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Article

Health Belief Model-Based Intervention for Stunting Prevention Among Toddlers in the Sikumana Health Centre Area Kupang City

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Abstract

Background: Stunting is a chronic nutritional issue that hinders child growth due to prolonged malnutrition from pregnancy to early childhood, with visible effects after age two. It affects cognitive and physical development, lowering the quality of future generations. **Objective:** This study aims to analyze the relationship between Health Belief Model (HBM) components perceived vulnerability, severity, benefits, barriers, and cues to action and stunting prevention efforts among mothers of toddlers in the Sikumana Health Center area, Kupang City. **Methods:** A quantitative cross-sectional study was conducted from February 6–29, 2024, involving 89 mothers selected through sequential sampling. Data were collected using a questionnaire and analyzed with the chi-square test ($p < 0.05$). **Results:** All HBM variables showed significant associations with stunting prevention efforts: perceived vulnerability ($p = 0.016$), severity ($p = 0.010$), benefits ($p = 0.044$), barriers ($p = 0.038$), and cues to action ($p = 0.000$). Maternal beliefs regarding stunting risk, its consequences, benefits of action, and external motivators play a crucial role in influencing preventive behavior. **Conclusion:** HBM components significantly influence maternal efforts in preventing stunting. The model is effective for designing public health interventions, particularly nutrition education strategies aimed at increasing awareness and proactive maternal behavior.

Keywords: stunting, toddlers, health belief model

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1. Introduction

Stunting, a condition of failure to thrive due to chronic malnutrition, is one of the world's greatest public health challenges. Stunting occurs when a child's height is far below the standard for his or her age due to a lack of adequate nutritional intake, especially during the critical period of the first 1,000 days of life, from in utero to age two. This condition not only inhibits physical growth but also has serious impacts on cognitive development, learning ability, and productivity in adulthood. Children who experience stunting are at higher risk of chronic diseases such as diabetes, hypertension, and obesity, as well as experiencing reduced work capacity and future income[20]. According to the World Health Organization (WHO), in 2019, around 21.3% or 144 million children under the age of five worldwide experienced stunting, with the highest concentration in Sub-

Saharan Africa and Southeast Asia, which recorded a prevalence of 24.7% (WHO, 2020). This figure shows the urgency of handling stunting as part of efforts to achieve the Sustainable Development Goals (SDGs), especially the second goal which targets the elimination of [7].

Indonesia, as one of the countries with the highest burden of stunting in the world, faces serious challenges in reducing the prevalence of stunting. Based on the 2022 Indonesian Nutritional Status Survey (SSGI), the national prevalence of stunting reached 24.4%, although it has shown a decline from 27.7% in 2019 [11]. However, disparities between regions are still significant. East Nusa Tenggara (NTT), for example, had a stunting prevalence of 35.3% in 2022, far above the WHO threshold of 20% which is considered the limit of a public health crisis (NTT Health Profile, 2023). In Kupang City, which is the capital of NTT province, the stunting rate in 2022 reached 21.5%, with Maulafa District, especially the working area of the Sikumana Health Center, reporting the highest number of cases, namely 1,391 cases[15]. The high stunting rate in this region shows that even though Kupang is an urban area with relatively better access to health services compared to rural areas in NTT, chronic nutritional problems remain a complex and multifactorial issue.

The factors causing stunting in the Sikumana Health Center area include various dimensions, both direct and indirect. Direct factors include low nutritional intake of pregnant women and toddlers, which is often caused by an unbalanced diet and lack of access to nutritious foods such as animal protein, fruits, and vegetables. Indirect factors include poor sanitation and hygiene, limited access to clean water, and low maternal knowledge about proper nutrition parenting patterns. In addition, socio-economic factors such as poverty, low maternal education levels, and family economic constraints exacerbate the situation. A study showed that maternal education is one of the main determinants in preventing stunting, because educated mothers tend to better understand the importance of balanced nutrition and good parenting practices. However, in areas such as Sikumana, where many mothers only have basic education, knowledge about nutrition is often limited, leading to inappropriate complementary feeding practices, such as providing low-nutrient foods or too early.

