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Model of Controlling Stunting Risk Factors on Toddlers in the Working Area of Maginti Health Center, West Muna Regency

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ABSTRACT

Introduction: The prevalence of stunting in West Muna Regency in 2021 was 29.1%, increased by 31.7% in 2022, and decreased by 24.3% in 2023. The causes of stunting are multidimensional, so comprehensive interventions are needed to reduce the incidence of stunting. The purpose of this study is to analyze the model of controlling stunting risk factor on toddlers in the working area of Maginti Health Center, West Muna Regency.

Method: This type of quantitative research uses a case control study research design. The research population was 152 toddlers, and stunting cases were 41 toddlers. The number of samples was 74 respondents which were divided into 37 cases and 37 controls. Sampling of the study used Simple Random Sampling. The analysis used chi square statistical tests and odds ratios, while the multivariate analysis used logistic regression analysis.

Result: Bivariate analysis obtained the OR value of maternal knowledge, hygiene practices, availability of healthy latrines, drinking water management, feeding practices, exclusive breastfeeding, complementary breastfeeding, history of diarrhea, and trust of more than 1, while the OR of health services included the number 1. Multivariate obtained values of f_{count} (76.189) > f_{table} (1.9846) with multivariate modeling results obtained complementary breastfeeding (OR 45,897).

Conclusion: The conclusion is that independent variables simultaneously affect the incidence of stunting in toddlers. The most influential variable is the provision of complementary breastfeeding. Controlling stunting risk factors with the Multilevel Approach to Community Health (MATCH) method is aimed at the mothers of toddlers, family support, organizations and communities, and health service levels and stakeholders.

Introduction

Stunting is a manifestation of chronic malnutrition, defined as low height with age; it is often associated with poverty. The nutritional burden is more or less common in developing countries than in developed countries.[1] Globally

in 2020, nearly 45% of under-five deaths were caused by malnutrition. According to the United Nations International Children's Emergency Fund (UNICEF), one in three children is stunted. About 40% of children in rural areas experience stunted growth.[2]

More than half of children under the age of five who experience stunting globally (about 55%) are from Asian countries. According to the World Health Organization (WHO), Indonesia has the third highest stunting prevalence in Southeast Asia.[3] The development of stunting prevalence according to the results of the Indonesia Nutrition Status Survey of the Ministry of Health for Southeast Sulawesi Province has experienced a decrease in prevalence value, namely in 2021 the percentage of stunted (very short and short) was 30.2%, then decreased in 2022 by 22.7%. Despite experiencing a decrease in prevalence, Southeast Sulawesi Province still ranks 9th in the highest prevalence nationally.[4]

Meanwhile, in West Muna Regency in 2021 it was in eighth position with a prevalence of 29.1% and in 2022 it increased in sixth position with a prevalence of 31.7%. Although West Muna is not the province with the highest prevalence of stunting, the prevalence rate of West Muna has increased from the previous year by 2.6%. Stunting data from the Maginti Health Center in 2021 there were 129 cases of stunting with a stunting prevalence of 32.37% and in 2022 as many as 45 cases. The Maginti Health Center oversees 4 villages with the distribution of stunting incidents in each village, namely Gala Village with 6 cases, Maginti Village with 18 cases, Kangkunawe Village with 14 cases, and Pasipadangan Village with 7 cases. This shows that the Maginti Health Center is one of the health centers that has a fairly high stunting incidence rate.[5]

The causes of stunting are multidimensional based on the framework of stunting theory by WHO and UNICEF consisting of complete components. Multifactor are the causes of malnutrition and malnutrition, including poverty factors, parental education and knowledge, parental parenting, complementary foods, infectious diseases, state security, limited health facilities, not being given exclusive breastfeeding, Low Birth Weight (LBW), nutrition during pregnancy.[6;7]

This MATCH (Multilevel Approach to Community Health) approach focuses on implementation with a socio-ecological perspective and develops 6 multiple interventions to address individual behavior and environmental conditions with modification of determinant factors. Based on the above background, this study aims to identify a model of controlling risk factors for stunting events in toddlers in the working area of the Maginti Health Center, West Muna Regency. Through this model, it is hoped that new behaviors can be formed in pregnant women in preventing the risk of giving birth to stunted children in the future by using the MATCH framework so that interventions can be carried out comprehensively by involving various sectors and stakeholders related and taking responsibility for realizing the National Medium Term Development Plan, especially in the health sector.

