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The Relationship Between Mothers' Knowledge about PHBS, Stunting, and Nutrition with Helminth Infection among Toddlers in Jember

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ABSTRACT

Helminth infections are still a problem in the world. According to WHO, children aged 1-4 years have a high morbidity of helminthic infections. The number of helminth infections in children is influenced by several factors, including PHBS (Clean and Healthy Living Behavior). In addition, children who are stunted or malnourished are prone to Helminth infections. This can be prevented with the role of the mother's knowledge regarding PHBS, stunting, and nutrition. This study aims to analyze the relationship between mother's knowledge about PHBS, stunting, and nutrition with Helminths in toddlers in Jelbuk District, Jember Regency. This research has a type of observational analytic research with a cross-sectional design. The population consists of mothers with toddlers aged 12-59 months in Jelbuk District, Jember Regency. The sampling technique used consecutive sampling and obtained 69 mothers. Knowledge was obtained from interviews using a questionnaire. Helminth infections in toddlers are obtained from stool examination using flotation techniques. Data analysis using Mann Whitney. The results showed that there were 4 toddlers (5.7%) who had Helminth infections. 3 toddlers were infected with Ascaris lumbricoides (4.34%), and the rest were hook Helminths (1.44%). The majority of mothers have good knowledge on all indicators of knowledge of PHBS and nutrition but lack of knowledge on stunting. Analysis using the Mann-Whitney test showed that there was a relationship with Helminths only on 2 indicators of PHBS, namely smoking (Sig. 2-tailed=0.036) and house cleanliness (Sig. 2-tailed=0.027). The conclusion of this study is that there is a relationship between knowledge of house hygiene and smoking with Helminths in children and there is no relationship between knowledge of health behavior, stunting, and nutrition. However, the results of this study need to be strengthened by further research because there are not too many research samples and improvements to the questionnaire used so that the results are more valid.

Keywords: brain tumor; pain; sleep quality; nursing

INTRODUCTION

Helminths are still a world health problem. Data from the WHO (World Health Organization) states that children aged 1-4 years who live in agricultural areas have a high morbidity rate of helminth infection. According to SSGI (Indonesian Nutritional Status Study) data for 2021, the prevalence of Helminths in children under five in Indonesia reaches 2.8% and the province of East Java ranks 17th highest with a prevalence rate of 2.4%. There is no data regarding the prevalence of Helminths in children under five in Jember Regency. Infection is also prone to occur in toddlers because the immune system is not yet fully developed (Moraes-Pinto et al., 2021).

In addition, research conducted by Nur (2020) shows that 3 factors influence Helminths in children: knowledge, environmental sanitation, and PHBS (Knowledge of Clean and Healthy Living). The application of PHBS to children is influenced by the level of PHBS knowledge possessed by parents, especially mothers (Maulidia and Hanifah, 2020). Research conducted by Maulin (2021) shows that 20% of mothers need better knowledge of PHBS. This can cause various health problems, one of which is helminthiasis. The Republic of Indonesia Ministry of Health in 2022 revealed that a risk factor that increases the potential for Helminthi infection is poor PHBS (Ministry of Health RI 2022). Research conducted by Lalangpuling (2020) revealed that more Helminths were found in children who did not habitually wash their hands after

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defecating. Clean and healthy living behavior that is implemented optimally, is able to prevent infection and malnutrition in children, namely stunting.

Stunting occurs during conception up to 1000 HPK (First Day of Life). In 2021, several districts in East Java have stunting rates above 10%, one of which is Jember Regency. The highest prevalence of stunting was in Jember Regency, which was 17.55%, which was found in Jelbuk District (Jember Health Office, 2022). An immune system that is not fully developed in stunted children is at high risk of infection, one of which is Helminth infection (Mutasa, 2022). As many as 30% of stunted children suffer from Helminths in Bulukumba Regency (Nurfaikatunnisa, 2021).

Child growth and development takes place at 1000 HPK so children's nutritional needs must be met to prevent stunting (Khadija et al, 2022). The government is intensifying the 1000 HPK program to increase mothers' knowledge about stunting and good nutrition in children (RI Ministry of Health, 2020a). Fulfillment of good and balanced nutrition will support the development of the child's immune system. The morbidity and mortality rates of infectious diseases increase in the condition of children with malnutrition or malnutrition (Degarege, 2022). One infection that is often found in cases of malnutrition is helminth infection. Research conducted by Rochmadina (2020) shows that 60% of children with Helminths have poor nutritional status. Research conducted by Maria (2020) on Helminths shows that high rainfall increases the transmission of helminthiasis. One of the districts in Jember Regency with a high rainfall rate is Jelbuk District. This condition is ideal for the development of intestinal worms in soil which is prone to attack toddlers.

The incidence of helminthiasis in toddlers, which is associated with mothers' knowledge about PHBS, nutrition, and stunting is rarely researched, both in Jember Regency and in other regions. Based on the description above, the researcher was interested in knowing the relationship between mother's knowledge about PHBS, nutrition, and stunting to Helminths toddlers in Jelbuk District, Jember Regency.