In addition to these factors, low maternal awareness of the risks of stunting is also a major obstacle. Many mothers in the local community do not consider short stature as a serious health problem, but rather as a condition that is considered normal or genetic. This perception is exacerbated by the lack of effective and specific health education. The stunting prevention program at the Sikumana Health Center currently tends to be general, such as the distribution of additional food or micronutrient supplementation, without an approach that focuses on changing maternal behavior. In fact, behavioral change is key to the sustainability of stunting prevention efforts, especially in ensuring consistent nutritional intake and parenting patterns that support child growth.

To address these challenges, behavioral-based approaches such as the Health Belief Model (HBM) offer a promising solution. The HBM, first developed by Rosenstock et al. (2008), focuses on how individuals' perceptions of health risks, severity of consequences, benefits of preventive measures, perceived barriers, and external cues (such as counseling or social support) influence their decisions to adopt healthy behaviors. In the context of stunting, the HBM can be used to understand how mothers of toddlers perceive the risk of stunting, how serious they perceive its impacts, and what motivates or inhibits them from taking preventive measures, such as providing nutritious complementary feeding or utilizing health services. Research shows that HBM-based interventions, such as nutrition education that emphasizes perceptions of risks and benefits, can increase maternal awareness and reduce the prevalence of stunting in certain communities. Another study [19] also found that mothers who have high perceptions of the benefits of providing balanced nutrition tend to be more consistent in stunting prevention practices.

Although HBM has been proven effective in various contexts, its implementation in the Sikumana Health Center area is still very limited. Existing health education rarely

considers psychological factors and individual perceptions of mothers, making it less able to change behavior significantly. In addition, the lack of specific data on how mothers in this area view stunting hinders the design of targeted interventions. In fact, understanding mothers' perceptions of the risks and benefits of stunting prevention can be the basis for designing more effective education programs, for example by using visual media, mothers' support groups, or community-based approaches. Therefore, an in-depth study of the implementation of HBM in the local context is needed to identify factors that influence stunting prevention behavior and support the development of sustainable and evidence-based intervention strategies.

Based on the description in the background, one problem is formulated: how is the relationship between the components of the Health Belief Model (perception of vulnerability, severity, benefits, barriers, and cues to act) with efforts to prevent stunting in toddlers in the work area of the Sikumana Health Center, Kupang City.?

This study also enriches the literature on the application of HBM in stunting prevention, providing empirical evidence to support community-based interventions. The results can be a guide for health workers in designing relevant nutrition counseling and empowering mothers of toddlers to reduce the prevalence of stunting.

The purpose of this study was to analyze the relationship between HBM components and stunting prevention efforts in toddlers at the Sikumana Health Center. Hypothesis: There is a significant relationship between perceptions of vulnerability, severity, benefits, barriers, and cues to action with stunting prevention efforts.

2. Materials and Methods

2.1 Study Design and Setting

The type of research used is quantitative research with a cross-sectional design through a survey approach where data and information collection is carried out simultaneously at a certain time.

2.2 Population and Sampling

The population in this study were all mothers of toddlers in Sikumana Village, Kupang City, totaling 1153. Sampling in this study used the consecutive sampling method, where all subjects who came and met the selection criteria were included in the study until the number of subjects required was met and the sampling technique used non-probability sampling, namely consecutive sampling. so that the number of samples obtained was 89, the determination of the sample size used the Lameshow formula:

$$\mathrm{n} = \frac{Z^2\, p\, (1-p) N}{d^2(N-1)+Z^2 p(1-p)}$$

2.3 Data Collection

The data collected in this study include primary data and secondary data. Primary data is data that is directly collected by the researcher himself from the results of interviews with respondents. While secondary data is data obtained from related agencies including data on the number of stunting from the Kupang City Health Office and the number of toddlers from the Sikumana Health Center.

