Regarding sanitation in their environment, most mothers had good handwashing habits (81.7%) and washed their hands with soap and running water. The majority of drinking water sources were dug wells, and the water was boiled before consumption (56.3%). Meanwhile, for drinking water sources other than dug wells, such as rainwater, the Regional Water Company (PDAM), pumped wells, river water, mountain springs, and bottled drinking water, the most commonly used source is the Regional Water Utility Company (RWUC).

The use of sweetened condensed milk in households was condensed milk by 58.3%, 5.1% of which was for toddler milk drinks. Data from a survey conducted in Kendari in 2022 showed that 32% of mothers provided sweetened condensed milk as a daily milk beverage to their children, whereas in Batam, this figure was 25% (Yudistira et al., 2022).

Mothers consider sweetened condensed milk affordable and practical, although many are aware of its negative impact on dental health, such as cavities. Most mothers knew that sweetened condensed milk is not milk (78.3%), and the source of this information was mass media (57.3%). Despite being told that sweetened condensed milk should not be given to children, approximately 16.8% of mothers still provided it to their children.

Table 2. Sociodemographic characteristics and sweetened condensed milk consumption (n = 942)

Variable	n	%
A. Mother's Characteristics		
Mother's age		
< 25 years	73	7.7
≥ 25 years	869	92.3
Parity		
Primipara	297	31.5
Multipara	645	68.5
Mother's education		
Non college	705	74.8
College	237	25.2
Mother's occupation		
Not working/housewife	652	69.2
Working	290	30.8
Family income		
< Province Minimum Wage	402	42.7
≥ Province Minimum Wage	540	57.3
Father's education		
Non college	784	83.2
College	158	16.8
Father's occupation		
Laborer	384	40.8
Other	558	59.2
Number of antenatal visits		
< 6 times	123	13.1
≥ 6 times	819	86.9
Place of delivery		
Private hospital	287	30.5
Independent midwife clinic	347	36.8
Regional Public Hospital	248	26.3
Community Health Center	56	5.9
At home	4	0.4
Primary caregiver		
Non Mother	115	12.2
Mother	827	87.8
Mothers' nutritional knowledge		
Sufficient (< score 80)	238	25.3
Good (≥ score 80)	704	74.7
Mother's condensed milk knowledge		
Sufficient (< median score 90)	125	13.3
Good (≥ median score 90)	817	86.7
Mother's parenting style		
Sufficient (< median 18)	427	45.3
Good (≥ median 18)	515	54.7
B. Child's Characteristics		
Sex		
Male	480	51.0
Female	462	49.0
Child's age		
< 24 months	269	28.6
≥ 24 months	673	71.4
Low birth weight (LBW)		

Variable	n	%
< 2500 grams	86	9.1
≥ 2500 grams	856	90.9
Immunization history		
Yes, complete	826	87.7
Incomplete	104	11.0
Not vaccinated	12	1.3
History of infectious diseases		
Yes, occurred	279	29.6
Never occurred	663	70.4
Early initiation of breastfeeding (EIB)		
Yes, EIB	755	80.1
No, not EIB	187	19.9
Complementary feeding		
< 6 months	68	7.2
≥ 6 months	874	92.8
Food diversity		
Incomplete	519	55.1
Complete	423	44.9
C. Sanitation		
Mother's handwashing habit		
Poor	172	18.3
Good	770	81.7
Source of drinking water		
Dug well	530	56.3
Non dug well	412	43.7
D. Sweetened Condensed Milk Use in Households		
Consumption of sweetened condensed milk in toddlers		
Consumption	549	58.3
No consumption	393	41.7
Reasons why mothers choose sweetened condensed milk		
Cheap price and convenience	541	57.4
Other	401	42.6
Effects of sweetened condensed milk		
Impact	635	67.4
No Impact	307	32.6
Mothers' understanding of sweetened condensed milk		
Milk	204	21.7
Not milk	738	78.3
Sources of understanding sweetened condensed milk		
Mass media	540	57.3
Non mass media	402	42.7

Table 3 displays the factors that were significantly associated with the occurrence of stunting. Based on maternal characteristics, toddlers with stunting mostly had mothers aged <25 years, with low or non-college education, who were unemployed/housewives, with a family income <PMW, a father with low or non-college education, who was a laborer, with < 6 antenatal visits, primary care by the mother, and adequate maternal knowledge of nutrition and sweetened condensed milk. Maternal characteristics associated with the occurrence of stunting were mother's age (p=0.039), mother's education (p<0.001), mother's occupation (p=0.003), family income (p<0.001), father's education (p=0.001), father's occupation (p<0.001), mother's knowledge of nutrition (p=0.002), and mother's knowledge of sweetened condensed milk (p=0.003). Parity, antenatal visits, primary care, and mothers' parenting styles were not related to the incidence of stunting.

