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Predisposing, supporting and reinforcing factors of stunting risk: A case study

Rotua Sumihar Sitorus[1*], Dewi Sartika Munthe[2], Lidya Natalia Br Sinuhaji[3], Tetti Seriati Situmorang[3], Samsider Sitorus[4]

[1]Department of Public Health, Institut Kesehatan Medistra, Lubuk Pakam, Sumatera Utara, 20512, Indonesia
[2]Department of Nursing and Midwifery, Universitas Prima Indonesia, Medan, Sumatera Utara, 20118, Indonesia
[3]Department of Midwifery, STIKes Mitra Husada, Medan, Sumatera Utara, 20142, Indonesia
[4]Department of Midwifery, Poltekkes Kemenkes, Medan, Sumatera Utara, 20137, Indonesia

**Correspondence*: rotuasitorus29@gmail.com

ABSTRAK

Latar Belakang*: Pemerintah Indonesia telah menetapkan stunting sebagai isu prioritas nasional dalam Rencana Pembangunan Jangka Menengah Nasional (RPJMN) dengan target penurunan stunting yang signifikan sebesar 14% pada tahun 2024.*
Tujuan*: Penelitian ini bertujuan untuk membahas prevalensi dan mengungkap faktor risiko kasus stunting di kota Medan. Faktor resiko tersebut dikelompokkan sebagai faktor-faktor predisposisi, pendukung dan penguat.*
Metode: *Data diperoleh dengan teknik purposive sampling. Data populasi adalah 442 ibu balita stunting yang terdiri dari 30 ibu sebagai kasus dan 30 ibu sebagai kontrol. Data primer didapat dari kuisioner yang terdiri dari variabel bebas yaitu faktor-faktor predisposisi, pendukung dan penguat dan variabel terikat yaitu resiko stunting berdasarkan indikator pengetahuan, sikap, aksi, pendapatan keluarga, dukungan keluarga, dukungan tenaga kesehatan dan dukungan kader Puskesmas. Data statistik diolah dengan analisis bivariat, dan multivariat dengan menggunakan uji regresi logistik berganda.*
Hasil: *Hasil penelitian menunjukkan bahwa pengetahuan (p = 0,034), tindakan (p = 0,033), sikap (p = 0,029), dukungan kader (p = 0,027), pendapatan keluarga (p = 0,019), dan dukungan keluarga (p = 0,008).) berpengaruh pada ibu yang berisiko melahirkan balita stunting. Dukungan keluarga yang buruk sebagai faktor dominan memiliki risiko 12,6 kali ibu melahirkan balita stunting.*
Kesimpulan: *Penelitian ini menyarankan untuk lebih memperkuat dukungan otonom dari keluarga sebagai subjek pertama dalam mencegah kasus stunting.*

KATA KUNCI: *stunting; faktor risiko; predisposisi; pendukung; penguat; puskesmas; Kota Medan*

ABSTRACT

Background: *The Indonesian government has designated stunting as a national priority issue in the National Medium-Term Development Plan (RPJMN) with a target of a significant stunting reduction to be 14 % in 2024.*

Objectives: *This research aims to address the recent prevalence and to reveal the most risk factor of stunting cases in Medan city. The risk factors are classified as predisposing, supporting and reinforcing factors.*

Methods: *Data were obtained by the purposive sampling technique. The population data was 442 mothers with stunting toddlers consisting of 30 mothers as cases and 30 mothers as controls. Primary data was obtained from a questionnaire consisting of independent variables, namely predisposing, supporting and reinforcing factors and the dependent variable, namely the risk of stunting based on indicators of knowledge, attitudes, actions, family income, family support, health workers and cadres supports. Statistical data were processed by bivariate and multivariate analysis using multiple logistic regression tests.*