2.4 Variables and Operational Definitions

In a study, a clear understanding of variables and operational definitions is very important to ensure the accuracy of data analysis and interpretation. This study consists of independent variables and dependent variables, each of which has a role in describing the relationship between the factors studied. The independent variables in this study include five main aspects, namely: (1) perceived vulnerability, (2) perceived seriousness, (3) perceived benefits, (4) perceived barriers, and (5) cues to action. Meanwhile, the dependent variable which is the main focus of this study is stunting prevention efforts.

To provide clarity in measuring research variables, a systematic operational definition is needed. This operational definition will help in understanding how each

variable is measured, analyzed, and interpreted in the context of the study. The following is a table detailing the operational definition of each variable used in this study:

	Variables Independent: Perception Individual		
1.	Perceived Susceptibility	Belief or perception Respondent about vulnerability on risk about stunting	1. Vulnerable if answer respondents ≥ with median value 2. Not vulnerable if answer respondents < with median value
2.	Perceived Seriousness	Perception Respondent about seriousness or the severity of stunting that causes impact bad term short or term long	1. Serious if answer Respondents ≥ with median value 2. Not Serious if answer respondents < with median value
3.	Perceived Benefit	Perception Respondent to benefit apply efforts prevention of stunting	1. Benefit if the respondent's answer is ≥ the median value 2. There is no benefit if the respondent's answer is < with value median
4.	Perceived Barrier	Perception negative about yourself respondents who obstruct individual for apply steps prevention of stunting	1. It's not an obstacle if you answer respondent ≥ median 2. Obstacle if the respondent's answer is <with a value median
5.	Cues to action	The urge felt Respondent For apply for can apply effort prevention of stunting	1. There is no encouragement if the Respondent's answer is <with Median value 2. There is encouragement if the respondent's answer is ≥ the median value
	Variables Dependent: Stunting prevention efforts	Perception respondents who want apply effort prevention of stunting	1. There are efforts to implement stunting prevention efforts if ≥ with the median value 2. Not implementing stunting prevention efforts if the respondent's answer is < the median value

2.5 Data Analysis

The collected data needs to be processed and analyzed to produce accurate information. This process includes processing, statistical analysis, and data presentation. The following are the steps taken in this study.

The collected data is processed through editing to ensure completeness, coding to change the answers into numbers, then data entry into the computer using statistical software.

Data analysis is carried out in two stages: univariate to see the frequency distribution and bivariate to test the relationship between independent and dependent variables using the chi-square test. The results of the analysis are then presented in the form of tables and narratives.

The research was conducted in three stages:

1) Completion of administration and preliminary observation.
2) Implementation stage: Distribution of questionnaires and data collection.
3) Final stage: Editing, coding, data entry, processing with SPSS 16, and univariate and bivariate analysis.

2.6 Ethical Considerations

This research has obtained approval from the Health Research Ethics Commission of FKM Undana (KEPK FKM Undana) with certificate number 04/UN15.21/KEPK/2024. With this approval, the research is declared feasible to be carried out while still following the applicable research ethics rules.

3. Results

3.1. Univariate Analysis

1). Characteristics of Respondents

Table 1. Frequency Distribution of Respondents by Age, Level of Education, and Occupation

Variable	Category	Frequency	
		n	%
Age	17-25 years old	24	27,0
	26-45 years old	65	73,0
	Total	89	100%
Education Level	SD (Elementary School)	10	11,2
	SMP (Junior High school)	14	15,7
	SMA (High School)	40	44,9
	College/University	25	28.1
	Total	89	100%
Pekerjaan	Housewives	72	80,9
	State Civil Servants	5	5,6
	Traders/Self-employed	5	5,6
	Students	1	1,1
	Unemployed	5	5,6
	Total	89	100%

Table 1 shows the distribution of respondents based on age, education level, and occupation. For the age category, the majority of respondents were aged 26-45 years old, as many as 65 people (73.0%), while those aged 17-25 years old were 24 people (27.0%). In terms of education level, the majority of respondents had elementary school education as many as 10 people (11.2%), followed by junior high school (14 people (15.7%), high school (40 people (44.9%), and college/university education with 25 people (28.1%), with a total of 89 respondents. For employment, the majority of respondents were housewives as many as 72 people (80.9%), followed by state civil servants as many as 5 people (5.6%), traders or self-employed also 5 people (5.6%), students as many as 1 person (1.1%), and unemployed as many as 5 people (5.6%), with a total of 89 respondents.

