

# Analysis Model of Toddlers Factor as Stunting Risk Predisposition Factor Due to Covid 19 in Stunting Locus Village Area of Indonesia

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## Abstract

**BACKGROUND:** Stunting is one of the global health and nutrition problems faced by toddlers because of the height growth problem caused by the lack of nutrition intake both the micro nutrition and macro nutrition and also infection diseases in long terms.

**OBJECTIVE:** This research aims at analyzing the toddler factors as the stunting risk predisposition factor due to Covid 19 pandemic in stunting locus village area of Indonesia.

**DESIGN:** This study applied case control study research design. This research was conducted for seven months (May 27th – November 20th 2022) in Stunting Locus Pudun Jae Village area, Padangsidimpuan City.

**PARTICIPANTS:** This case control study took 112 toddlers as the samples who were divided into two groups; 56 stunting toddlers were included in case group and 56 normal toddlers were included in control group. The sampling technique used was purposive sampling.

**KEY RESULTS:** This research found that the poor eating frequency (OR=3,619), monotonous eating habit (OR=0,440), and exclusive breastfeeding history (OR=0,070) were stunting risk predisposition factors on toddlers. In addition, the result of multivariate analysis on the three stunting risk factors showed that the eating frequency (OR=3,619) was the most dominant factor leading to stunting.

**CONCLUSIONS:** This research findings summary confirmed that eating habit, eating frequency, and exclusive breastfeeding history were the stunting risk predisposition factors with the value of OR > 1. Thus, any intervention which can overcome those predisposition factors to prevent stunting is needed such as family-based nutrition education and accurate nutrition intervention.

**Keywords:** Stunting, Toddler, Eating Frequency, Eating Habit, Exclusive Breastfeeding History.

## INTRODUCTION

Stunting was a failure of growth in toddlers and the symptoms appeared at age two [1]. Stunting has long term and short term effects and if there was no early treatment, it could lead to poor quality human resource in the future and bequeath degenerative diseases [2].

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Besides, stunting was directly caused by poor nutrition intake and infection disease. In addition, social culture, economy, health, and politic factors also contributed, thus special attention was necessary for the prevention and countermeasure [3]. Specific and sensitive nutrition intervention has been done by the government to decrease the stunting rate in Indonesia. In Indonesia, the prevalence of stunting cases was 24,4%. According to the Indonesian Nutrition Status Survey 2021, the prevalence of stunting in the province of North Sumatera reached 25,8%. This figure was slightly higher than the national average. The World Health Organization classifies this rate as high because it was over the recommended threshold of 20% [4]. From 33

Districts/Cities in North Sumatera, only 5 Districts/Cities had stunting prevalence below 20%, 28 Districts/Cities were still above 20%, even in Padangsidempuan City the prevalence reached 32,1% (13 Districts/Cities were categorized in very high category > 30%). Various stunting reduction efforts have been done in Indonesia; SSGI data in 2019 and 2021 showed the reduction from 27,7% to 24,4% but the President targeted to accelerate stunting reduction to be 14% in 2024 [5].

In addition, the high stunting burden in many cities and districts in Indonesia was greatly influenced by the mothers' health condition and eating habit [6], before the fertilization and during pregnancy, and continuous exposure towards bad eating habit, considering the food quantity and quality [7] (i.e. food with poor level of energy, protein, and micronutrient), and the repeated infection in baby period were the main factors leading to stunting [8]. On the other hand, the other stunting factors were food vulnerability, poor feeding practice, and unhealthy household environment, poor health service access, and poverty [9]. Covid 19 pandemic was worried to affect the decrease of the community access and purchasing power toward nutritious food compliance [10]. If it is not anticipated, there will be food and nutrition vulnerability especially in the areas identified as susceptible. Food and nutrition vulnerability increases the risk of stunting problem appearance which may increase due to the long term Covid 19. Due to the widespread extent of the Covid 19 pandemic, data on stunting were difficult to obtain by and were not given top priority [11].