Method

The type of research used in this study is quantitative research using a case control study research design which was carried out in July-August 2024. The population in this study is all toddlers weighed in the integrated health service post area of the Maginti Health Center in 2023 as many as 152 toddlers. The case population is the total number of babies weighed in the integrated health service post in the Maginti Health Center area in 2023 and declared stunted as many as 41 toddlers. The number of samples in the study was 37 people. The ratio of the intervention sample and the control sample was 1:1, so the total number of samples was 74 people. Sampling of the study used Simple Random Sampling by paying attention to the age matching of mothers under

five. Data collection through observation and interviews using questionnaires containing variable questions. The analysis of this study uses the statistical test of chi square and odds ratio (OR) for the bivariate test, while the multivariate analysis uses logistic regression analysis.

Result

Table 1 shows that the results of bivariate analysis using Odd Ratio are obtained that the risk factors for stunting incidence in the Maginti Health Center area are variables of maternal knowledge (p-value = 0.005 and OR = 5.440), hygiene practices (p-value = 0.008 and OR = 4.265), availability of healthy latrines (p-value = 0.003 and OR = 5.454), drinking water management (p-value = 0.004 and OR = 5.042), feeding practices (p-value = 0.014 and OR = 4.060), exclusive breastfeeding (p-value = 0.002 and OR = 5.317), complementary foods (p-value = 0.000 and OR = 17.188), history of diarrhea (p-value = 0.002 and OR = 6.078), and food abstinence trust (p-value = 0.008 and OR = 5.625). Meanwhile, the health services factor (p-value = 1,000 and OR = 0.648) is not a risk factor for stunting in the Maginti Health Center area.

Table 2 shows that there are 9 variables that can be included in the logistic regression analysis ($p<0.25$), namely maternal knowledge, hygiene practices, availability of healthy latrines, drinking water management, feeding practices, exclusive breastfeeding, complementary breastfeeding, history of diarrhea in toddlers, and trust. Regression analysis is carried out using the backward method, which is to output one by one the variables with the greatest significance value, until the variables that have a significance value of less than 0.05 are obtained which are simultaneously analyzed. In this study, there are 6 stages of the logistic regression model, so that it is found that maternal knowledge, availability of healthy latrines, drinking water management, complementary breastfeeding which are variables that are at risk of significance to the incidence of stunting in toddlers by considering confounding variables. The most influential variable has the largest exp (B), so it can be concluded that the provision of complementary breastfeeding (exp B = 45.897) is the variable that is most at risk of stunting incidence in the Maginti Health Center working area.

