

Factors associated with stunting among children below five years of age: A mixed method study

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ABSTRAK

Latar Belakang: Indonesia saat ini menghadapi beban ganda masalah gizi pada anak salah satunya masalah stunting pada balita. Desa Sukamukti menjadi lokus prioritas stunting 2019 di Kabupaten Sumedang dengan angka kejadian 33%. Eksplorasi faktor risiko stunting perlu dilakukan untuk merancang intervensi berkelanjutan.

Tujuan: Penelitian ini dilakukan untuk mengetahui faktor-faktor yang berhubungan dengan stunting pada balita di Desa Sukamukti Kabupaten Sumedang tahun 2020.

Metode: Penelitian ini merupakan penelitian mixed method dengan rancangan concurrent mixed method. Penelitian kuantitatif melibatkan 37 responden dan penelitian kualitatif melibatkan 2 partisipan yang merupakan ibu balita di Desa Sukamukti Kecamatan Tanjungmedar yang diambil dengan teknik Total Sampling pada bulan Juni 2020. Interpretasi status gizi diukur dengan kurva pertumbuhan WHO tinggi badan per usia pada balita. Pengumpulan data menggunakan kuesioner yang dikembangkan dari Faktor Risiko Stunting WHO tahun 2014. Data kuantitatif dianalisis menggunakan uji univariat, bivariat dan multivariat. Serta dielaborasi dengan hasil penelitian kualitatif yang dianalisis dengan metode Coalizzi.

Hasil: Angka kejadian stunting di Desa Sukamukti Kabupaten Sumedang sebesar 37,8%. Faktor tinggi badan ibu merupakan faktor yang berhubungan dengan risiko stunting di Desa Sukamukti (OR= 8,55; CI95%=1,8 - 39,7; p=0,006). Tinggi badan ibu yang pendek (<150 cm) mempengaruhi kejadian risiko stunting sebesar 8,55 kali. Hasil kualitatif menghasilkan 7 tema diantaranya adalah: 1) Persepsi ibu tentang penyakit (stunting), 2) perkembangan kesehatan anak, 3). Riwayat kesehatan ibu, 4) perilaku adaptif dan maladaptif ibu selama merawat anak 5) bentuk dan sumber dukungan yang diperoleh ibu selama merawat anak, 6) Bentuk dan sumber hambatan yang ditemui ibu selama merawat anak, serta 7) respon psikologis yang ditunjukkan ibu.

Kesimpulan: Tinggi badan ibu menjadi determinan faktor risiko stunting dalam penelitian ini. Intervensi gizi sensitif penting untuk dilakukan dengan upaya perbaikan gizi secara komprehensif dari hulu ke hilir. Pemberdayaan remaja putri dalam meningkatkan pola hidup sehat dan gizi seimbang dapat dilakukan sebagai upaya untuk mencegah stunting.

KATA KUNCI: anak; ibu; pengalaman; risiko; stunting

ABSTRACT

Background: Indonesia is currently facing a double burden of nutritional problems in children. Stunting is one of them. Sukamukti Village became the priority locus of stunting, with the prevalence of 33% in 2019. Exploration on stunting risk factors is necessary to identify sustainable interventions.

Objective: This study was conducted to determine the factors associated with the risk of stunting in Sukamukti Village, Sumedang Regency, West Java, Indonesia.

Methods: This study is mixed-method research with concurrent mixed-method design. The quantitative study involved 37 respondents and the qualitative study involved 2 participants who are mothers of children under five years of age in Sukamukti Village, taken using the Total Sampling technique in June 2020. Interpretation of nutritional status was measured by the WHO growth curve for height per age in toddlers. Data collected using questionnaire developed from WHO Stunting Risk Factor in 2014. Quantitative data analyzed using univariate, bivariate and multivariate tests using logistic regression. Qualitative data analyzed using Coalizzi method.

Results: The quantitative study showed that 37.8% of children under five years of age were at risk of stunting. Maternal height is a factor associated with the risk of stunting in Sukamukti Village (OR = 8.55; 95% CI = 1.8 - 39.7; p = 0.006). The mother's short height (<150 cm) affects the incidence of stunting risk by 8.55 times. The qualitative results produced seven themes, including 1) Mother's perception of illness (stunting), 2) child health development, 3) Maternal health history, 4) mother's adaptive and maladaptive behavior during child care, 5) mother's form and source of support during child care, 6) mother's form and source of obstacles during child care, and 7) mother's psychological response.