2) Individual Perception

Table 2 shows the distribution of respondents based on individual perceptions of several variables. In terms of Perceived Susceptibility, 57 respondents (64.0%) felt vulnerable, while 32 respondents (36.0%) felt not vulnerable. For Perceived Severity, 59 respondents (66.3%) considered the condition severe, while 30 respondents (33.7%) considered it not severe. Regarding Perceived Benefit, 52 respondents (58.4%) felt there were benefits, and 37 respondents (41.6%) felt there were no benefits. In terms of Perceived Barrier, 62 respondents (69.7%) felt there were no barriers, while 27 respondents (30.3%) felt there were barriers. Finally, for Cues to Action, 80 respondents (89.9%) had cues to action, and 9 respondents (10.1%) did not have such cues. The total number of respondents in this table is 89 people.

Table 2. Distribution of respondents based on individual perception

Variabel		Frequency	
		N	%
Perceived Susceptibility	Susceptible	57	64,0
	Not Susceptible	32	36,0
Perceived Severity	Severe	59	66,3
	Not Severe	30	33,7
Perceived Benefit	Beneficial	52	58,4
	Not beneficial	37	41,6
Perceived Barrier	No Barriers	62	69,7
	Has Barriers	27	30,3
Cues to action	Has Cues	80	89,9
	No Cues	9	10,1
Total		89	100

3) Stunting Prevention Efforts

Tabel 3. Distribution of respondents based on stunting prevention efforts

Prevention Measures	Frequency	
	N	%
No Effort	8	9,0
Has Efforts	80	91,0
Total	89	100

Table 3. shows the distribution of respondents based on the effects of stunting prevention. Of the total 89 respondents, 80 people (91.0%) stated that the preventive measures taken had an effect, while 8 people (9.0%) considered the measures to have no effect. Overall, the majority of respondents felt a positive impact from the stunting prevention efforts that had been taken.

4. Discussion

4.1 Relationship between Perceived Susceptibility and stunting prevention efforts

Perceived susceptibility is an individual's perception of vulnerability to the risk of stunting so that a person can adopt healthier behaviours in order to prevent stunting. The more a person feels vulnerable, the more likely it is to take action to reduce risk. A mother who has a toddler and realises the risk of stunting in her child will try to prevent stunting (Glanz., 2008). Individuals who believe they have a low risk of disease tend to engage in unhealthy behaviours, while those who feel they have a high risk are more likely to take action to reduce their risk of disease [16].

The results of this study, most respondents, namely 57 (64.0%) respondents had a high perception of vulnerability, where there were 55 people with stunting prevention efforts and 2 people had no stunting prevention efforts. It can be seen that respondents with high perceptions of susceptibility tend to have stunting prevention efforts. From the data it can be seen that there are 2 respondents who have a high perception of susceptibility but no stunting prevention efforts may occur because they are related to demographic factors, such as low respondent education. This is in accordance with the theory stated[6] that vulnerability is a subjective assessment for each individual, this can be influenced by several things, like age, income, education and knowledge of a person.

The results of statistical tests in this study show that there is a relationship between perceptions of susceptibility and efforts to prevent stunting. This can be seen from the statistical test with a p-value = 0.16 (p-value <0.05). Based on the results of bivariate

analysis, it shows that there is a relationship between the susceptibility perception variable and stunting prevention efforts.

The education level of most respondents in this study was high school, as many as 40 people (44.9%); followed by college education level, as many as 25 people (28.1%) while the least educated was elementary school, which is 10 people (11.2%). Mother's education also affects parenting, because mothers are the first and main coach in children's health, food managers in the family, and have an important role in improving the nutritional status of family members[13].