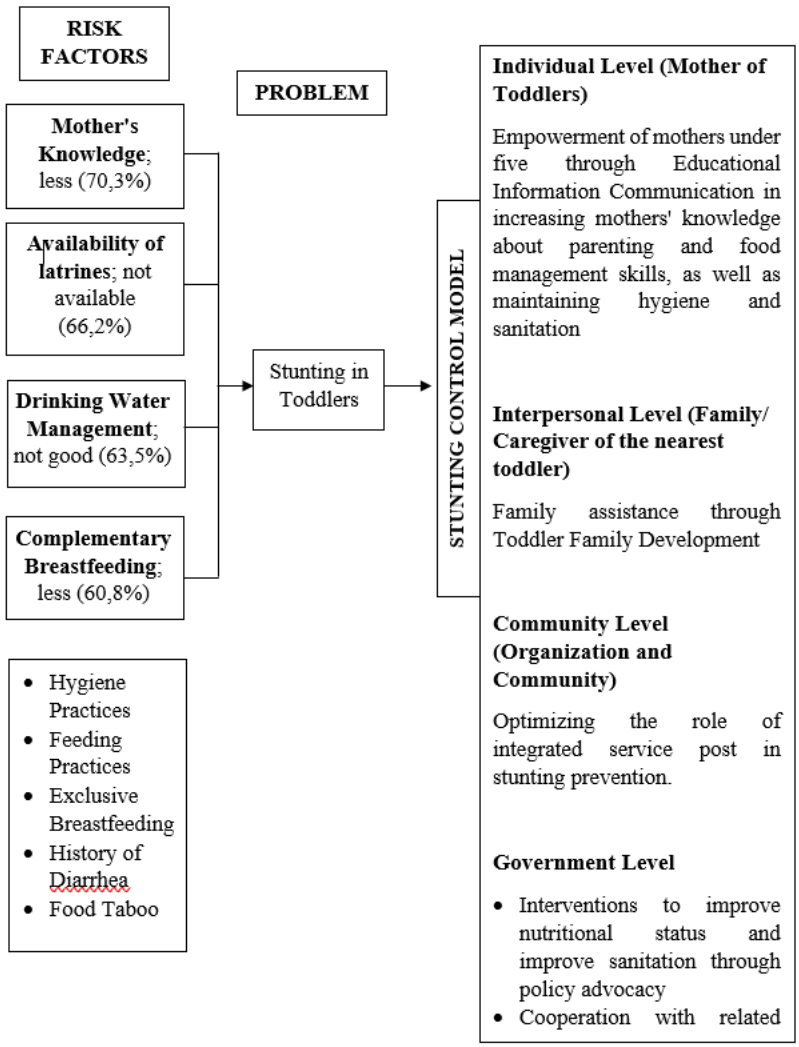
Table 1.
Analysis of Risk Factors for Stunting in Toddlers

Independent Variable	Stunting in Toddlers				Total		Statistical Analysis
	Case		Control				
	n	%	n	%	n	%	
Mother's Knowledge							p-value = 0,005 OR = 5,440 (1,735-17,060)
Less	32	86,5	20	54,1	52	70,3	
Enough	5	13,5	17	45,9	22	29,7	
Hygiene Practices							p-value = 0,008 OR = 4,265 (1,545-11,771)
Not Good	29	78,4	17	45,9	46	62,2	
Good	8	21,6	20	54,1	28	37,8	
Availability of Healthy Toilets							p-value = 0,003 OR = 5,454 (1,841-16,159)
Not Available	31	83,8	18	48,6	49	66,2	
Available	6	16,2	19	51,4	25	33,8	
Drinking Water Management							p-value = 0,004 OR = 5,052 (1,771-14,356)
Not Good	30	81,1	17	45,9	47	63,5	
Good	7	18,9	20	54,1	27	36,5	
Feeding Practices							p-value = 0,014 OR = 4,060 (1,428-11,547)
Not Good	30	81,1	19	51,4	49	66,2	
Good	7	18,9	18	48,6	25	33,8	
Exclusive Breastfeeding							p-value = 0,002 OR = 5,317 (1,914-14,766)
No Exclusive Breastfeeding	29	78,4	15	40,5	44	59,5	
Exclusive Breastfeeding	8	21,6	22	59,5	30	40,5	
Complementary Breastfeeding							p-value = 0,000 OR = 17,188 (4,948-59,704)
Less	33	89,2	12	32,4	45	60,8	
Enough	4	10,8	25	67,6	29	39,2	
History of Diarrhea							p-value = 0,002 OR = 6,078 (2,049-18,030)
Ever	31	83,8	17	45,9	48	64,9	
Never	6	16,2	20	54,1	26	35,1	
Health Service							p-value = 1,000 OR = 0,648 (0,102-4,120)
Less	2	5,4	3	8,1	5	6,8	
Enough	35	94,6	34	91,9	69	93,2	
Food Taboo							p-value = 0,008 OR = 5,625 (1,648-19,202)
Yes	33	89,2	22	59,5	55	74,3	
No	4	10,8	15	40,5	19	25,7	