METHOD

This type of research is observational analytic with a cross-sectional research design. This research was conducted in 2 villages in Jelbuk District, namely Panduman Village and Jelbuk Village, Jember Regency from August 2022 to January 2023. The population in the study were mothers with toddlers aged 12-59 months who lived in Panduman Village and Jelbuk Village, Jelbuk District, Jember Regency. The number of samples in this study were 69 mothers who met the inclusion and exclusion criteria. The sampling method in this study was consecutive sampling.

Methods of data collection through interviews to mother of toddler using questionnaires and examination of faeces in toddlers at the Laboratory of Parasitology, Faculty of Medicine, University of Jember. Researchers chose mothers of toddlers who would become research objects using inclusion criteria, namely living with toddlers in the Jelbuk sub-district, having a working duration of less than 5 hours, and agreeing to fill out a questionnaire and take their toddler's stool for research. Interviews using a questionnaire were used to obtain information on mother's knowledge and this activity is carried out at the *Posyandu* when mothers with toddlers gather to check the health of their toddlers. The questionnaire in the study has passed the validity and reliability tests. Examination of feces in toddlers using the flotation technique to get Helminth infections. The data analysis used was univariate analysis to find out the description of the variables. Bivariate analysis was also used to determine whether there was a relationship between the 2 variables using the Mann Whitney test.

This research has an ethical issue, namely the waste disposal protocol system in the form of faeces and the provision of complete identity for both the subject and the person in charge of the research. In addition, this research has received approval from the ethical commission from the Faculty of Medicine, University of Jember with ethical clearance number 1721/H25.1.11/KE/2023.

RESULT

Based on Table 1, the majority of toddlers who are the object of research are female, namely 37 (53.6%). Meanwhile, the other 32 infants (46.4%) were male.

Volume 3, Number 3 (September 2023)
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p-ISSN: 2798-5059

Table 1. Frequency Distribution Based on Gender of Toddlers

Characteristic	Frequency (n)	Percentage (%)
Gender		
Boy	32	46.4
Girl	37	53.6

Table 2 shows that the research respondents were dominated by mothers aged 20-30 years, namely 52 toddlers (75.4%). Most of the mothers had a high school level of education with 26 toddlers (37.7%). The majority of mothers have jobs as housewives (IRT), namely as many as 58 toddlers (84.1%).

Table 2. Frequency Distribution based on Age, Education Level, and Mother's Occupation

Characteristic	Frequency (n)	Percentage (%)
Age		
Under of 20-year-old	2	2.9
20 - 30-year-old	52	75.4
Over 30-year-old	15	21.7
Level Education		
Elementary School	24	34.8
Junior High School	18	26.1
Senior High School	26	37.7
College	1	1.4
Occupation		
Housewife	58	84.1
Farmer	6	8.7
Private	5	7.2

Table 3 shows that 4 people or 5.8% of the total respondents (69) were positively infected with Helminths. Ascaris lumbricoides Helminths caused the majority in 3 toddlers. Infected of hook Helminth in 1 toddler.

Table 3. Distribution of Helminth Infection

Helminth infection	Frequency (n)	Percentage (%)
Infection Status		
Positive	4	5.8
Negative	65	94.2
Type of Helminth		
A. lumbricoides	3	33.3
T. trichiura	0	0
Hook Helminth	1	66.6

The frequency distribution of mothers' PHBS knowledge levels can be seen in Table 4. Mother's PHBS knowledge was adapted from 6 of the 10 indicators of PHBS households of the Indonesian Ministry of Health. The sample data shows that most mothers have good knowledge about clean water, namely 55 mothers (79.7%). The second PHBS knowledge indicator is regarding the availability of healthy latrines, the majority of mothers have a good level of knowledge, namely 42 mothers (60.9%). The third indicator of PHBS knowledge is house cleanliness. It was found that the majority of mothers had a good level of knowledge, namely 29 mothers (42%). As for PHBS knowledge regarding smoking, the majority of mothers had good knowledge, namely 28 mothers (40.6%). The fifth PHBS knowledge indicator regarding waste disposal, it was found that the majority of mothers had good knowledge, namely 45 people (65.2%). The last PHBS indicator, namely fruit and vegetable consumption, found that most mothers had good knowledge, namely 37 people (53.6%).

Volume 3, Number 3 (September 2023)
e-ISSN: 2798-5067
p-ISSN: 2798-5059

Table 4. Distribution of Mother's PHBS Knowledge

PHBS Knowledge	Frequency (n)	Percentage (%)
Clean water facilities		
Good	55	79.7
Enough	11	15.9
Bad	3	4.3
Availability of healthy latrines		
Good	42	60.9
Enough	10	14.5
Bad	17	24.6
House cleaning		
Good	29	42
Enough	25	36.3
Bad	15	21.7
Smoking		
Good	28	40.6
Enough	21	30.4
Bad	20	29
Waste disposal		
Good	45	65.2
Enough	14	20.3
Bad	10	14.5
Consumption of fruit and vegetables		
Good	32	46.4
Enough	23	33.3
Bad	14	20.3

In Table 5. the distribution of knowledge about stunting is examined and grouped into levels, namely good, fair, bad. Based on the results of the study, it was found that the majority of mothers had poor knowledge about stunting, namely 48 mothers (69.6%).