In addition, this was supported by the fact that the toddlers' family members consumed food that did not adhere to the balanced and diverse nutrition principle based on the contents of my plate, the consumption of unhealthy snacks, and the lack of information regarding the types of foods that

were indeed rich in nutrition substances to prevent stunting. Considering the issue, children became the victim of insufficient nutrition intake fulfillment which influences on the short term and long term health and toddlers' development and future [12]. Food vulnerability causes the decrease of the consumed food quantity and quality and change eating habit because of the lack of money or other resources unavailability. The combination of factors working together affects negatively on the family's nutrition, health, and welfare status [8]. Therefore, breast milk availability in a longer period does not seem to meet toddlers' nutrition need. As the result, these children were more vulnerable toward growth delay [13].

The latest study showed that growth issue was began during pregnancy. Therefore, steps to intervene and prevent the effect across the generation related to short appearance were very crucial, especially during the first 1.000 days of their lives [14]. Intervention has to try to break down stunting problem since early using education intervention and nutrition behavioral change communication model. Considering that the nutrition status of short children was worrisome, the determinant evaluation remains a key challenge not only for the sanitary problem but also for health workers and professionals. Thus, this study aimed to analyze the toddlers' factors as stunting risk predisposition factor due to Covid 19 in stunting locus village area of Indonesia.

**RESEARCH METHOD**

This study applied case control study research design. This research was conducted for seven months (May 27th – November 20th 2022) in Stunting Locus Pudun Jae Village area, Padangsidempuan City. The object of this research was toddler who got normal and stunting nutrition status from the anthropometrical measurement result. The sampling technique used purposive sampling. The number of research samples was 112 toddlers who were divided into two groups; 56 stunting toddlers were included in the case group and 56 normal toddlers were involved in the control group. The data reflecting stunting risk predisposition factor were collected using questionnaire and toddlers' anthropometrical measurement including the height and the weight. The data were then analyzed using univariate, bivariate, and multivariate analyses. The data were analyzed using Odds Ratio test and Logistic Regression test.

**RESULT AND DISCUSSION**

Table 1: Analysis Model of Toddlers' Factor as Stunting Risk Predisposition Factor Due to Covid 19 in Stunting Locus Pudun Jae Village Area of Padangsidempuan City

Toddler Factor	Category	Case (%)	Control (%)	P Value	OR	CI 95%
Gender	Male	56,40	56,40	1,000	1,000	0,471-2,125

Eating frequency	Female	43,63	43,63	0,007	3,619	1,374-9,531
	Sufficient	65,50	87,30			
Eating habit	Insufficient	34,50	12,70	0,035	0,440	0,204-0,948
	Diverse	45,50	65,50			
	Not Diverse	54,50	34,50			
Exclusive breastfeeding history	Yes	21,80	80,00	0,000	0,070	0,028-0,175
	No	78,20	20,00			

According to Table 1, the result of odds ratio analysis of toddler factor with stunting risk was significant (p value < 0,05) on toddlers with insufficient eating frequency (OR=3,619), monotonous eating habit (OR=0,440), and exclusive breastfeeding history (OR=0,070). In other words, toddlers with insufficient eating frequency will get the risk 3,619 times bigger to suffer from stunting compared to toddlers with sufficient eating frequency. Meanwhile, toddlers with monotonous eating habit were able to increase the risk 0,440 times bigger to suffer from stunting compared to toddlers with diverse eating habit. Likewise, toddlers who had no history of having exclusive breast milk will risk 0,070 times bigger to suffer from stunting compared to toddlers who got exclusive breast milk.