Table 2.
Modeling Risk Factors for Stunting in Toddlers in the Working Area of the Maginti Health Center, West Muna Regency

Variable	B	S.E.	Wald	df	Sig	Exp B
First Stage Modeling						
Mother's Knowledge	3.051	1.284	5.645	1	0.018	21.135
Hygiene Practices	1.706	1.336	1.632	1	0.201	5.507
Availability of Latrines	20.413	4.575E3	0.000	1	0.996	7.330E8
Drinking Water Management	1.656	1.208	1.881	1	0.170	5.238
Feeding Practices	1.526	1.297	1.383	1	0.240	4.599
Exclusive Breastfeeding	19.998	4.575E3	0.000	1	0.997	4.842E8
Complementary Breastfeeding	20.728	4.575E3	0.000	1	0.996	1.005E9
History of Diarrhea	1.224	1.194	1.052	1	0.305	3.401
Food Taboo	3.196	1.634	3.827	1	0.050	24.446
Second Stage Modeling						
Mother's Knowledge	3.024	1.138	7.060	1	0.008	20.566
Hygiene Practices	1.070	.947	1.277	1	0.259	2.916
Availability of Latrines	2.217	1.062	4.358	1	0.037	9.180
Drinking Water Management	1.774	0.969	3.355	1	0.067	5.896
Feeding Practices	1.101	0.950	1.344	1	0.246	3.008
Complementary Breastfeeding	3.454	1.137	9.233	1	0.002	31.624
History of Diarrhea	1.214	0.946	1.648	1	0.199	3.368
Food Taboo	2.442	1.317	3.439	1	0.064	11.492
Third Stage Modeling						
Mother's Knowledge	2.929	1.117	6.876	1	0.009	18.712
Availability of Latrines	2.718	1.001	7.375	1	0.007	15.143
Drinking Water Management	1.755	0.976	3.234	1	0.072	5.781
Feeding Practices	0.899	0.940	0.915	1	0.339	2.457
Complementary Breastfeeding	3.509	1.118	9.848	1	0.002	33.418
History of Diarrhea	1.358	.918	2.190	1	0.139	3.889
Food Taboo	2.387	1.248	3.656	1	0.056	10.881
Fourth Stage Modeling						
Mother's Knowledge	2.820	1.051	7.194	1	0.007	16.778
Availability of Latrines	2.672	0.963	7.692	1	0.006	14.467
Drinking Water Management	1.876	0.967	3.765	1	0.052	6.527
Complementary Breastfeeding	3.616	1.094	10.918	1	0.001	37.190
History of Diarrhea	1.422	.911	2.434	1	0.119	4.145
Food Taboo	2.112	1.184	3.180	1	0.075	8.261
Fifth Stage Modeling						
Mother's Knowledge	2.574	0.990	6.760	1	0.009	13.122
Availability of Latrines	2.525	0.900	7.876	1	0.005	12.490
Drinking Water Management	2.142	0.929	5.313	1	0.021	8.517
Complementary Breastfeeding	3.699	1.024	13.056	1	0.000	40.399
Food Taboo	1.812	1.040	3.039	1	0.081	6.124
Sixth Stage Modeling						
Mother's Knowledge	2.317	0.937	6.118	1	0.013	10.150
Availability of Latrines	2.523	0.871	8.396	1	0.004	12.470
Drinking Water Management	2.118	0.885	5.731	1	0.017	8.313
Complementary Breastfeeding	3.826	0.960	15.871	1	0.000	45.897

Picture 1.
Stunting Risk Factor Control Model



Discussion

Risk Factors for Stunting in Toddlers at Maginti Health Center

Notoatmodjo stated that knowledge is the result of knowing and will exist after a person senses an object.[8] The results of the analysis of this study were obtained OR = 5.440, which means that respondents who have less knowledge are 5.44 times more likely to be stunted than respondents who have sufficient knowledge. Based on the results of the selected modeling, the level of maternal knowledge about stunting is a predictor of stunting in toddlers. These results explain that good maternal knowledge about the causes, impacts and prevention can improve good parenting patterns. Knowledge can provide encouragement to parents in providing the best parenting pattern to their children in the optimal growth process. The results of this study supported by Rahayu, et al. are the knowledge of mothers who are less at risk that can increase the incidence of stunting in toddlers (OR=5.29; 95% CI=1.30-21.54; P=0.002).[9] Similar results were also conducted in Rwanda by Habyarimana et al, who found that knowledge is an influential and significant predictor of stunting incidence in children.[10]

