Application of Health Belief Model Theory on Prevention of Stunting in Toddlers Through Nutritional Behavior

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ABSTRACT

Stunting is a chronic condition that describes stunted growth due to long-term malnutrition. Incidence of stunting is caused by not optimal nutrition. The purpose of this study in general was to find the effect of the Health Belief Model theory on effort to prevent stunting in toddlers through nutritional fulfillment behavior. The research is a quantitative study with an observational method and a cross sectional approach. The sample was 243 stunting mothers. The independent variables are perceived susceptibility, severity, barriers, cues to action, perceived benefit and self efficacy. Nutritional fulfillment behavior as an intermediate variable and stunting prevention as a dependent variable. The result show that simultaneously there was an effect of variabel X on Y with a significance value of 0,000 and a large effect of 10,2%. And simultaneously shows that there is an effect of variable X and Y of Z with a significance value of 0,000 and a large effect of 12,8%. Data analysis used path analysis. Simultaneousy, there is an effect of the application of Health belief model theory on effort to prevent stunting in toddlers through nutritional fulfillment behavior.

Keywords: Health belief model, nutrients, behavior, preventive, stunting

INTRODUCTION

The growth procces experienced by toodlers is a cumulative result since the toodlers was born. The conditions have potential to interfere with the fulfillment of nutrients, especially energy and protein in children, will cause growth problems (Hermina & Prihartini,2011). Stunting is children under five with chronic nutritional problems, who have nutritional status based on length or height according to the age of under five when compared with standar of Multicenter Growth Reference Study 2005, has a z-score less than -2 standar deviation and if the z-score less than -3 standar deviation is categorized as a very short toddler (Depkes RI, 2015). Prevalence of stunting in South Central Timor Regency in 2019 reached 48,1%. Children under five who were stunted at Kualin Health Center in 2019 reached 74,8% (Dinas Kesehatan Kabupaten Timor Tengah Selatan, 2019). This figure is still far from SDGs target of reducing the prevalence of stunting by up to 20%.

Health Belief Model theory is a model designed to encourage people to take positive health actions. The main concept of the health belief model theory is that healthy behavior is determined by individual beliefs or perceptions about disease and the means available to avoid the occurrence of a disease (Hall, 2012). Health Belief Model theory is based on 6 components, namely perceived susceptibility, perceived severity, perceived barrier, cues to action, perceived benefit and self-efficacy.

One of the ways to prevent and deal with stunting is by applying theory of behavior change, especially fulfilling good nutrition for toddlers by providing knowledge to mother and families to empower natural resources around to meet the nutritional needs of families, especially stunting toddlers. It also increases the motivation of health workers to increase maternal knowledge through health counseling on the behavior of fulfilling good nutrtion for mothers of toddlers to prevent increased stutning in toddlers. The purpose of this

study in general is to find the effect of theory behavior change, namely health belief model as an effort to prevent increased stunting in toddlers through nutritional fulfillment behavior.

MATERIALS AND METHODS

The research is a quantitative study, observational methods and cross sectional approaches. The study was conducted during August 2020. The independent variable are perceived susceptibility, severity, barrier, cue to action, benefit and self efficacy, nutritional fulfillment behavior a an intermediate variable and stunting prevention as dependent variable. Population was 621 stunting mothers and the samples was 243 people. The sample teqhnique used simple random sampling. The research instrument of all variables used quitionnaire. Data were analyzed using path analysis. This research has been through an ethical test conducted by the health research ethich commission of Institute of Science Health STRADA Indonesia with the numbel 2008/KEPK/VI/2020.