Table 2: Final Model of Toddler Factor as Stunting Risk Predisposition Factor Due to Covid 19 in Stunting Locus Pudun Jae Village Area of Padangsidempuan City

Toddler Factor	Constanta	OR	CI 95%	p Value
Eating Habit	3,397	2,650	0,492-14,286	0,027
Eating Frequency	2,654	3,619	1,374-9,531	0,012
Exclusive Breastfeeding History	4,078	0,070	0,028-0,175	0,000

According to Table 2, it is shown that from the result of multivariate analysis of toddler factor as stunting risk predisposition factor due to Covid 19, it was retrieved that there were three variables indicating risk factor which means that p value < 0,05. The three stunting risk factors were eating habit, eating frequency, and exclusive breastfeeding history. The most dominant risk factor of stunting was eating frequency with the value of OR=3,619 as the biggest one which means that toddlers who had insufficient eating frequency had the risk of suffering from stunting 3,619 times bigger than normal or healthy toddlers.

## DISCUSSION

The poor family's eating habit contributed on the poor nutrition intake of toddlers in Pudun Jae Village was caused by mothers let their children be when they did not want to

eat or had trouble eating so that they did not get proper nutrition intake [15]. The habit of mothers or family waiting for the toddlers to ask for a meal made the children rarely ate because they preferred to play [16]. In the meantime, mothers continued to offer fruits, biscuits, and milk in modest quantities, such that toddlers' nutritional requirements were not adequately met [8]. The situation of toddlers seeking the same menu at every meal could be a result of food availability factors prepared by mothers with limited knowledge, low family income making it difficult to provide a variety of foods, or because toddlers were accustomed to the same meal menu and did not have access to other food options [17]. The habit of eating whatever offered to the toddlers which was only rice and vegetable without fulfilling other nutrition needs affected on the toddlers' linear growth [18]. Eating habit was a stunting risk predisposition factor according to the result of odds ration analysis which presented the OR value > 1. Stunting toddlers often consumed two kinds of food; they were rice and monotonous vegetables. Poor knowledge of the mothers was one of the factors which made them were not able to change the habit of feeding their toddlers. Children's preference for a single food type led to them missing out on the nutritional benefits of a variety of foods [19]. The potential impacts of malnutrition were irreversible and could not be remedied. The effects were not only on the physical growth but also on the cognitive and mental development [20]. Consequently, toddlers' optimal development will be greatly influenced by their eating habits and nutritious foods [12].

The eating habit in consuming food in a day was passed down by the toddlers' family. The children were started to be fed complementary foods for breast milk in the form of instant milk porridge or rice flour porridge which was self-cooked without any side dish when they were six-month-old. If the mothers cook the rice porridge, they would not add any side dish or vegetables as they only added fish soup or vegetable soup [21]. This was done because they assumed that breast milk was enough to fulfill child's nutrition need until whenever they wanted to be breastfed. After they were above six months old, toddlers were fed with rice and egg/fish as the side dish and clear vegetable soup or with rice only. Rice was given to make the children fat. When children were above two years old, they were fed with non-

spicy family food. If the mothers cooked spicy food, toddlers were fed with the available non-spicy foods such as fried tofu or fried egg or fried fish; they were even fed with only rice and salt water. If there was vegetable soup, the toddlers only got approximately one teaspoon of it [22]. This phenomenon was caused by the mothers who did not have a lot of time to take care of their children since they were busy working in the rice fields or farm including to cook special food for their toddlers because of their multiple burdens. The children were let to choose the food that they liked without any rules [23].

Stunting was closely related to the feeding frequency especially in the first two years of the children's life. Eating frequency can affect the quality of children's food consumption so that it can affect toddlers' nutrition status. Eating frequency may serve as a measure of toddlers' nutritional sufficiency [24]. The factors affecting the formed eating frequency were closely related to toddlers' eating habit. In general, factors affecting the formed eating frequency were family, economy, social culture, religion, education, and environment factors. The factors causing stunting were not only from the nutrition intake but it was also from the family's eating frequency and eating habit [7]. Children would be malnourished and stunted if their needs were not met by sufficient nutritional intake. The ability to consume varied food in the optimal scale was closely related to the toddlers' family capability to provide foods [25].