Results: *The results showed that knowledge (p = 0.034), actions (p = 0.033), attitudes (p = 0.029), cadre support (p = 0.027), family income (p = 0.019), and family support (p = 0.008) had an effect on mothers at risk of giving birth to stunting toddlers. Poor family support, as the dominant factor, has 12.6 times the risk of mothers giving birth to stunting toddlers compared to other factors.*

Conclusions: *This study has suggested strengthening the autonomous support from family as the first subject to prevent stunting cases.*

KEYWORD: *Stunting, Risk factors, Predisposing, Supporting, Reinforcing, Public Health Center, Medan city.*

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INTRODUCTION

Globally, WHO has reported that 144 million children under the age of 5 years old have stunting problems in 2019, where as the stunted toddlers are dominated by lower-middle-income countries as 64% of the total stunting incidence (1). Based on the national record, the highest prevalence occurred in the provinces of East Nusa Tenggara at 42.6%, West Sulawesi at 39.8%, and Aceh at 37.3% (2). Medan city is the highest populated region in North Sumatra, consisting of 21 sub-districts, and has a total of 3,169 stunting toddlers (1.5%) out of 210,958 toddlers in 2018. Eight sub-districts that have the highest stunting toddlers are; Medan Tembung (6.6%), Deli (4.4%), Maimun (2.7%), Belawan (1.5%), Sunggal (1.4%), Helvetia (1.3%), Marelan (1.1%), and Medan Timur (1.04%) (3). The government plays role in preventing stunting by implementing President Regulation No. 72 of 2021 regarding the acceleration of stunting reduction in Indonesia, to support efforts and raise stakeholder participation and concern in a planned and coordinated manner to accelerate nutrition improvement in the first 1000 days of life (4).

A pregnant women's nutritional status has a significant impact on the fetus's health and development. Low birth weight can be caused by womb growth problems. Research in Nepal shows that babies with low birth weight have a higher risk of becoming stunted (5). Research in the Central Mozambique

region proves that toddlers who do not receive exclusive breastfeeding for 6 months are at high risk of stunting (6). Research by Torlesse (2016) explained that 40.6% of children aged 0-23 months were given age-appropriate food (7). Giving food in the form of exclusive breastfeeding aged 0-5 months. Significantly related risk factors include low income, no health care in health facilities, and maternal participation in feeding. According to Frempong and Annim (2017) providing the right food for children can reduce nutritional problems, where children who consume a variety of foods have a good level of health (8). Regarding the advancement of research on nutritional status, the researcher has developed a mobile application called stunting child nutrition (GiAS) that can detect stunting, monitor toddler growth, recommend daily menus for toddlers, and calculate the nutritional adequacy rate (RDA). The macronutrients, zinc, and calcium from stunting and non-stunting children aged 12–24 months have had distinguished effects on children's weight and height under five at two weeks and one month (9).

However, stunting can increase morbidity and mortality in infancy, a decline in cognitive, motor, and language development, and increase health costs and costs for child care. Stunting can also be detrimental to long-term health, and as an adult can affect work productivity, childbirth complications, and increase the risk of being overweight and obese which can trigger metabolic syndrome diseases such as coronary heart disease, stroke, hypertension, and others (10). Mothers need to carry out health maintenance in the form of optimal nutritional intake early during pregnancy and after toddlerhood to avoid stunting. A recent study concluded that gender and clinical health are the most stunting determinant factors in toddlers aged 12-24 using a cross-sectional design of gender, weight, exclusive breastfeeding history, completeness immunization, and clinically healthy variables, with case-control for nutrition intake variables of Singaparna Public Health Center Tasikmalaya regency (11).

Based on the literature, the basic concept of health behavior according to Green's theory (12) is influenced by three risk factors, namely: 1) predisposing factors such as knowledge and attitudes, education level, and social or economic level; 2) supporting factors: the availability of facilities and infrastructure or health facilities for the community; and 3) reinforcing factors include: attitudes and behavior of community leaders, religious leaders, attitudes and behavior of officers including health workers, including laws, regulations from both the central government and local governments related to health.