Previous research has shown a relationship between the mother's age and stunting in toddlers, with stunting being more prevalent among mothers aged 35 and above (Permatasari et al., 2023). Non-educated and working mothers have a higher likelihood of having children who experience stunting compared to educated and non-working mothers (Akombi et al., 2017; Handayani et al., 2023; Laksono et al., 2022). Consistent with earlier studies, family income was related to stunting in toddlers in DKI Jakarta (Permatasari, Chairunnisa, et al., 2023). Low paternal education and occupation types are associated with stunting in toddlers (Akombi et al., 2017; Noor et al., 2022; Petrika et al., 2023). Mothers with insufficient nutritional knowledge tend to have more stunted children than mothers with adequate nutritional knowledge (Masilela & Modjadji, 2023). Nutritional education based on the Health Belief Model (HBM) can help reduce stunting in young children (Elfeshawy et al., 2022).

Toddler characteristics showed no sex differences in the incidence of stunting. Stunting is most common in toddlers under 24 months of age, with a birth weight <2500 g, a history of complete immunization, no history of infectious diseases, and incomplete dietary diversity. Toddler characteristics associated with stunting included age (p<0.001), low birth weight (LBW) (p=0.013), immunization history (p=0.002), history of infectious diseases (p=0.001), and dietary diversity (p=0.038). Sex, EIB, and complementary feeding were not associated with stunting.

Toddler age is a risk factor for stunting due to its connection with the growth period. This study aligns with Noor et al.'s (2022) research, which also showed an association between toddler age and stunting. Similarly, low birth weight was a contributing factor to stunting in that study (Noor et al., 2022). Furthermore, the relationship between immunization and infectious disease histories and stunting aligns with previous research, indicating that complete immunization is a dominant factor affecting stunting. Toddlers who are not completely immunized are 2.4 times more likely to experience stunting than those who are fully immunized (Permatasari et al., 2023). A history of infectious disease was associated with a reduced risk of stunting (OR = 0.562; 95% CI: 0.403–0.784; p = 0.001). In this study, a history of infectious disease was defined as any infection experienced by the respondents within the past 6 months. These results indicate that respondents with a history of infectious disease during that period had a lower chance of experiencing stunting than respondents without a history of infection. Children with a history of diarrhea are more likely to experience stunting (Akombi et al., 2017). Additionally, dietary diversity in this study included a variety of foods consumed by toddlers, such as rice, potatoes, yams, noodles, side dishes, vegetables, and fruits. Toddlers with limited food diversity during meals are more prone to stunted growth. This is consistent with prior research that indicates a link between dietary diversity and stunting, as diverse diets can meet various nutritional needs for optimal child growth and development (Prastia & Listyandini, 2020).

This study found no differences in maternal handwashing habits or drinking water sources between stunted and normal-weight toddlers. Therefore, maternal handwashing habits and drinking water sources were not associated with stunting in toddlers.

The use of sweetened condensed milk in households indicates that most stunted toddlers have mothers who choose sweetened condensed milk because it is affordable and practical, and because the mothers understand that sweetened condensed milk is milk. Factors related to the use of sweetened condensed milk in households associated with the incidence of stunting were the mother's reason for providing sweetened condensed milk (p=0.002) and the mother's understanding of sweetened condensed milk (p<0.001). Importantly, the consumption of SCM itself was not significantly associated with the incidence of stunting, nor were the perceived impacts of SCM or the sources of information about SCM. This finding suggests that the issue may not lie solely in the act of consumption but rather in the underlying maternal perceptions and decision-making processes regarding SCM. Misconceptions about SCM as an appropriate substitute for milk may play a more critical role in influencing nutritional outcomes in children than consumption frequency alone.

Sweetened condensed milk is often mistaken for a dairy product and is sometimes given to children as a substitute for milk. However, due to its limited nutritional value and high sugar content, it is advisable not to give it to toddlers to support their development (Juffrie et al., 2020). The study conducted by Sunardi et al. indicated that toddlers who consume sweetened condensed milk are more likely to experience deficiencies in vitamin A, folate, vitamin D, iron, and zinc (Sunardi & Wang, 2023).