RESULTS

1. **Classic Assumption Test**
   a. *Normality Test with One Sample Kolmogorov-Smirnov Test*
      The results of normality tet in regression model 1 and 2 show the value of Asymp. Sig (2-tailed) of 0.200 more than $\alpha = 0.05$ so that the data is normally distributed.
   b. *Multicollinearity Test*
      The result shows values of tolerance in first and second model of each dependent and independent variables more than 0,1 (>0,1) and the value of VIF in first and second model of each dependent and independent variables less than 10 (<10) then multicollinearity does not occur so that it meets the requirements for the regression test.
   c. *Heteroscedasticity Test*
      The result of heteroscedasticity in the first and second model show that there is no clear pattern in the image of *scatterplot* and the dots spread above and below the number 0 on the Y axis so that the are no symptoms of heteroscedasticity
2. **Regression Analysis**
   a. *Determinant Coefficient Test*

Table 1. Detrmination Coefficient Test (R^2) model 1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.320[a]	.102	.080	2.355066

Table of determination coefficient show that the value of determination coefficient (R Square) of 0,102 so that the effects of variable X1, X2, X3, X4, X5 and X6 on Y simultaneously is 0,102 or 10,2%. Remaining effect was 89,8%. Value of e1 $= \sqrt{1 - 0,102} = 0,948$.

Table 2. Determination Coefficient Test (R^2) model 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.358[a]	.128	.102	1.858850

Table of determination coefficient show that the value of determination coefficient (R Square) of 0,128 so that the effects of variable X1, X2, X3, X4, X5, X6 and Y on Z simultaneously is 0,128 or 12,8%. Remaining effect was 87,2%. Value of e2 $= \sqrt{1 - 0,128} = 0,934$.

b. F Test

Table 3. F Test model 1

	ANOVAª				
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	149.427	6	24.904	4.490	.000[b]
Residual	1308.936	236	5.546		
Total	1458.362	242			

Table of F test show that the significance value is 0,000 < 0,005 so that simultaneously, there is effect of variable X1, X2, X3, X4, X5 and X6 on variable Y.

Table 3. F Test model 1

	ANOVAª				
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	119.466	7	17.067	4.939	.000[b]
Residual	812.001	235	3.455		
Total	931.467	242			

Table of F test show that the significance value is 0,000 < 0,005 so that simultaneously, there is effect of variable X1, X2, X3, X4, X5, X6 and Y on variable Z

c. t Test

Table 3. t Test model 1

|	Coefficientsª				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model	B	Std. Error	Beta		
1 (Constant)	32.267	4.705		6.857	.000
Perceived Susceptibility	.156	.066	.150	2.377	.018
Perceived Severity	.178	.062	.184	2.872	.004
Perceived Barries	.131	.062	.133	2.116	.035
Cues To Action	.148	.086	.106	1.716	.088
Perceived Benefits	-.151	.068	-.145	-2.207	.028
Self Efficacy	-.137	.065	-.135	-2.120	.035

Table of test t show that the value of significance variable X1 is 0,018 < 0,05 so that partially, variable X1 has effect directly on Y. Variable X2 is 0,004 < 0,05 so that partially, has effect directly on variable Y. Variable X3 is 0,035 < 0,05 so that partially, has effect directly on variable Y. Variable X4 is 0,088 > 0,05 so that partially, has no effect directly on veriable Y. Variable X5 is 0,028 < 0,05 so that partially, has effect directly on variable Y. Variable X6 is 0,035 < 0,05 so that partially, has effect directly on variable Y.

Table 4. t Test model 1

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	24.380	4.067		5.994	.000
	Perceived Susceptibility	.152	.052	.183	2.893	.004
	Perceived Severity	-.157	.050	-.203	-3.157	.002
	Perceived Barries	.065	.049	.083	1.323	.187
	Cues To Action	.144	.068	.130	2.101	.037
	Perceived Benefits	.025	.054	.030	.452	.652
	Self Efficacy	-.142	.051	-.175	-2.754	.006
	Perilaku pemenuhan gizi	-.135	.051	-.168	-2.620	.009

Table of test t show that the value of significance variable X1 is $0,004 < 0,05$ so that partially, variable X1 has effect directly on Z. Variable X2 is $0,002 < 0,05$ so that partially, has effect directly on variable Z. Variable X3 is $0,187 > 0,05$ so that partially, has not effect directly on variable Z. Variable X4 is $0,037 < 0,05$ so that partially, has effect directly on variable Z. Variable X5 is $0,652 > 0,05$ so that partially, has not effect directly on variable Z. Variable X6 is $0,006 < 0,05$ so that partially, has effect directly on variable Z. Variable Y is $0,009 < 0,05$ so that partially, has effect directly on variable Z