The purpose of this study is to analyze the three main risk factors for mothers giving birth to stunting following variables determined based on Green's theory of influence health behavior categorized as predisposing, supporting, and reinforcing factors. To the best of our knowledge, stunting research that relies on Green’s Theory is rarely reported especially in North Sumatra Province. We considered that our research results might be an intellectual resource for the consideration of the government policies in Medan city.

MATERIALS AND METHODS

This research is quantitative research with a case-control design. The research was carried out at the Tembung Public Health Center, Medan City, in December 2020. The population was 442 people and a sample of 30 people (cases = stunting) and 30 people (control = normal). The sampling technique was purposive sampling based on the inclusion criteria; 1) toddlers aged 6-24 months, whether stunted or not and 2) had their nutritional status checked with the Heights/Ages index. The exclusion criterion was those with missing data on the studied variables.

Primary data was collected by the distribution of questionnaires containing questions about the independent variables as well as predisposing factors; knowledge (20 items), attitudes (20 items), actions (20 items); supporting factors: income (1 item), and family support (16 items); reinforcing factors: support of health workers (16 items) and cadres (16 items). The results of the answers to the knowledge and action variables were grouped into good (scores 31-40) and not good (scores 20-30) alternative answers on the Guttman scale were yes and no. Attitudes were categorized into positive (scores 31-40) and negative (20-30), on the Guttman scale, namely agree and disagree. Income is categorized (< minimum wage in 2019 which is IDR 2,750 million). Support from family, health workers, and cadres were respectively grouped as supportive (score 25-32) and less supportive (score 16-24) with the Guttman scale, namely “Yes or No”. Mothers who give birth to stunting toddlers were examined by nutritional status with an index of Heights/Ages.

Data analysis has been used to examine the frequency distribution of each variable, bivariate using the chi-square test and multivariate using multiple linear regression at a significance level of 5%. The distribution of questionnaires was carried out in the first and second weeks of December 2020 and previously tested the validity and reliability at the Padang Bulan Health Center, Medan Selayang Subdistrict with 30 respondents, the lowest count value was 0.551 and the highest was 0.842 > from R table, (0.361) and the lowest Cronbach alpha value was calculated as 0.807 and the highest was 0.884, it was assumed that the question items in the questionnaire are valid and reliable. The indicators for each variable are presented in Table 1 below.

Table 1. Variables and indicators in the questionnaires

Risk Factors	Variable	Indicator	Item
Predisposing	Knowledge	Impact of malnutrition, tetanus toxoid immunization, information on breastfeeding, and complementary feeding.	20
	Attitude	Impact of malnutrition, vaccination during pregnancy, exclusive breastfeeding, and complementary feeding.	20
	Action	Vaccination during pregnancy, consumption of Fe-tablets, early initiation of breastfeeding, breastfeeding for up to 2 years.	20

Risk Factors	Variable	Indicator	Item
Supporting	Family Income	Low income under minimum wages that able to meet nutritional intake and health services for pregnant women and children.	16
	Family support	Reminding them to eat small but frequent portions, reminding them to do breast care, reminding them to early initiation of breastfeeding, and helping toddlers go to public health care.	16
Reinforcing	Health worker's support	Advising to eat small but frequent portions, advising to consume Fe tablets, advising birth attendants, and advising exclusive breastfeeding.	16
	Cadre's support	Notifying chronic energy deficiency, notifying anemia, notifying stunting, measuring baby's length and height of toddlers	16

The ethical clearance of this research has been approved by Komisi Etik Penelitian Kesehatan, Universitas Prima Indonesia, No. 021/KEPK/UNPRI/XII/2022.

RESULTS AND DISCUSSIONS

Respondent Characteristics

Characteristics of pregnant women and children under five by age showed that the most stunting cases are found in women majority 20-30 years old (80%), working as a housewife (100%), senior high school graduates (70%), having 2-4 children (83.3%). Meanwhile, the stunting toddlers were aged 37-60 months (50% cases) and female (56.7%).