Conclusion: Mother's height is a determinant factors for stunting in this study. Sensitive intervention such as nutrition must be carried out with comprehensive nutrition improvement efforts. Empowering teenagers to improve a healthy lifestyle and balanced nutrition is necessary to prevent stunting.

KEYWORDS: children; mother; experience; risk; stunting

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INTRODUCTION

In developing countries, including Indonesia, the incidence of stunting has increased. Stunting is a global problem because of its consistently high prevalence. In 2017, more than half of children under five diagnosed with stunting in the world came from Asia (55%), while more than a third (39%) lived in Africa. Of the 83.6 million stunted children under five in Asia, the largest proportion came from South Asia (58.7%), and the least proportion was in Central Asia (0.9%) (1). Data on the prevalence of stunting toddlers collected by WHO, Indonesia is the third country with the highest majority in the Southeast Asia region, the average prevalence of stunting toddlers in Indonesia from 2005-2017 was 36.4% (2).

World Health Organization (WHO) stated that the rate limit of stunting prevalence is 20%. The prevalence of stunting in children under five years of age in Sumedang is 28.1%. The higher prevalence became a national health problem. According to the priority locus (2020), the highest number of areas at increased risk of stunting was the Tanjungmedar sub-district. Sukamukti village, with a prevalence of 33.1%. Stunted growth is a feature of stunting characterized by the condition that height or body length compared to age is at -2 SD or lower (3). Stunting in children is caused by various factors. The study's results suggest that stunting were caused by three main causes, including environmental, genetic, and epigenetic factors (4). Children with short parents, either one or both, are more at risk of growing short than

children with normal height parents (5). Other research suggested that children born to short mothers are more at risk of becoming stunted, due to physical conditions. They had an inheritor in the gene structure that can carry short traits so that children have the opportunity to inherit genes so that they grow into stunting (6).

Another study stated a relationship between exclusive breastfeeding and the incidence of stunting in toddlers 2-3 years. Several risk factors for childhood stunted growth have been identified through epidemiological studies. However, elaboration studies carrying quantitative and qualitative analyses are necessary to explore the risk factor of stunting maternal and child factors according to mother experience. In-depth interviews will explore information focusing on mothers' experiences caring for children at risk of stunting. Identification of risk factors by elaborating on data and experience is expected to be able to explore determinant factors more focused according to community needs. This study aimed to determine the factors associated with the risk of stunting in Sukamukti Village, Tanjungmedar, with quantitative and qualitative elaboration to describe the factors that may be related to the risk of stunting in children under five years of age.

MATERIALS AND METHODS

A concurrent mixed method approach was used in this research. In this research, quantitative and qualitative data collection is treated independently both in data collection and analysis and then the result mixes are carried out on the overall interpretation. The research variable measured quantitatively in this study was the risk of stunting as the dependent variable, while the independent variables include the mother's height, birth weight of the child, history of comorbidities during pregnancy, and history of giving exclusive breastfeeding.

The determination of the stunting category was measured with the child's height or length according to age and then interpreted by growth indicators based on Kepmenkes No. 1995/MENKES/SK/XII/2010 concerning anthropometric standards for assessing children's nutritional status. Data collection on stunting risk factors was carried out using a questionnaire developed from the WHO Stunting Risk Factors (2014). The questionnaire has been tested for validity and reliability with $r = 0,644$. A qualitative study was carried out by using in-depth interviews with a structured guideline. Data collection techniques on the quantitative approach were distributed to 37 respondents to mothers of children under five in Sukamukti Village determined by total sampling technique, while data collection in the qualitative approach was carried out by in-depth interviews with two informants of mothers of children under five years of age.

Respondent selection criteria for quantitative research were based on inclusion criteria, including mothers who have children aged 0-5 years, are not experiencing serious illness (both mother and child), do not have communication disorders, and are willing to be respondents. The research hypotheses were tested quantitatively using univariate, bivariate, and multivariate logistic regression. Meanwhile, the criteria for selecting informants were respondents who stated their willingness to become informants as stated in the interview willingness form attached to the quantitative data collection questionnaire.