d. *Path Analysis*
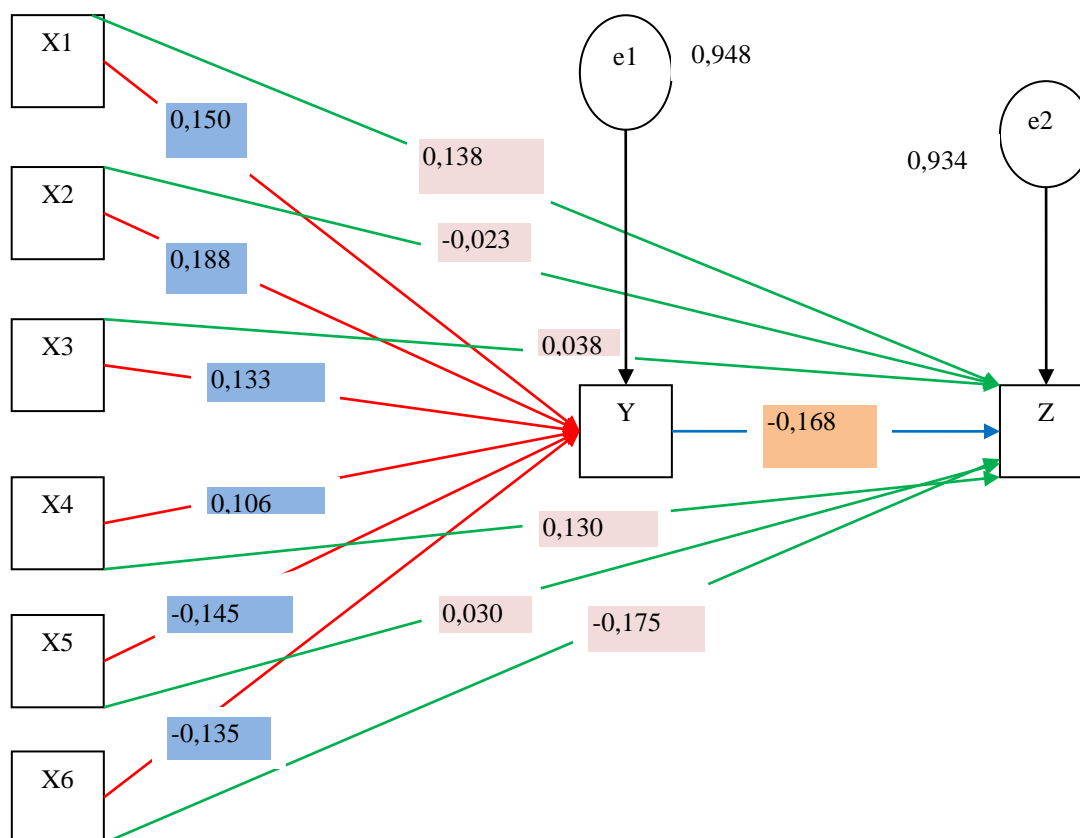
Picture Path Analysis

According to the picture above shows that :
1) Direct Effect

The direct effect of variable X on variable Y is based on value of standardized beta, show that X1 value of 0.150, X2 value of 0.188, X3 value of 0.133, X4 value of 0.106, X5 value of -0,145 and the X6 value of -0,135. The direct effect of variable X and Y on variable Z based on value of standardized coefficients beta show that X1 value of 0.183, X2 value of -0.203, X3 value of 0.083, X4 value of 0.130, X5 value of 0.030, X6 value of -0.175 and Y value of -0.168.

2) Indirect Effect

The indirect effect is known based on the formula Y = the value of X on Y multiplied by the direct effect of Y on Z. Based on picture above, it is known that the direct effect of X1 on Z through Y is -0.025, X2 on Z through Y of -0.032, X3 on Z through Y -0.022, X4 on Z through Y of -0.018, X5 on Z through Y of 0.025, X6 to Z through Y of 0.023.

3) Total Effect

The value of total effect is known based on addition of direct effect and indirect effect. Based on the picture above, it is known that the total effect of variable X1 on Z is 0.125, X2 on Z is 0.156, X3 on Z is 0.111, X4 on Z is 0.088, X5 on Z is -0.12 and X6 on Z is 0.122.