Table 2. Characteristics of pregnant women and toddlers

Characteristics	N	Cases		Control	
		n	%	n	%
Age					
20-30 years	30	24	80.0	21	70.0
31-40 years		6	20.0	9	30.0
Occupation					
Housewife	30	30	100.0	24	80.0
Employee		0	0	6	20.0
Education					
Elementary School	30	1	3.3	2	6.7
Junior High School		8	26.7	7	23.3
Senior High School		21	70.0	21	70.0
Number of Children					
1 person	30	3	10.0	2	6.7
2-4 persons		25	83.3	22	73.3
> 4 persons		2	6.7	6	20.0
Age of Toddlers					
1-12 months	30	1	3.3	4	13.3
13-24 months		7	23.3	5	16.7
25-36 months		7	23.3	18	60.0
37-60 months		15	50.0	3	10.0
Sex					
Female	30	17	56.7	17	56.7
Male		13	43.3	13	43.3

Stunting Risk Factors

Our results showed that most stunting cases were due to lack of knowledge (60.7%), negative attitude (62.5%), and inappropriate action (59.5%) which are considered predisposing factors. Moreover, supporting factors such as low-income and unsupportive families also contributed 62.5% and 63.4%, respectively. Health workers and Cadre's support also contributed 60.5% and 62.2% for the most stunting cases as the reinforcing factors in a Public Health Center, respectively. The distribution frequency of stunting risk factors is presented in Table 3 below.

Table 3. Frequency Distribution of Stunting Risk Factors

Risk Factors	Stunting Birth				Total	
	Cases		Control			
	n	%	n	%	n	%
Knowledge						
Not good	7	60.5	15	39.5	22	100
Good	23	31.8	15	68.2	38	100
Attitude						
Negative	25	62.5	15	37.5	40	100
Positive	5	25.0	15	75.0	20	100
Action						
Not good	25	59.5	17	40.5	42	100
Good	5	27.8	13	72.2	18	100
Family income						
< minimum wage	20	62.5	12	37.5	32	100
≥ minimum wage	10	35.7	18	64.3	28	100
Family support						
Not supportive	26	63.4	15	36.6	41	100
Supportive	4	21.1	15	78.9	19	100
Health worker's support						
Not supportive	23	60.5	15	39.5	38	100
Supportive	7	31.8	15	68.2	22	100
Cadre's support						
Not supportive	23	62.2	14	37.8	37	100
Supportive	7	30.4	16	69.6	23	100

Statistical Data Analysis

We used bivariate analysis using the chi-square test resulted in the p-values < 0.05 for all variables. The results showed that the variables of knowledge, attitudes, actions, family income, family support, health workers and cadre support are significantly related to stunting cases as presented in Table 4 below.

Table 4. Bivariate analysis of variables' effects on stunting cases

Variables	*p*	OR
Knowledge	0.032	1.902 (1.085-9.952)
Attitude	0.006	2.500 (1.510-16.560)
Action	0.024	2.143 (1.150-12.713)
Family income	0.038	1.750 (1.046-8.603)
Family support	0.002	3.012 (1.820-23.213)
Health worker's support	0.032	1.902 (1.085-9.952)
Cadre's support	0.017	2.042 (1.239-11.385)

The bivariate analysis serves as a candidate variable requirement for multiple logistic regression models showing all variables have a p-value < 0.25, so that all variables are included in the multivariate analysis.

Furthermore, when we used multivariate analysis, from the seven variables, it turned out that six variables had a p-value <0.005, meaning that there was an effect of knowledge with OR = 5.889 (95% CI; 1.141-30.393), attitude with OR = 8.113 (95% CI; 1.241-53.047), action with OR = 6,504 (95%CI 1,165-36,308), family income with OR = 7,885 (95% CI 1,407-44,188), family support with OR = 12,644 (95% CI;1,935-82,640) and Public health cadres with OR = 7,897 (95% CI;1,258 - 49,582) to mothers at risk of giving birth to stunting. Cadre's support was then eliminated

because of no effect (*p > 0.05*). Based on the multivariate analysis, we noted that family support is the most significant variable correlated with stunting cases. Family support has a 12.6 times greater chance of influencing mothers at risk of giving birth to stunting toddlers compared to other variables.