These results are also supported by Rosenstock's theory in the Health Belief Model (HBM) which states that the higher a person feels at risk of a disease, the better the preventive measures will be taken. The more individuals feel that their illness is getting worse, they will perceive it as a threat and will take precautions. This result is in line with Rosenstock's theory in the Health Belief Model, which states that the perception of the seriousness of the stunting problem will affect the preventive actions a person takes. So, the more anxious or serious the mother is about the adverse effects that may occur due to stunting, the better the mother will take action to improve the nutritional status of toddlers in order to prevent stunting. The higher the perception of risk, the greater the likelihood that individuals will engage in behaviours aimed at reducing that risk. This encourages someone to take precautions against disease[13].

4.2 Relationship between Perceived Severity and Stunting Prevention Efforts

Perceived severity involves the way individuals assess the seriousness of stunting and its effect on life. The severity of the disease often depends on the medical information received, beliefs about the experience of the person experiencing the disease, or the perceived impact on quality of life. This concept of perceived severity reflects individuals' beliefs about how serious or severe an illness is. While often based on medical information or knowledge, perceived severity can also stem from an individual's beliefs about how difficult the illness will be to change or affect their life as a whole.

The results showed that out of 89 respondents, most respondents, which is 59 (66.3%) respondents, had a high perception of seriousness, where they felt that stunting had a serious impact on life. The data also shows that respondents with a high perception of severity tend to have efforts to prevent stunting that 57 people have efforts to prevent stunting and 2 people have no efforts to prevent stunting. Meanwhile, 30 (33.7%) respondents who had a low perception of severity felt that malnutrition and stunting in children could not cause worrying health problems such as death. There is still a low perception of severity because respondents think that malnutrition in their children cannot cause serious health problems, let alone cause death.

The results of statistical tests in this study indicate a relationship between perceptions of severity and efforts to prevent stunting with a score value of p-value 0.10 (p-value <0.05), which indicates a relationship between perceived severity and stunting prevention efforts. The results of the analysis in this study show that the higher the perception of severity related to the negative impact of stunting, the more efforts to prevent stunting will increase.

This is in line with the Health Belief Model theory[18, 15] which states that efforts to act in preventing the occurrence of a disease are influenced by perceived severity. Based on the construction of the Health Belief Model, the perception of seriousness or severity is part of the perception of threats to one's health. Mothers' perceptions of the adverse effects of stunting can cause a mother to feel worried about her child's health, thus encouraging her to take steps to prevent stunting [8].

A high perception of severity does not make good behaviour or efforts to prevent stunting, as well as mothers who have a low perception of severity does not mean that mothers do not make efforts to prevent stunting. Perceptions of severity are also influenced by other perceptions, the higher the perception of vulnerability, benefits and cues to action, the

higher the perception of seriousness. High perception of severity in mothers of toddlers is influenced by education and knowledge factors.

4.3 The relationship between Perceived Benefit and stunting prevention efforts

Perceived benefits are the way individuals see the positive benefits of healthy behaviour, where individuals believe that the benefits of the recommended behaviour outweigh any barriers that may exist (Indah, 2020). Perceived benefits are related to how individuals perceive the effectiveness of recommended actions to reduce risk. A person's belief in the efforts available to reduce the threat of disease, as well as the perceived benefits, will increase the positive view of the disease prevention behaviour even greater [10]. The beliefs of mothers who have toddlers in optimising their children's growth have an impact in their behaviour or efforts to prevent stunting in their children.

The results showed that out of 89 respondents, most of them, 52 (58.4%) who had a good perception of benefits, felt that the efforts made to prevent stunting were useful. From the research data, respondents with high perceived benefits, which is 50 people, tend to have efforts to prevent stunting.

The result of statistical tests in this study indicates a relationship between perceived benefits and stunting prevention efforts. This can be seen from the statistical test with a score of p-value 0.44 (p value <0.05), which indicates a relationship between perceived benefits and stunting prevention efforts.

This is in line with the concept of the Health Belief Model Theory, where individuals who have high perceived benefits of various effective efforts or actions to prevent stunting. Research conducted[12] found that educational interventions based on the Health Belief Model can significantly improve mother's perceptions of the benefits of seeking to prevent stunting in children, namely in this study, the perceived benefits have increased significantly in the experimental group after the educational intervention.