DISCUSSION

1. **Effect of Perceived susceptibility on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is a positive and significant effect between variable perceived susceptibility on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Rambu Eri Hupunau, et al (2019) show that there is no significant relationship between perceived susceptibility and maternal behavior in fulfilling nutrition in toddler. From the results of the analysis, it shows that the higher of perceived susceptibility regarding the understanding if the child.s condition and the belief in increasing the need for good nutrition for children, then the nutritional fulfillment behavior will be better.

Based on results of second regression model, it shows that partially there is a positive and significant effect between variable perceived susceptibility on variable revention stunting. According to Onoruoiza (2015) in Ratna Setiyaningsih, et al (2016), perceived susceptibility refers to a subjective assessment of the risk of health problems. Individuals who believe they have a low risk of disease are more likely to commit unhealthy actions, individuals who perceive a high risk are more likely to engage in behaviors to redurce their risk of developing disease. The results of the analysis study indivate that higher of mother toddlers has a good perception of susceptibility, then mother will be better at preventing stunting in her child.

There is an indirect effect between perceived susceptibility on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X1 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X1 on Y is 0.150 and beta value of direct effect of variable Y on variable Z is -0.168 so that 0.150 x (-0.168) = -0.025. then the total effects is the sum of the direct effect with indirect effect of 0.133. Based on the results of these calculations, it is known that the value of indirect effect of -0.025 is smaller than direct effect of 0.150. this shows that indirectly X1 through Y does not have a significant effect on Z. This means that variable nutritional fulfillment behavior does not become a good mediator.

2. **Effect of Perceived severity on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is a positive and significant effect between variable perceived severity on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Rambu Eri H, et al (2019) show that there is no significant relationship between perceived severity and maternal behavior in fulfilling nutrition in toddler. The results of analysis in this study indicate that the higher perceived severity to knowing the complications and impacts that will be experienced by the child if stunting problem not prevented, then better of mothers behavior in fulfilling nutrition of her child.

Based on results of second regression model, shows that partially there is a p and significant effect between variable perceived severity on variable revention stunting. The results of other studies conducted by Helmy Bachtiar, et al. (2017) show a relationship between perceived severity and effort to prevent DHF with a strong level of relationship. From the results of analysis of this study show that there is negative and significant effect between perceived severity on prevention stunting, it means that the decreasing perception of severity will have an effect on increasing efforts to revent stunting in toddlers. If there is high perceived severity of problem stunting in toddlers, it will encourage mothers to take good preventive measures. Based on theory Health Belief Model (Rosenstock, 1977) in Helmi Bachtiar (2017) it stated that the effort to act in preventing the occurrence of a disease and seeking treatment is influenced by perceived seriousness.

There is an indirect effect between perceived severity on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X2 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X2 on Y is 0.188 and beta value of direct effect of variable Y on variable Z is -0.168 so that 0.188 x (-0.168) = -0.032. Then the total effects is the sum of the direct effect with indirect effect of -0.055. Based on the results of these calculations, it is known that the value of indirect effect of -0.032 is smaller than direct effect of 0.188. This shows that indirectly X2 through Y does not have a significant effect on Z. This means that variable nutritional fulfillment behavior does not become a good mediator.

3. **Effect of Perceived barrier on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is a positive and significant effect between variable perceived barrier on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Retnayu Pradanie (2019) show that there is a very weak relathionship of perceived barrier and maternal behavior in fulfilling nutrition in toddler. The results of analysis in this study indicate that there a positive effect between perceived barrier on nutritional fulfillment behavior. This means that if there is a perception of obstacles such as anxiety in fulfilling nutrition needs due to a lack of knowledge of mother about good nutritional needs, inadequate access to services, lack of costs in fulfilling children's nutrition, it eill affect mothers in their effort to fulfill children's nutrition.