Poor personal hygiene practices can increase the risk of stunting in toddlers. This is due to the appearance of bacteria due to poor personal hygiene of toddlers, then enter the body through the food consumed and will have an impact on infectious diseases.[11;12] Mother's habits in maintaining personal hygiene for toddlers are not good because mothers do not pay attention to personal hygiene and mothers feel that this is not an important thing to do. The results of the odd ration test obtained a value of OR = 4.265, which means that respondents who have poor hygiene practices are 4.265 times more likely to be stunted than respondents who have good hygiene practices in the Maginti Health Center work area. This indicates that the maintenance of personal hygiene is necessary for the comfort, safety and health of the individual. This finding is in line with research in the work area of the Rejosari Pekanbaru Health Center which found that toddlers with poor personal hygiene are 5,183 times at risk of stunting (13). Other research that has been conducted has found that there is a relationship between personal hygiene practices and the incidence of stunting in toddlers with p-value = 0,032.[14]

Latrines are one of the important facilities in basic sanitation. A healthy latrine is a latrine that defecates in a special place for feces or septic tanks, not into rivers or the sea.[15] The results of the study obtained a value of OR = 5.454, meaning that respondents who did not have healthy latrines were 5.454 times more likely to be stunted than respondents who had good healthy latrines. This shows that the unavailability of latrines will increase open defecation behavior that can pollute the environment and have long-term impacts causing health problems, such as stunting in toddlers. Likewise, vice versa, with the existence of healthy latrines, it will be able to break the chain of disease transmission carried by disease vectors. In line with research that shows that toddlers who do not have access to healthy latrines are 5.25 times more likely to experience stunting than toddlers who have access to healthy latrines.[16] It is also in line with the findings of the study which shows that the incidence of stunting in children under five is 7,424 times more common in families with unsuitable latrines.[17]

Household drinking water and food management is a process of processing, storing, and utilizing safe drinking water in households.[18] The results of the odds ratio analysis obtained a value of OR = 5.042, which means that respondents with poor drinking water management are 5.042 times more likely to be stunted than respondents with good drinking water management. The water source in the Maginti Health Center area is greatly influenced by the season, where this situation greatly affects the pattern of diseases spread by vectors and the level of pollution to clean water sources consumed by the community. The availability of unqualified drinking water comes from unimproved sources, the distance of the water source is too close to the latrines, inappropriate water treatment before consumption can cause malnutrition in children. In line with the research with p value = 0.013 and RP = 12.200. This shows that there is a relationship between drinking water management and the incidence of stunting in toddlers. And also the study that the variable of drinking water treatment is related to the incidence of stunting in Mamuju Regency (PR 1,332, 95% CI, 1,048-1,693, p = 0.038).[19]

Feeding patterns in toddlers play a very important role in the growth process in toddlers, because food contains a lot of nutrients.[20] Respondents with poor feeding practices were 4.06 times more likely to have stunted toddlers than respondents with good feeding practices. The practice of feeding with stunting in children under five found that the majority of parents were less optimal in feeding their children. There are many children who are fed inappropriately; Improper supplementary feeding practices make children prone to malnutrition. This can be due to the average child who lacks nutritional intake from food because it is difficult for children to eat, as well as the possibility that mothers who are impatient or good at persuading children to eat and lack in making food creations that make children interested in eating. In addition, the lack of maternal knowledge about foods that are good for child growth (child height) can also be one of the causes of stunting in children. shows that the risk of parents who do not feed well is 18.0 times more likely to suffer from stunting when compared to toddlers whose parents have good feeding patterns.[21] It is also supported by research that optimal parents in feeding children have a relationship with nutritional status p-value = 0,000.[22]