Table 5. One-step multivariate analysis of variables

Variable	*B*	*p*	*OR*	*95% C.I. for Exp(B)*	
Knowledge	1.773	0.034	5.889	1.141	30.393
Attitude	2.093	0.029	8.113	1.241	53.047
Action	1.872	0.033	6.504	1.165	36.308
Family income	2.065	0.019	7.885	1.407	44.188
Family support	2.537	0.008	12.644	1.935	82.640
Health worker's support	2.066	0.027	7.897	1.258	49.582

We found that the mother's feeling malnourished has an impact on toddlers, vaccinations during pregnancy, exclusive breastfeeding, and complementary feeding for babies. In line with research by Paramashanti et.al., (2017) reported that poor food diversity and the right timing of complementary feeding for nutritional adequacy are associated with stunting in children aged 6-24 months (13). Another study showed that children who eat a variety of foods in an appropriate amount improve health and reduce nutritional problems compared to children who do not consume a variety of foods (14).

Action factors would risk the giving birth of stunting toddlers where mothers do not take early prevention of stunting seriously, such as not getting vaccinated during pregnancy, not routinely taking Fe 90 tablets every day as a blood booster to avoid anemia, or not participating in the early breastfeeding initiation when the baby is born in the first 1 hour, and not giving breast milk until the age of 2 years for adequate nutrition for toddlers (13). The literature says that maternal factors, parental education, and socioeconomic status might correspond to the risk of giving birth to stunting toddlers (15,16). A report by Aridiyah et.al., (2015) showed that the factors influencing the occurrence of stunting in children under five in rural and urban areas are exclusive breastfeeding, the age of complementary feeding, and the level of zinc and iron adequacy (17). Women who do not experience symptoms of anemia can take Fe tablets regularly for 3 months to avoid interfering with the process of pregnancy and childbirth (18). In this research, we found the mother's action in preventing as early as the possible occurrence is not good, so it needs to be changed through the Supplementary Food Program from the Health Center and carry out direct monitoring at home on the development of the nutritional status of pregnant women and toddlers. Cadres in collaboration with mothers could be engaged in small groups to share information about efforts to prevent stunting and provide education about types of food that contain good nutrition, of course with cheap food ingredients. In particular, the diversity of these foods is important to meet the need for balanced nutrition. Currently, the program in Medan City is prioritizing malnourished children under five by providing counseling and distributing high-calorie biscuits to families.

Regarding cadre support, a study by Adistie et.al., (2017) reported that the role of health cadres in the Public Health Center activities is still not able to determine the early detection of stunting and has not been able to carry out several points of developmental stimulation in children (19). Our study confirmed the midwives saying that the behavior of mothers who tends to be at risk of giving birth stunting was triggered by some reasons such as; rarely doing health checks so they do not get immunizations and Fe tablets, and food behavior that is not following a good nutritional menu, especially the provision of milk and fruit after the baby is over 6 months due to the limited family income (20).

The factor of low family income also causes mothers to be at risk of giving birth to stunted toddlers because they are unable to meet the nutritional needs of the family, especially milk and fruit consumption, accompanied by poor eating habits (21,22). Following the opinion by Aridiyah et.al., (2015) that the incidence of stunting is more due to low family income because they are less able to meet nutritional intake and health services for pregnant women and children (17). To address this issue, the government has made efforts to improve public health, especially for low-income families, through a *"Program Keluarga Harapan* (PKH)". PKH has opened access to utilize various health service facilities according to the Minimum Service Standards or *Standard Pelayanan Minimal* (SPM), especially for pregnant women and children with low incomes. Therefore, families can be joined as PKH participants so that their health is guaranteed and can meet their nutritional needs.