Based on the results of regression analysis in second model, shows that partially there is a positive and significant effect between variable perceived barrier on variable prevention stunting in toddlers. The results of another study conducted by Ratna Setyaningsih (2017) show that there is a negative relationship and significant between perceived seriousness with prevention hypertension. According to Hartzler et al (2014) in Ranti Asri (2017) said that the people who feel high inhibition, usually then to have poor prevention and self-management. From the results of analysis in this study, there is positive effect between perceived barriers on stunting prevention in toddlers, which means that if there is increase in the preventiom of obstacles, it will have negative effect on effort to prevent stunting in toddlers.

There is an indirect effect between perceived barrier on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X3 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X3 on Y is 0.133 and beta value of direct effect of variable Y on variable Z is -0.168 so that 0.133 x (-0.168) = -0.022. Then the total effects is the sum of the direct effect with indirect effect of 0.016. Based on the results of these calculations, it is known that the value of indirect effect of -0.022 is smaller than direct effect of 0.133. This shows that indirectly X3 through Y does not have a significant effect on Z. This means that variable nutritional fulfillment behavior does not become a good mediator.

4. **Effect of cues to action on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is no effect between variable cues to action on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Retnayu Pradanie (2019) show that there is no relathionship of cues to action and maternal behavior in fulfilling nutrition in toddler. The results of this study indicate that although the action cues lead to a positive direction and mothers thae more action on encouragement from family and counseling from health workers, does not have a significant effect on fulfillment of nutrition in toddlers. This could have happened because of education factors, most of whom have high school and junior high school education, so that it affects the knowledgeof mother about nutritional problems.

Based on the results of regression analysis in second model, shows that partially there is effect between variable cues to action on variable prevention stunting in toddlers. The results of another study conducted by Helmy Bachtiar (2007), it concluded that there is a relationship between the signal to take action with the revention DHF. The results of this study indicate a positive direction towards stunting prevention, which means that if the mother needs support from other people, health education activities to assist mothers in taking steps to prevent stunting in toddlers.

There is an indirect effect between cues to action on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X3 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X3 on Y is 0.106 and beta value of direct effect of variable Y on variable Z is -0.168 so that 0.106 x (-0.168) = -0.018. Then the total effects is the sum of the direct effect with indirect effect of 0.016. Based on the results of these calculations, it is known that the value of indirect effect of -0.018 is smaller than direct effect of 0.106. This shows that indirectly X4 through Y does not have a significant effect on Z. This means that variable nutritional fulfillment behavior does not become a good mediator.

5. **Effect of perceived benefit on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is a negative and significant effect between variable perceived benefit on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Retnayu Pradanie (2019) show that there is no relathionship of perceived benefits and maternal behavior in fulfilling nutrition in toddler. The results of this study indicate a negative effect between perceived benefit on nutritional fulfillment behavior in toddlers. This means that if the perception of benefits in terms of benefits obtained from an actiom decreases towards a negative direction, it will affect effort to fulfill nutrition in toddlers.

Based on the results of regression analysis in second model, shows that partially there is no effect between variable perceived benefit on variable prevention stunting in toddlers. The other research conducted by Dawiyah (2014) in Ratna Setiyaningsih (2016) concluded that there is a relationship between perceived benefit and effort to prevent hypertension. The results of this study indicate that there is no effect between perceived benefits on preventing stunting in toddlers. This occurs due to various factorsm including a lack of knowledge of mother about adequate nutritional needs for children, lack of funds to meet nutritional needs so that there is an assumption thaa there is no benefit in fulfilling nutrition. On the other hand, there is thought from the mother that if there is short toddlers is due to heredity.

There is an indirect effect between perceived benefit on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X5 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X5 on Y is -0.145 and beta value of direct effect of variable Y on variable Z is -0.168 so that -0.145 x (-0.168) = 0.025. Then the total effects is the sum of the direct effect with indirect effect of 0.055. Based on the results of these calculations, it is known that the value of indirect effect of 0.025 is bigger than direct effect of -0.145. This shows that indirectly X5 through Y have a significant effect on Z. This means that variable nutritional fulfillment behavior become a good mediator between variable perceived benefit on prevention stunting.