The food diversity provided or given to toddlers was crucial to their nutritional sufficiency and food compliance. Hong states that stunting was more susceptible to be experienced by children who come from family that were unable to provide complete food proportion for the family [26]. Current findings discovered that eating frequency was the most dominant risk factor of stunting with the biggest value of OR=3,619; it means that toddlers who has poor eating frequency get the risk of suffering from stunting 3,619 times bigger than the normal toddlers. In feeding toddlers, we should pay attention to the eating frequency, feeding time accuracy, types of food, food ingredients portion, and how to cook them. The inappropriate toddlers' feeding habit were: too early or too late feeding time, insufficient food portion and composition, and inadequate eating frequency. It was found that there were children who were 0 to 5 months old who had been fed with complementary foods for breast milk by their family like the grandmother as the toddler's caretaker. Grandmothers gave complementary foods for breast milk with eating frequency of less than three times a day aside from the breast milk of toddlers who were 0 to 5 months old as the mothers were busy working in the rice field or farm as the family's breadwinner [6]. Moreover, the breast milk of the toddler's mother came out in a little amount while the mothers were busy working so that they did not pay attention to the toddlers' nutrition parenting [21].

Exclusive breastfeeding history and toddlers' nutrition status were greatly affected by the family's social cultural situation

with the risk of suffering from stunting bigger than the toddlers who were not breastfed and they are never breastfed exclusively during the first six months. It was found that most toddlers had the history of not being breastfed since they were born and were given formula milk instead by the grandmothers or the family as the breast milk did not instantly come out. If the breast milk were out, the mothers got rid the first breast milk as they considered the colostrum was dirty. If the breast milk was considered as insufficient, mothers instantly gave formula milk instead [27]. The poor exclusive breastfeeding because of the formula milk can cause diarrhea disease and lead to the troubled growth and become one of the factors causing stunting for toddlers in Padangsidempuan City especially in Pudun Jae Village because of the past experience and will affect toddlers' future. On the other hand, the proper breastfeeding by mothers can help keeping children's nutrition balance so that the normal children growth can be achieved. Thus, mothers should breastfeed their children exclusively until they were 6 months old and keep breastfeeding them until they reach two years old to fulfill toddlers' nutrition need. On the other hand, this situation was greatly affected by the poor knowledge of the mothers related to health and nutrition before and during pregnancy, and after they give birth. To retrieve the optimum nutrition intake for the health, it is important for children to get exclusive breast milk in the first six months before they were fed with complementary foods [28]. WHO recommends that children were breastfed exclusively in the first six months and followed by being breastfed and fed with complementary foods until they were two years old [29].

The determinant proven to be stunting predisposition was exclusive breastfeeding history because the research findings found that exclusive breastfeeding proportion among the case group (78,2%) and control group (80,0%) was similar. Even though the result showed there was a meaningful correlation, the big number of toddlers with non-exclusive breastfeeding history correlated with the early feeding of complementary foods for breast milk so that it caused the failure of exclusive breastfeeding for the children. Children who got early complementary foods for breast milk greatly decreased their portion of consuming breast milk because they felt full from the given complementary foods for breast milk. A study conducted in South Ethiopia confirmed that toddlers who did not get exclusive breast milk for six months had a high risk of suffering from stunting [30]. The result of Baseline Health Research (2013) indicated that toddlers' stunting was greatly affected by the poor parents' income and education [31]. As such, family with higher income will get education and health accesses more easily so that the children's nutrition status will be better [32].

## CONCLUSION

This research findings prove that eating frequency is the

strongest predisposition factor related to stunting risk beside the eating habit factor and exclusive breastfeeding history factor. Family nutrition program especially healthy eating habit can be used as eating culture for households as the important strategy to decrease malnutrition on toddlers and will help preventing stunting across generations.

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