In our study, the main factor of risk of stunting toddlers was related to family support (23,24). The higher risk was regarding no actions to remind mothers to eat small portions but often, do not remember breast care, do not remind them to participate in early breastfeeding activities, and do not help bring toddlers to the Public Health Center. Mulia et.al., (2016) reported that adequate parenting practices are very important not only for the child's immune system but also for optimizing the physical and mental development of the child as well as the good condition of the child's health (25). If child care is inadequate, especially regarding food security and children's health, it can be one of the factors that cause children to suffer from nutritional disorders. One of the cadres' duties is to reduce the number of toddlers experiencing stunting as early as possible in their working area. According to one study, the stunting control model involves increasing family empowerment concerning infectious disease prevention, using the yard as a source of family nutrition, and improving environmental sanitation (26). Two variables are the same as this study, namely maternal knowledge and family income but differ in the stunting control model. The cause of stunting is not only a lack of food but due to disease. Children who get good food but often suffer from infectious diseases can suffer from stunting, so it is important to empower family behavior in nutrition and health intake (27–29).

Several efforts on increasing family support were engaged by the Healthy Community Movement or *Gerakan Masyarakat Sehat* (Germas). Germas is a national movement through awareness, willingness, and ability to behave in a healthy community to improve the quality of life starting from the family because the family is the smallest part of the community. the societies that make up the personality. Several important points in the program for stunting include the family's habit of consuming various kinds of vegetables and fruits, and routine health checks through the Community Health Insurance or *Kartu Indonesia Sehat* (KIS) for underprivileged families. Currently, the government's program is to meet the nutritional needs of the community through a family approach through the Healthy Indonesia Program with a Family Approach or *"Program Indonesia Sehat dengan Pendekatan Keluarga"* (PISPK) to improve the nutritional status of maternal and child health and nutrition, improve disease control, and increasing access to family health services through the *Kartu Indonesia Sehat* (KIS). Every mother with a low income can be joined as a PISPK participant so that it can help maternal and child nutrition and family health. The PISPK program can synergize with other programs to support the prevention of early detection of stunting in toddlers and prevent mothers from giving birth to stunting toddlers.

It is hoped that the success of the first 1000 days of birth's movement is necessary to empower family elements, especially the husband as the person in charge of the needs of the family and fulfilling the health of family members empowered through the *Suami Siaga* (SuSi) program. The *SuSi* program provides full support, attention, and assistance to mothers during pregnancy, childbirth, and maintaining the health of family members. It is also important in the future to increase the

knowledge of the community through periodic counseling of health workers about the first 1000 days of birth's movement when mothers carry out health checks accompanied by their husbands as the SuSi program. This counseling can also be carried out in association activities or community organizations. Furthermore, the Public Health Center followed up by monitoring and evaluating the first 1000 days of birth's movement regularly to minimize the incidence of stunting in toddlers (30).

CONCLUSIONS AND RECOMMENDATIONS

The unsupportive family was found as the most significant variable that caused the stunting cases followed by low family income, unsupportive health workers, bad attitude, bad actions and lack of knowledge, respectively. To prevent stunting cases, the implementation of family support could be the participation of the husband or family accompanying the mother to check her pregnancy, reminding the mother to check pregnancy regularly, husband or family reminding the mother to take Fe tablets every day and to fulfill balanced nutritional needs during pregnancy. Interestingly, the reinforcing factor is not more significantly effective compared to the supporting factor, in this case, is family support. This study has suggested strengthening the autonomous support from family as the first subject to prevent stunting cases. The supporting factors also need to be improved so that the family has adequate knowledge, attitude and action to eliminate stunting cases.

CONFLICT OF INTEREST

All authors declare that there is no potential conflict of interest. All authors have read and agreed with the manuscript before the journal's submission.

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