6. **Effect of self efficacy on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in first model, shows that partially there is a negative and significant effect between variable self efficacy on variable nutritional fulfillment behavior in toddlers. The results of another study conducted by Retnayu Pradanie (2019) show that there is no relathionship of self efficacy and maternal behavior in fulfilling nutrition in toddler. The results in this study indicate a negative effect between self-efficacy on nutritional behavior in toodlers. This means that if self-efficacy in this case is optomical sense, self-confidence and motivation decrease, or have a negative effect in nutritional fulfillment behavior in toddlers.

Based on the results of regression analysis in second model, shows that partially there is a negative and significant effect between variable self efficacy on variable preventing stunting in toddlers. The other research by Ratna Setiyaningsih (2016) show that there ia a relationship direct effect between self efficacy with prevention stunting behavior. According to Edberg (2010) in Ratna Setiyaningsih (2016), self-efficacy is a person's belief about the ability he has to do something. From the analysis of this study, there is a negative effect between self-efficacy on preventing stunting in toddlers, which means that is there a decrease in self-efficacy it will have a negative effect on increasing efforts to revent stunting in toddlers.

There is an indirect effect between self efficacy on prevention stunting through nutritional fulfillment behavior in toddler. The indirect effect is obtained from the multiplication of the direct effect of variable X6 on variable Y with beta value variabel Y on variable Z. It is known that beta value of the direct effect of X6 on Y is -0.135 and beta value of direct effect of variable Y on variable Z is -0.168 so that -0.135 x (-0.168) = 0.023. Then the total effects is the sum of the direct effect with indirect effect of -0.152. Based on the results of these calculations, it is known that the value of indirect effect of 0.023 is bigger than direct effect of -0.135. This shows that indirectly X6 through Y have a significant effect on Z. This means that variable nutritional fulfillment behavior become a good mediator between variable self efficacy on prevention stunting.

7. **Effect of perceived benefit on prevention stunting in toddler through nutritional fulfillment behavior**

Based on the results of regression analysis in second model, shows that partially there is a negative and significant effect between variable nutritional fulfillment behavior on variable preventing stunting in toddlers. Other research conducted by Sari Pediatri (2016) included that there is a relationship between adequacy of feeding and responsive feeding with the incidence of stunting. The other research conducted by Jelantik (2012) in Sanny (2015) said that mothers who have good nutrition, have children with good nutritional status. The analysis in this study shows that there is a negative effect between nutritional fulfillment behavior on preventing stunting. This means that if there is a decrease in good behavior from mothers to fulfill children's nutrition, it will have a negative effect on preventing stunting.

CONCLUSION

According to results of the research, included that :

1. The direct effect value of perceived susceptibility 0.150 is greater than indirect effect of -0.025 so that indirectly there is no effect between variable X1 on variable Z through variable Y.
2. The direct effect value of perceived severity 0.188 is greater than indirect effect of -0.055 so that indirectly there is no effect between variable X2 on variable Z through variable Y.
3. The direct effect value of perceived barriers 0.133 is greater than indirect effect of 0.022 so that indirectly there is no effect between variable X3 on variable Z through variable Y.
4. The direct effect value of cues to action of 0.106 is greater than indirect effect of 0.018 so that indirectly there is no effect between variable X4 on variable Z through variable Y.
5. The direct effect value of perceived benefits -0.145 is smaller than indirect effect of 0.025 so that indirectly there is effect between variable X5 on variable Z through variable Y.
6. The direct effect value of self efficacy -0.135 is smaller than indirect effect of 0.023 so that indirectly there is effect between variable X6 on variable Z through variable Y.
7. There are variables that affect on prevention stunting through variables nutritional fulfillment behavior namely perceived benefits and self efficacy. Meanwhile, variable perceived susceptibility, perceived severity, perceived barriers and cues to action had no effect on variable revention stunting through nutritional fulfillment behavior.

SUGGESTIONS

To prevent stunting, it is expected that there will be motivation from the families of toddlers and also from health workers to increase the knowledge of toddlers mother about behavior of fulfilling good nutrition. There needs to be a good perception and confidence in a person to turn bad behavior in to good behavior. Further researchers are encouraged to continue this research with independent variables and other variable intervening.

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CONFLICTS OF INTEREST

In the research that has been done, this research does not have a conflict of interest from other parties

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