The Colaizzi method was used to analyze qualitative data. The analysis phase included reading the participants' full description of the phenomenon being studied, obtained by reading the verbatim transcript. The second stage separated the significant statements from each participants' explanation and sentences according to the phenomenon under study. The third stage was carried out by formulating the meaning of each significant statement in the participants' explanation. The fourth stage was to group the meanings made into theme clusters.

RESULTS AND DISCUSSIONS

Table 1 shows, the characteristics of respondents in this study. The majority of respondents had a low level of education (elementary and junior high school/equivalent) (86.4%), worked as housewives (97.3%), and had low monthly income (94.6%). Table 1

shows an average maternal height is 153.3 ± 10.8 cm, only 5.4% of mothers had a history of hypertension during pregnancy, and 32.4% of mothers of children under five had a history of eating difficulties and experienced weight loss. Most mothers know the importance of fulfilling nutrition as a teenager was 97.3%.

Table 1. Distribution of Mother and Children Under Five Years of Age Characteristics

Characteristics	Frequency (f)	Percentage (%)	Mean \pm SD
Education			
Elementary School	14	37.8	
Junior High School	18	48.6	
Senior High School	5	13.5	-
Work			
Housewife	36	97.3	
Laborer	1	2.7	
Income			1.737.837 \pm 815.594
Low	35	94.6	
High	2	5.4	
Mother's Height			153.3 \pm 10.8
Mother's Weight			57.2 \pm 11.1
Children	-	-	
Age (months)			34.1 \pm 15.1
Gender			
Boy	18	48.6	
Girl	19	51.4	
Children's Weight (kg)			12.3 \pm 2.6
Children's Height (cm)	-	-	88.7 \pm 13.1
Birth Weight (kg)			2.8 \pm 0.5
Birth Height (cm)			46.9 \pm 3.1
Risk of Stunting			
Normal	23	62.2	
At Risk	14	37.8	

The characteristics of children below five years of age in Sukamukti Village showed the majority are girls as (51.4%), with an average weight of 12.3 ± 2.6 kg and height showed an average of 88.7 ± 13.1 cm. 45.9% of children below five years of age get exclusive breastfeeding, with the majority of toddlers got colostrum (94.6%) and early initiation of breastfeeding opportunity (91.8%), and starting to get complementary food (MP-ASI) at the age of 6 months (97.3%). Based on **Table 2**, it was obtained a significant value of $0.006 < 0.05$ and AOR value = 8.55, the results of the analysis showed that there is a relationship between maternal height with risk of stunting in children's below five years of

age and the short maternal height (<150 cm) affects the incidence of stunting risk by 8.55 times.

Previous research revealed that maternal height was the dominant factor associated with the risk of stunting in children (4). Mothers who had a low height (<150 cm) and malnourished conditions during pregnancy had an increased risk of intrauterine growth retardation (IUGR), inhibition of intrauterine blood flow, and growth disorders in the uterus, placenta and fetus, which refer to IUGR and stunting in children (7). Mothers who had a low height tended to have the opportunity to have shorter children and vice versa (5). The results showed that mothers

Table 2. Logistic regression for maternal height and risk of stunting among children's below five years of age

Variable	B	Sig.	Exp(B)	95% C.I for EXP(B)	
				Lower	Upper
Maternal height	2.146	0.006*	8.550	1.841	39.702
Constant	-1.335	0.008	0.263		

less height (<150 cm) had children under five at risk of stunting by compared to mothers with normal height (>150 cm).The results shows, there is a relationship between maternal height and the risk of stunting in children's below five years of age.

Stunting conditions in children can arise due to three main conditions, social environment, genetics, and epigenetics, which are related to maternal impacts. Genetic factors are a predisposing factor for stunting in children. The interaction between genetics and the environment is in the form of exposure to a lack of fulfillment of balanced nutrition, and growth inhibition related to stunting in children (8). Stunted children or stunted growth can be passed on to the next generation through an intergenerational cycle of malnutrition (4). This cycle can be caused by low economic status or intergenerational poverty conditions. Children with short stature are usually born into low-income households (9). This findings is supported by the results of this study which shows that most families have low incomes (94.6%). The results shows that low socioeconomic conditions can result in a lack of fulfillment of family nutrition, resulting in a cycle of malnutrition that can be passed down between generations, resulting in stunting in children.