Regarding the use of sweetened condensed milk at home, the occurrence of stunting in toddlers was more common among those whose mothers chose sweetened condensed milk for its practicality and understood that it is a milk product. Earlier studies have shown a significant relationship between sweetened condensed milk consumption habits and the nutritional status of weight/height. This implies that sweetened condensed milk consumption patterns can impact toddler growth and nutritional status, particularly in terms of weight and height. The study also found a connection between attitudes and the frequency of sweetened condensed milk consumption (Mala et al., 2023).

Research on sweetened condensed milk is still very limited, but the results reported on factors influencing the consumption of sweetened condensed milk by children are generally consistent. Factors related to these products are often associated with socioeconomic conditions that influence caregivers' choices to give sweetened condensed foods to their children. To overcome this non-ideal practice, active monitoring of product advertising, strict enforcement of regulations, and effective consumer education are necessary (Juffrie et al., 2020).

Table 3. Relationship between sociodemographic characteristics and sweetened condensed milk consumption on the occurrence of stunting

Variable	Stunting		Normal		p-value	OR (CI 95%)
	n	%	n	%		
A. Mother's Characteristics						
Mother's age					0.039*	1.727(1.056-2.825)
< 25 years	29	39.7	44	60.3		
>=25 years	240	27.6	629	72.4		
Parity					0.915	1.029(0.760-1.394)
Primipara	86	29.0	211	71.0		
Multipara	183	28.4	462	71.6		
Mother's education					<0.001*	2.129(1.476-3.070)
Non college	226	32.1	479	67.9		
College	43	18.1	194	81.9		
Mother's occupation					0.003*	1.664(1.203-2.302)
Not working/housewife	206	31.6	446	68.4		
Working	63	21.7	227	78.3		
Family income					<0.001*	1.702(1.280-2.264)
< Province Minimum Wage	140	34.8	262	65.2		
≥ Province Minimum Wage	129	23.9	411	76.1		
Father's education					0.001*	2.061(1.333-3.186)
Non college	241	30.7	543	69.3		
College	28	17.7	130	82.3		
Father's occupation					<0.001*	2.034(1.527-2.710)
Laborer	143	37.2	241	62.8		
Other	126	22.6	432	77.4		
Number of antenatal visits					0.172	1.352(0.904-2.023)
< 6 times	42	34.1	81	65.9		
≥ 6 times	227	27.7	592	72.3		
Primary caregiver					0.066	0.627(0.390-1.006)
Non Mother	24	20.9	91	79.1		
Mother	245	29.6	582	70.4		
Mother's nutrition knowledge					0.002*	1.652(1.208-2.260)
Sufficient	87	36.6	151	63.4		
Good	182	25.9	522	74.1		
Mother's condensed milk knowledge					0.003*	1.820(1.233-2.688)
Sufficient	50	40.0	75	60.0		
Good	219	26.8	598	73.2		
Mother's parenting style					0.273	1.184(0.892-1.572)
Sufficient	130	30.4	297	69.6		
Good	139	27.0	376	73.0		
B. Child's Characteristics						
Gender					0.510	0.900(0.678-1.194)
Male	132	27.5	348	72.5		
Female	137	29.7	325	70.3		
Child's age					<0.001*	1.765(1.304-2.388)
< 24 months	100	37.2	159	62.8		
≥ 24 months	169	25.1	504	74.9		
Low birth weight (LBW)					0.013*	1.824(1.157-2.877)
< 2500 grams	35	40.7	51	59.3		
≥ 2500 grams	234	27.3	622	72.7		
Immunization history					0.002*	
Yes, complete	220	26.6	606	73.4		
Incomplete	45	43.3	59	56.7		