4.4 The relationship between perceived barriers and stunting prevention efforts.

According to[6], perceived barriers are anything that prevents individuals from making certain behavioural changes. The Health Belief Model theory explains that these barriers can be seen in terms of high costs, benefits, unsatisfactory and unpleasant health services and support from family.

Perceived barriers are how individuals see the negative aspects that prevent them from implementing stunting prevention measures. It includes individuals' views of the various barriers that may prevent them from undertaking recommended health actions. These barriers and obstacles are considered with regard to the effectiveness of the action, including aspects of cost, health risks, inconvenience, or complexity in implementation[21]. One of the main reasons someone does not change health behaviour is because they think it will cause a lot of difficulties if they make these changes, both psychological or physical and social difficulties (Fadilah et al., 2020).

The results showed that out of 89 respondents, most of the respondents, namely 62 (69.7%) had a high perception of obstacles, namely feeling that they had no obstacles in implementing stunting prevention efforts, most of them had stunting prevention efforts, namely 59 people and 3 people had no stunting prevention efforts. Of the 27 respondents who felt there were obstacles in stunting prevention efforts, 22 people had stunting prevention efforts and no stunting prevention efforts. The majority of respondents felt they had no obstacles in stunting prevention efforts. This study also found respondents who felt there were barriers to preventing stunting but had positive stunting prevention behaviour or stunting prevention efforts. Perceived barriers can be influenced by many factors, one of which is due to economic reasons.

The statistical test results in this study p-value 0.38 (p-value <0.05), which indicates a relationship between Perceived Barrier (perceived barriers) with stunting prevention efforts with stunting prevention efforts. When the relationship between perceived barriers and maternal behaviour in meeting children's nutritional needs is low, then efforts to prevent stunting in children will increase. The majority of respondents have a good

understanding and perception of vulnerability, seriousness and benefits, so perceived barriers will decrease. Mothers' perceptions of barriers have a major influence on their motivation or determination to take positive action to prevent stunting. However, there are additional factors that can cause mothers who face barriers to stunting prevention to be unaffected by stunting prevention behaviours. For example, mothers can seek information through electronic media and utilise the experiences of other mothers with toddlers to find solutions to the obstacles faced in implementing stunting prevention efforts.

This is in line with the Health Belief Model theory, namely everything that hinders can be seen from the perspective of high costs, perceived benefits, unsatisfactory and unpleasant health services, and support from family and others[16].

4.5 Relationship between Cues to action with stunting prevention efforts

Cues to action refer to factors that encourage individuals to perform a certain action or behaviour[6]. Cues influence a person's behaviour to perform an action or behaviour. These can be external signals such as messages delivered through mass media, advice from friends or family members, and sociodemographic aspects (Notoatmodjo, 2012). Cues to action are stimuli needed to trigger the decision-making process for health behaviour to occur. According to Rosenstock (1974), cues to action measure social and environmental influences that stimulate a person's desire to take health-related action. However, cues to action do not only come from external sources (e.g. mass media communication, personal interaction, information from health workers), but can also come from internal sources (e.g. disease symptoms). Cues to action in a behaviour are influenced by various factors that provide cues to a person to perform certain actions or behaviours[9]. These cues can come from external and internal factors, such as messages received from mass media, advice from friends or family members, as well as socio-demographic factors such as education, living environment, parental care, association with peers, religious beliefs, ethnic background, economic conditions, and other social and cultural factors.

The results showed that out of 89 respondents, most of them, 80 (89.9%) had the urge to make efforts to prevent stunting. The majority of respondents with high cues to action had efforts to prevent stunting in their children, namely 77 people and 3 people had no efforts to prevent stunting, while respondents with low cues to action were 4 people had efforts to prevent stunting in their children and 5 people had no efforts to prevent stunting in their children.