Another factor related to the increased risk of stunting in children is low birth weight. The result showed that the mean of birth weight is 2.8 ± 0.5 . Furthermore elaboration through in-depth interviews showed the results, namely the description that two toddlers at risk of stunting had a history of low birth weight. This findings is revealed from the results of interviews with participants P1 and P2 as follows:

“Thanks to God, my child is save, his birth weight was 2.4 Kg, but he had to be hospitalized first, we couldn't get home earlier” P1

“Yes, his birth weight was 2.4 Kg ” P2
The condition of low birth weight (LBW) is a determining factor in the anthropometry of children in their adulthood. Having a low birth weight significantly adversely affects the health and development of the neonate. In malnourished children, there is a reduction in critical hormones responsible for growth, such as insulin-like growth factor-1 (IGF-1) and thyroid hormone, which leads to lower linear growth. In addition, there is a reduction in anabolic processes in insulin-dependent tissue synthesis, resulting in lower lean body mass and impaired bone growth (10).

The high number of LBW is estimated as a common cause of increased incidence of stunting in Indonesia. LBW is the most dominant factor at risk for stunting in children (11). Birth weight has a major impact on a child's growth, development and subsequently height. Babies born with LBW will be at high risk of morbidity, mortality, infectious diseases, underweight and stunting in the early neonatal period to childhood (11,12)

The results showed that most respondents did not have a history of illness during pregnancy, only 5.4% of respondents had a history of hypertension, and had a history of eating difficulties and experienced weight loss.

Elaboration of results through interviews showed different results. There is one informant with a child at risk of stunting with hypertension history during pregnancy as indicated by high blood pressure. In addition, a history of other diseases is shown by the results of the interview as follows:

“My child has been sick, sick as usual, fever, cough, he has never been seriously ill” P1

“I was healthy when i was 9 months pregnant, just coughing ill as usual” P2

The maternal health history is supported by adequate nutrition and immunizations. The results of informant exposure based on interviews showed that prenatal supplementation intake was fulfilled with a history of vaccination during pregnancy. The following interview results this:

“I got complete immunizations until I give birth”P1

“I get vaccinated when I was pregnant”P2

Nutrition

“My son usually eats with eggs, fish, vegetables and fruit. It's just rarely eat fish”P1

“My son usually drank milk” P2

Intranatal history

“My amniotic fluid is low so I need to get treatment”. P1

The study's results showed that most respondents experienced parenting stress (70.3%). Although parental stress was not associated with the risk of stunting in toddlers in Sukamukti Village, the results of the study stated that mothers who experienced difficulties in childhood tend to have psychosocial stress as adults. Parents' psychosocial stress negatively affects children's growth and development (13). Elaboration of results through interviews shows results that support this. The risk of stunting in toddlers in Sukamukti Village, the results of the study stated that mothers who experienced difficulties in childhood tend to have psychosocial stress as adults. This psychosocial stress negatively affects children growth and development (13). This is shown by the results of interviews with informants P1 and P2 as follows:

“When my child behaves badly, I scold him, but i never hit him”P1

“When my child behaves badly, I often get annoyed, and when my child doesn't want to eat, I often scare him” P2

“When I found out that my child was diagnosed with stunting, I felt sad. I'm afraid what the future will be” P1, P2

The results of interviews with both participants regarding their feelings, they feel sad, fear and anxiety because they did not know what to do for their child. They also have a feeling of inferiority because their child was different from other children, physically stunted children already look different from children who are not stunted, one of the striking signs in edited children is the short height of their age, and there are several disorders in motor development, this makes both participants sad, afraid and anxious. They were afraid of their children in the future. Psychological responses (anxiety, fear and feelings of sadness) experienced by the two participants are normal for a mother with stunting.