According to the Indonesian Ministry of Health, the benefit of exclusive breastfeeding for babies is as a natural immunity to prevent babies from getting sick. Breast milk also optimizes the baby's brain and physical development. The results showed that respondents who did not provide exclusive breastfeeding had a 5.317 times greater risk of stunting than respondents who provided exclusive breastfeeding in the Maginti Health Center work area. These results show that growth failure after birth is the result of inappropriate exclusive breastfeeding and causes stunting. Efforts to reduce the incidence of stunting are to optimize exclusive breastfeeding for 6 months. Proper exclusive breastfeeding can provide protection against gastrointestinal infections that can lead to malnutrition that leads to stunting. Another study that obtained an OR value = 2.808, that Exclusive Breastfeeding is a risk factor for stunting in toddlers.[23] In line with research with a p-value = 0.025 ($P \leq 0.05$) which shows a relationship between exclusive breastfeeding and the incidence of stunting.[24]

The World Health Organization recommends proper feeding for infants and (children are early initiation of breastfeeding within one hour of delivery, exclusive breastfeeding for six months, and complementary feeding as needed from six months of age with continuous breastfeeding until the age of two years or more.[25] The results showed that complementary breastfeeding was a risk factor for stunting in the Maginti Health Center working area with OR = 17.188. This shows the importance of providing complementary breastfeeding to meet the needs of babies who will not be satisfied with breast milk. During this period, children are vulnerable to malnutrition, so they need energy and nutrients for physical growth and development. In addition, it is important to provide a more diverse diet that suits the needs. Where it is known that in Indonesia there is a 4-star diet in the practice of complementary breastfeeding, namely carbohydrates, animal protein, vegetable protein, fat, vegetables and fruits and snacks. Another study found that 89.4% of stunted toddlers were given complementary breastfeeding earlier (<6 months) with the results of the chi square p-value test = 0.001.[26] In line with other money, the p value of 0.016 means that there is a significant relationship between the provision of complementary breastfeeding and the incidence of stunting in the coastal area of Sitaro Regency.[27]

Diarrhea is a disease characterized by changes in the shape and consistency of soft stools and bowel movements more than 3 times a day.[28] The results of the study obtained a value of OR = 6.078. Diarrheal diseases in toddlers are very closely related to environmental conditions. The poor environment that triggers the incidence of diarrhea in toddlers found from the results of observation is the environment where children's playgrounds are still found garbage from the results of rising sea tides, the cleanliness of the house is not maintained by the mother, and the lack of supervision from parents so that the habit of children not using slippers when playing and the habit of children not washing their hands after playing arises. In line with research in Southern Ethiopia states that diarrhea diseases have a significant relationship with stunting. A relationship was found between the history of diarrhea and the incidence of stunting in toddlers aged 24-60 months in the working area of the Way Urang Health Center, South Lampung Regency with a p-value of 0.004.[29]

Maternal and child health services are an effective program to prevent stunting. The services provided can be in the form of nutrition, energy and materials, as well as the treatment of infectious diseases in pregnancy that play a role in stunting.[30] In this study, health services are not a risk factor for stunting of toddlers in the Maginti Health Center Working Area, with an OR value = 0.648. This is because health services in the Maginti Health Center work area are quite active, especially in integrated health service post services for both stunted and non-stunted toddlers. Integrated health service post is the closest service to the community, integrated health service post is the front line in stunting prevention, with various activities for mothers and children. Research on access to health services obtained a value of p value = 0.164 ($p > 0.05$), so it can be concluded that there is no relationship between access to health services and parenting of stunted toddlers.[31]

Mother's trust is one of the indirect factors that affect the nutritional status of children. Sociocultural factors play a very important role in a person's nutritional status.[32] The results of this study obtained a value of OR = 5.625 (95% CI:

1.648 – 19.202) that trust/taboo towards food is a risk factor for stunting of toddlers in the Maginti Health Center Working Area. Some of the taboos found by researchers at the research site are that most of the taboos are believed to cause babies to be difficult to be born, because shrimp and squid walk backwards. The types of vegetables that pregnant women abstain from are cabbage and chili peppers because it is feared that children will be swept away by a thick layer like cabbage so that it is difficult to be born while chili is abstained from because it makes the baby red, dirty, fussy and sick. Consumption of fruits such as ambarella fruit, pineapple, and durian by pregnant women is not allowed, because it is feared that it can cause miscarriage. The results of research related to taboos in the Madura community are several taboos on animal protein and vegetables and fruits that should not be consumed can result in toddlers being at risk of stunting.[33]

Stunting Risk Factor Control

The Multilevel Approach to Community Health (MATCH) model proposed by researchers in controlling stunting in the work area of the Maginti Health Center is aimed at the individual level (toddler mothers), interpersonal level, community level (organization and community), and health service level and stakeholders.

In individuals who focus on mothers of toddlers, the risk factor control model via; (1) increasing maternal knowledge and skills about parenting (increasing exclusive breastfeeding, complementary breastfeeding, food and nutrition awareness, as well as the diversity of ingredients and processed foods with balanced nutrition); (2) increasing knowledge and awareness of maintaining good environmental sanitation (clean water sources, drinking water treatment, provision of healthy latrines), clean and healthy living behavior practices for families and personal hygiene, especially for children in an effort to reduce and prevent infectious diseases that are often suffered by children.

At the interpersonal level, parental and family support is very important in the growth and development of toddlers to prevent stunting. Therefore, it is necessary to provide assistance to parents and families through the Toddler Family Development which is an effort to improve parents' knowledge and skills related to holistic child care, namely comprehensive care in meeting the basic needs of children.

Stunting control at the community level can be carried out through optimizing the role and function of Integrated health service post and Early Childhood Education. Optimizing the role of integrated health service post in stunting prevention can be done by counseling on nutritional health counseling whose goal is to increase the awareness and knowledge of mothers under five so that there is a change in behavior for the better as well as community-based sanitation training. Then the implementation of healthy communication information and education community development and empowerment for mothers and to meet the nutritional needs of toddlers such as the availability of vegetables and other protein ingredients. The Maginti Health Center area is a coastal area that produces a large number of fisheries or marine products, so it is necessary to empower community development and empowerment with local processed products that are favored by children.

At the level of health services and stakeholders, it is necessary to intervene to improve nutritional status and improve sanitation through policy advocacy related to efforts to prevent and control stunting in children under five. The control model can be carried out through; (1) increasing the role of National Population and Family Planning Board through Toddler Family Development, Build a Teen Family, & the Planning Generation; (2) Intervention and realization of improving the quality and reach of National Health Insurance services as an effort to prevent and control stunting in toddlers; (3) cooperation between the Ministry of Public Works and Public Housing and Agriculture Offices in the provision of joint nutrition garden facilities; and (4) Increasing Community-Based Total Sanitation, especially in the pillars of Stop Open Defecation and Household Water and Food Management.

Conclusion

The conclusion of the study was that maternal knowledge, hygiene practices, availability of healthy latrines, drinking water management, feeding practices, exclusive breastfeeding, complementary breastfeeding, history of diarrhea in toddlers, and food abstinence

beliefs are risk factors for stunting in Bali at the Maginti Health Center, while health services are not stunting risk factors. The most influential variable is the provision of complementary breastfeeding. The stunting risk factor control model of the Multilevel Approach to Community Health (MATCH) method is aimed at the individual level (mothers of toddlers) through family empowerment, especially mothers of toddlers related to the prevention of infectious diseases using the yard as a source of family nutrition and environmental sanitation. At the interpersonal level, namely the support of family and close people, through the assistance of parents and families through the Toddler Family Development. At the community level with an increase in the role and function of integrated health service post. At the level of health services and stakeholders, it is necessary to intervene to improve nutritional status and improve sanitation through policy advocacy related to efforts to prevent stunting in toddlers.

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