The statistical test results in this study are p-value = 0.00 (p-value <0.05), which indicates a relationship between cues to action and stunting prevention efforts. Most respondents received information about stunting from health centre health workers during posyandu so that it could encourage respondents to make efforts to prevent stunting. The higher the perception of vulnerability, perception of seriousness, perception of benefits, the higher the cue to action, otherwise the perception of obstacles will be low.

This research is in line with research conducted[16] with a value of ϱ = 0.037 (p = <0.05) which means that there is a relationship between cues to action (encouragement to act) on stunting prevention efforts. This study is not in line with research conducted[5] where the statistical results obtained a p value> 0.05 (p value = 0.113) which means that there is no significant relationship between cues to action and stunting prevention efforts. Another study conducted[9] also found that there was no significant relationship between cues to action and mothers' behaviour in meeting nutritional needs for their children, with a p value of 0.075. Although health workers consistently provided counselling on the importance of a nutritionally balanced diet, this did not directly lead to respondents adopting adequate behaviour in meeting nutritional needs. Demographic factors such as education and income, along with other reasons, may also influence mothers' behaviour in meeting their children's nutritional needs. Some reasons may include the lack of frightening experiences related to child malnutrition or the lack of cases of child deaths due to malnutrition in their neighbourhood. In addition, cues to action are also influenced

by other perceptions. The higher the perceptions of vulnerability, seriousness, benefits and confidence, the greater the likelihood of action, while perceptions of barriers are likely to be low.

Comparison with Previous Studies

4.6 The relationship between Perceived Susceptibility and stunting prevention efforts

Based on the results of bivariate analysis, it shows that there is a relationship between the perceived vulnerability variable and stunting prevention efforts. This research is in line with the concept of the Health Belief Model theory, namely that the higher the perception of vulnerability related to a disease increases prevention efforts. According to the Health Belief Model Theory, the existence of modifying factors such as age, gender, socio-economic, and education of a person will encourage behavioural changes that are preventive and even overcoming. A mother who has a good education will tend to realise the need for behaviour change in taking action to prevent stunting, by preparing for the needs from pregnancy to childcare until adulthood. Research conducted by Madyasari, et al found that there is a significant relationship between the level of education of mothers' knowledge about stunting and efforts to prevent stunting in toddlers[14].

main coach in children's health, food managers in the family, and have an important role in improving the nutritional status of family members[13]. This is in line with research conducted[19], that maternal education and knowledge have a significant relationship with stunting prevention efforts. In addition, research conducted[2] found that nutrition education or counselling about stunting by Puskesmas officers can increase maternal knowledge so that it can affect maternal efforts in preventing stunting. Another study conducted[17] showed that providing education about nutrition and stunting can increase understanding and attitudes towards meeting nutritional needs, which can then be an alternative method to improve health behaviour in an effort to prevent stunting. Based on the results of the study, all respondents in this study had received counselling about stunting from health workers during Posyandu. Research conducted[3] found that education or education about nutrition and stunting based on the Health Belief Model theory can reduce stunting. Another study conducted[12] found that educational interventions based on the Health Belief Model significantly increased mothers' knowledge and efforts in preventing stunting. The higher mothers understand the impact and cause of stunting and the benefits of preventing stunting, the better their efforts in preventing stunting in children. This increased awareness can be achieved through education, which plays an important role in stunting prevention. Therefore, this model can act as a framework for designing and implementing educational interventions for stunting prevention.

This study is in line with research conducted[16] where the statistical test results obtained a p-value of 0.00 (p-value <0.05). Another study conducted[9] also found that there was no relationship between perceptions of stunting prevention efforts (p-value = 0.382).

4.7 Relationship between Perceived Severity and stunting prevention efforts

The results of the analysis in this study show that the higher the perception of severity related to the negative impact of stunting, the more efforts to prevent stunting will increase. This research is in line with research conducted[13] where the statistical test results obtained a p value <0.05 (p value = 0.00) which means that there is a relationship between perceived severity and stunting prevention efforts. Another study conducted[16] found that there was a significant influence between perceptions of severity and efforts to prevent stunting, the higher the mother's perception of the negative impact of stunting that her child will experience, the better the mother's efforts in fulfilling child nutrition to prevent stunting. The decrease in the perception of seriousness or severity of stunting will affect the increase in stunting prevention efforts. Research conducted[12] found that educational interventions based on the Health Belief Model can significantly improve mothers' perceptions of the serious impact of stunting on their children so that mothers succeed in increasing their children's weight in order to prevent stunting.