Anxiety and fear occur in both participants because they do not get complete information about stunting affecting their knowledge level, because of their ignorance. The disease confused both of them, and they wondered how significant the danger of stunting was. Such feelings made both of them anxious, because they received unclear information about stunting. Both participants were afraid of their child's development.

Fulfilling nutrition to nutrition to achieve optimal nutritional status in children is a crucial factor directly related to the risk of stunting in children (14). The results of interviews in qualitative research showed that the informant said that his children ate three times a day of relatively good quality food, served varied daily. The menus were prepared for their children, such as carrots, chicken liver, fish and eggs. Although each of these menus did not serve every day, for fish, not every participant gave fish to their children because their children did not like it and participants were confused about the presentation.

The two participants often served vegetables and eggs on the menu because the processing was easy and cheap. When viewed in terms of energy and protein intake, the two children participated in good nutritional status, and varied food presentations.

Based on the theory, food intake is not the only cause of stunting, but is a multifactorial cause (12). Short nutrition problems that occur in toddlers can occur due to many factors such as lack of energy and protein intake, feeding patterns, consumption of nutritious foods, energy and protein intake needed by the body, not only vegetables and eggs that children must consume in fulfilling nutritional status (3).

In this study, it is explained that stunting children have higher adequacy of energy and protein intake. This is presumably because stunting children are more than one year old, so children consume more diverse foods, including protein sources, while many normal children are less than one year old. So that children's consumption tends to only with lower consumption of protein sources. This is presumably because the energy adequacy level obtained only describes the current state of children's consumption. In contrast the current nutritional status of children is an accumulation of previous eating habits. Short period intake does not directly affect their nutritional status. Responsive feeding is necessary to improve children eating behavior.

Regarding exclusive breastfeeding, most infants did not receive exclusive breastfeeding (54.1%), and infants received complementary feeding at the age of 6 months (97.3%). The interview results showed that the two informants did not exclusively breastfeed their children, caused of the condition of low birth weight babies and are required to consume special LBW formula milk to increase the child's weight at birth.

The two participants, said that their children received exclusive breastfeeding, but both mothers always gave their children water when thirsty and formula milk because their children were LBW to increase their child's weight. Participant 1 said that her child was still breastfed until now 2.5 years old. Breast milk is a nutritional intake following the needs that will help the growth and development of children (6). In this study, the two participants did not give exclusive breastfeeding to their children. This is contrary to the theory above, where both participants provided additional drinks for their children.

Children who do not get enough breast milk have poor nutritional intake and can cause malnutrition, one of which can cause stunting (8). Mothers' lack of knowledge about exclusive breastfeeding can make mothers less optimal when giving exclusive breastfeeding to their children, so that children's nutritional needs are not appropriately met. Exclusive breastfeeding provides various benefits for mothers and babies, whereas breast milk is a natural food that is good for babies, practical, economical, easy to digest, and has an ideal composition of nutrients according to babies' needs and digestive abilities. In addition, breast milk supports baby growth, especially height, due to calcium.

Exclusive breastfeeding supports babies' growth, especially height, because breast milk calcium is more efficiently absorbed than breast milk substitutes or formula milk. So babies who are given exclusive breastfeeding tend to have a higher height and fit the growth curve than babies who are given formula milk. This is because breast milk contains more calcium and can be absorbed by the body sufficiently to maximize growth, especially height, and avoid the risk of stunting.

Although this study did not show that the two participating children had respiratory infections and diarrhea, there was only one participant whose child experienced shortness of breath at birth. Still, it was only experienced at that time, which means that the shortness of breath has never been felt, and, according to his mother's narrative, he never experienced an ARI. This is in line with several studies conducted that there is no relationship between a history of childhood disease and the incidence of stunting. This is because stunting is not only influenced by the frequency of infectious diseases, but also by the duration of infectious diseases and nutrient intake during episodes of infectious diseases.