Not vaccinated	4	33.3	8	66.7		
History of infectious diseases					0.001*	0.562(0.403-0.784)
Yes, occurred	58	20.8	221	79.2		
Never occurred	211	31.8	452	68.2		
Early initiation of breastfeeding (EIB)					0.600	1.120(0.781-1.605)
Yes, EIB	219	29.9	536	71.0		
No, not EIB	50	26.7	137	73.3		
Complementary feeding					0.416	0.755(0.423-1.348)
< 6 months	16	23.5	52	76.5		
≥ 6 months	253	28.9	621	71.1		
Food diversity					0.038*	1.369(1.027-1.826)
Incomplete	163	31.4	356	68.6		
Complete	106	25.1	317	74.9		
C. Sanitation						
Mother's handwashing habit					0.528	1.142(0.797-1.637)
Poor	53	30.8	119	69.2		
Good	216	28.1	554	71.9		
Source of drinking water					0.236	0.832(0.624-1.108)
Dug well	160	30.2	370	69.8		
Non dug well	109	26.5	303	73.5		
D. Sweetened Condensed Milk Use in Households						
Consumption of sweetened condensed milk in toddlers					0.915	1.027(0.770-1.368)
Consumption	158	28.8	391	71.2		
No consumption	111	28.2	282	71.8		
Reasons why mothers choose sweetened condensed milk					0.002*	1.597(1.191-2.142)
Cheap price and convenience	176	32.5	365	67.5		
Other	93	23.2	308	76.8		
Effects of sweetened condensed milk					0.209	1.232(0.906-1.675)
Impact	190	29.9	445	70.1		
No Impact	79	25.7	228	74.3		
Mothers' understanding of sweetened condensed milk					<0.001*	2.825(2.045-3.904)
Milk	95	46.6	109	53.4		
Not Milk	174	23.6	564	76.4		
Sources of understanding sweetened condensed milk					0.175	1.234(0.825-1.646)
Mass media	164	30.4	376	69.6		
Non mass media	105	26.1	297	73.9		

*Significant at α= 5%

Table 4. Binary Logistic Regression analysis of factors associated with the occurrence of stunting

Variable	p-value	OR	95% CI Lower-Upper
Father's Occupation	<0.001	1.820	1.346-2.462
Child's Age	<0.001	1.792	1.302-2.467
Low Birth Weight (LBW)	0.004	2.049	1.259-3.333
History of Infectious Diseases	0.022	0.667	0.471-0.944
Reasons why mothers choose sweetened condensed milk	0.108	1.292	0.945-1.767
Mothers' understanding of sweetened condensed milk	<0.001	2.583	1.835-3.637

The next stage was the selection of multivariate candidate variables from the bivariate analysis with a p-value <0.25. These variables included mother's age, education, and occupation; family income; father's education and occupation; number of antenatal visits; primary caregiver; mother's nutritional knowledge; mother's knowledge of condensed milk; child's age; low birth weight (LBW); immunization history; history of infectious diseases; food diversity; source of drinking water; reasons why mothers choose sweetened condensed milk; effects of sweetened condensed milk; mothers' understanding of sweetened condensed milk; and sources of understanding sweetened condensed milk. These variables were entered into a binary logistic regression analysis to determine the factors most strongly associated with stunting.

Based on the final results of the multivariate analysis, the most dominant factor associated with stunting in children was the father's occupation (p <0.001; OR = 1.820; 95% CI = 1.346–2.462). Children whose fathers work as laborers are 1.8 times more likely to experience stunting than those whose fathers have other occupations. This was followed by the mother's understanding of sweetened condensed milk, LWB, and the child's age (Table 4).

The dominant factor associated with stunting in toddlers was the father's occupation. Fathers working as laborers were 1.8 times more likely to have stunted toddlers than fathers working in other professions. Previous research has also shown a relationship between fathers' occupations and the occurrence of stunting in toddlers aged 0-59 years in Nigeria (Akombi et al., 2017). Therefore, to improve the nutritional status and reduce stunting in children with fathers working as laborers, tailored nutritional education programs, improved access to health and economic services for families, and the provision of skill training for parents are required. Psychosocial support and active participation in community activities are also crucial.

Conclusion

The research results showed that the mother's age, education, and occupation; family income; father's education and occupation; mother's knowledge of nutrition; mother's knowledge of sweetened condensed milk; child's age; low birth weight (LBW); immunization history; history of infectious diseases; dietary diversity; the mother's reason for giving sweetened condensed milk; and the mother's understanding of sweetened condensed milk were related to the incidence of stunting in toddlers. The dominant factor associated with the incidence of stunting among toddlers in the Special Region of Yogyakarta is the father's occupation.

This finding emphasizes the importance of strengthening health education for both mothers and fathers, focusing on their critical role in ensuring adequate child nutrition and care. In terms of practical implications, efforts are needed to improve public understanding of appropriate child feeding practices, particularly the role and limitations of sweetened condensed milk. Educational campaigns through various media and community-based programs are recommended.

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