This research is not in line with research conducted[9] where the results of the study show

that the perception of severity is not related to stunting prevention efforts (p value = 0.127).

4.8 The relationship between *Perceived Benefit* and stunting prevention efforts

The results of statistical tests in this study indicate a relationship between perceived benefits and efforts to prevent stunting. This research is in line with the research of[21] where the results of the statistical test obtained a p < 0,05 (p value = 0.00) which means that there is a significant relationship between the perception of benefits with the efforts to prevent stunting. Another study conducted[1] found that the more positive or higher the mother's perceived benefits of stunting prevention, the more likely she will adopt good stunting prevention behaviour. Respondents positively assessed the benfits of stunting prevention efforts. Individuals' belief in the effectiveness of existing measures in reducing disease risk or perceived benefits will increase positive attitude towards disease prevention behaviour, making them more likely to take preventive measures[10].

This research is not in line with other research conducted[9] where the results showed that most respondents had a good perception of benefits but the statistical test results showed that perceived benefits were not related to stunting prevention efforts (p value = 0.182), meaning that even though the perception of benefits owned by respondents was high, it did not affect behaviour or efforts to prevent stunting. Other research conducted[16] also found that statistically there was no relationship between perceived benefits and stunting prevention efforts.

4.9 The relationship between Perceived barriers and stunting prevention efforts

Mothers' perceptions of barriers have a major influence on their motivation or determination to take positive action to prevent stunting. However, there are some additional factors that can cause mothers who face barriers to stunting prevention to be unaffected by stunting prevention behaviours. For example, mothers can seek information through electronic media and utilise the experiences of other mothers with toddlers to find solutions to the obstacles faced in implementing stunting prevention efforts. This study is in line with[21], where the statistical test results obtained a p value = 0.003 (p < 0.05) which means that there is a significant relationship between perceived barriers and stunting prevention efforts. Research conducted[12] found that educational interventions based on the Health Belief Model can significantly improve the perception of maternal barriers, namely the perceived barriers have decreased significantly in the experimental group after the intervention, meaning that after the mother is given education, the experimental group understands the benefits of growth disorder prevention behaviour and experiences fewer obstacles in implementing the behaviour. This research is not in line with that conducted[5] where there is no relationship between perceived barriers and efforts to prevent stunting.

4.10 The relationship between Cues to action and stunting prevention efforts

The higher the perception of vulnerability, perception of seriousness, perception of benefits, the higher the cues to action, otherwise the perception of obstacles will be low. This study is in line with research conducted by[18] with a value of ϱ = 0.037 (p = <0.05) which means that there is a relationship between cues to action (encouragement to act) on stunting prevention efforts. This study is not in line with research conducted by Fadilah, et al (2020) where the statistical results obtained a p value> 0.05 (p value = 0.113) which means that there is no significant relationship between cues to action and stunting prevention efforts. Another study conducted[9] also found that there was no significant relationship between cues to action and maternal behaviour in meeting nutritional needs for their children, with a p value of 0.075.

5. Conclusions

The results of the analysis of this study indicate that the independent variables, namely perception of vulnerability (p value = 0.16), perception of severity (p value = 0.10), perception of benefits (p value = 0.44), perception of barriers (p value = 0.38) and action cues (p value = 0.00) are related to stunting prevention efforts.

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7. Conflicts of Interest

This research was conducted without any conflict of interest. The researchers, both individually and as a team, declare that there are no financial, professional, or personal relationships that could affect the objectivity, integrity, or results of the research. Funding, if any, comes from sources that have no interest in the results of the research. All research procedures, including data collection, analysis, and reporting, were conducted independently and in accordance with ethical principles of research. Thus, this research is free from bias or external pressures that could interfere with the validity of the findings.

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