According to the results of interviews with the two participants, namely P1 and P2, both of them were confused when the researcher asked about stunting as stated by the following two participants, they only knew

superficial material about stunting, such as definition, as follow:

It was shown that the two participants did not understand deeply of stunting by definition. The participants only knew the definition of stunting seen from the symptoms of stunting itself without knowing the definition of stunting as a whole, while the factors that could influence the incidence of stunting were mother's knowledge. Knowledge about stunting is vital for a mother because mother's lack of knowledge about stunting can cause children to be at risk of stunting. A mother's knowledge will affect the growth and development status of the child. Mother's knowledge is a necessary and supportive in child growth and development. Knowledge result from human sensing or someone knowing about objects through their senses (eyes, nose, ears and so on). What is meant by knowledge here is that the more often an individual or someone gets information, the higher the knowledge gained. Knowledge or cognition is fundamental in shaping one's actions (over behavior). This proves that the two participants are at the level of knowing only, where knowing is defined as remembering a material previously studied. They lack information about stunting. Both participants lack information about stunting.

Education associated with person's prior knowledge. Higher education made easier to receive information. Mothers can understand how to prevent stunting in their children, people with better levels of education will easier to receive information than people with less education level (15). This information is used as a provision for mothers to take care of their toddlers daily so that children are not at risk of stunting. However, mothers who have less education or are not educated will make it difficult for mothers to prevent stunting because of their lack of ability to absorb information. Quantitative result shows, that the majority of respondents have a low level of education of 86.4%, with the majority working as housewives (97.3%).

The results showed that mothers with less height (<150 cm) were at risk of having children with stunting compared to mothers

with normal height (>150 cm). Genetic factors can be a predisposing factor for stunting in children. These genetic factors interact with environmental factors in the form of exposure to lack of fulfillment of balanced nutrition, and growth inhibition related to stunting in children, which has an impact on growth and development disorders (stunted growth) which can be passed on to the next generation through intergenerational cycles of malnutrition. This cycle can be caused by low economic status or intergenerational poverty conditions. The results showed that the majority of the people had low economic status.

Children with short stature are usually born into low-income households. This shows that low socioeconomic conditions can result in a lack of fulfillment of family nutrition, resulting in a cycle of malnutrition that can be passed down between generations resulting in stunting in children. Increasing economic status becomes the focus of national development, especially in developing countries. Multilevel sectors should be involved in reducing poverty.

Another factor is the cognitive ability of parents, especially mothers, to respond to stunting and the risk of stunting in children. Parental knowledge is critical in raising parents' awareness to provide adequate parenting for children. The parenting pattern can be in the form of stress management when dealing with children, parents' emotional conditions, parents' attitudes toward fulfilling children's nutrition, and parents' attitudes towards facilitating optimal child growth and development. Limitations of this research included the scope of study still in the local coverage, so it is necessary to carry out further research with a broader range and more comprehensive factors.

CONCLUSIONS AND RECOMMENDATIONS

The incidence of stunting risk in Sukamukti Village is 37.8%. Based on the research result, maternal height was the dominant factor associated with the incidence of stunting risk in Sukamukti Village. The qualitative results produced seven themes including 1) Mother's perception of disease

(stunting), knowledge of both participants about stunting was at a low level because both participants only know what stunting means but do not know more about stunting, 2) child health development, 3) Maternal health history, both participants during pregnancy experienced hypertension and gave birth with a risk of preeclampsia and pregnancy disorders, 4) adaptive and maladaptive behavior of mothers while caring for children, the behavior of both participants in parenting patterns often experienced difficulties when providing nutrition to children so that they carried out maladaptive behaviors, 5) the forms and sources of support that mothers get while caring for children, both participants always get support from their husbands and families when caring for children, 6) The forms and sources of obstacles encountered by mothers while caring for children, and 7) psychological responses shown by mothers when caring for children the children of the two participants felt sad, confused and scared when their children were at risk of stunting, and also what mothers should do when they found out their children were at risk of stunting because the mother's knowledge about stunting was lacking.

Sensitive and specific nutrition interventions are essential in treating and preventing stunting in children. Monitoring the success of exclusive breastfeeding involving cadres and educating parents and caregivers regarding the first 1000 days of birth as a critical period of child growth and development can be done. In addition, caregiver empowerment supports the achievement of balanced nutrition by utilizing food ingredients available in the community during the first 1000 days of birth. Increasing parents's self-efficacy in parenting practices according to the first day of birth standards is very important. Further research with many respondents needs to be conducted for more detailed information.

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