Table 5. Distribution of Mothers' Knowledge of Stunting

Variable	Frequency (n)	Percentage (%)
Knowledge of stunting		
Good	6	8.7
Enough	15	21.7
Bad	48	69.6

In Table 6. the distribution of nutrition knowledge is examined and grouped into several levels, namely good, fair, bad. Based on the study's results, it was found that most mothers had good knowledge about nutrition, namely 39 mothers (56.5%).

Table 6. Distribution of Mother's Nutritional Knowledge

Variable	Frequency (n)	Percentage (%)
Knowledge of nutrition		
Good	39	56.5
Enough	21	30.4
Bad	9	13.1

Table 7 shows the results of tests on the relationship between knowledge of PHBS, stunting, and maternal nutrition with Helminth infection. Most of the Helminth's infections in toddlers were found in mothers with good knowledge on all PHBS indicators. However, Helminths were found more in mothers with bad knowledge regarding stunting and nutrition.

Volume 3, Number 3 (September 2023)
e-ISSN: 2798-5067
p-ISSN: 2798-5059

Table 7. Relationship between Knowledge of PHBS, Stunting, and Nutrition with Helminthic Infections in Toddlers

Variable	Helminthic Infection				Total		Sig. (2-tailed)
	Negative		Positive				
	n	%	n	%	n	%	
Knowledge Level of Clean Water Facilities							
Good	51	92.7	4	7.3	55	100	0.304
Enough	11	100	0	0	11	100	
Bad	3	100	0	0	3	100	
Knowledge Level of Healthy Latrines							
Good	38	90.5	4	9.5	42	100	0.111
Enough	10	100	0	0	10	100	
Bad	17	100	0	0	17	100	
Knowledge Level of house cleansing							
Good	25	86.2	4	13.8	29	100	0.027
Enough	25	100	0	0	25	100	
Bad	15	90	0	0	15	100	
Knowledge Level of Smoking							
Good	27	87.1	4	12.9	31	100	0.036
Enough	19	100	0	0	19	100	
Bad	19	100	0	0	19	100	
Knowledge Level of Water Disposal							
Good	42	93.3	3	6.7	45	100	0.573
Enough	13	92.9	1	7.1	14	100	
Bad	10	100	0	0	10	100	
Knowledge Level of Vegetable and Fruit Consumption							
Good	28	87.5	4	12.5	32	100	0.077
Enough	23	100	0	0	23	100	
Bad	14	100	0	0	14	100	
Knowledge Level of Stunting							
Good	6	100	0	0	6	100	0.194
Enough	15	100	0	0	15	100	
Bad	44	91.7	4	8.3	48	100	
Knowledge Level of Nutrition							
Good	38	97.4	1	2.6	39	100	0.409
Enough	20	95.2	1	4.8	21	100	
Bad	7	77.8	2	22.2	9	100	

DISCUSSION

The number of samples in this study were 69 samples consisting of 69 mothers and 69 toddlers. The characteristics of the respondents in this study can be seen in Table 1. The results in Table 2 show that the sex of the 69 toddlers who became the sample was 32 boys (46.4%) and 37 girls (52%). After examining the feces, 4 out of 69 toddlers (5.79%) had Helminth infections, as can be seen in Table 3. The Helminth eggs found were mostly A. lumbricoides eggs, namely 3 eggs and 1 other egg. Hookworm (WHO, 2022). The results of this study are in accordance with data from WHO 2020 concerning helminthic infections that most of the incidence of helminthic infections is dominated by type A. lumbricoides and hook Helminths. by Helminths type A. Lumbricoides (Konoralma et al., 2022). Research in Cameroon in 2020 has the same results, namely the majority of children are infected with Ascaris lumbricoides worms (10.5%), while those affected by hookworm are (3.2%) (Nganji N et al., 2020). Ascaris lumbricoides and hookworm is able to suppress human immune activity so that it can develop and live longer. This condition worsens in young children because the immune system is still underdeveloped. According to the CDC 2020 explained, the Trichuris trichiura type worm often attacks adults, while the object of this research is toddlers, so it was not found in this study.

The prevalence of helminthic infections in toddlers in this study was 5.79%, very little compared to toddlers not infected with helminthiasis. This prevalence is lower than a study by Ketrina which found that 20% of children under five had Helminth infections in Manado Regency (Ketrina, 2022). This low prevalence was also influenced by the sampling that coincided with routine deworming administration held by the Jelbuk Community Health Center (Puskesmas). In addition, even though the Jelbuk area has a suitable climate for developing intestinal worms, Jelbuk is not an area with high cases

of intestinal worm infection. The difference in Helminth infection rates was also caused by many factors, including the application of PHBS (Clean and Healthy Behavior), sanitation environment, and socio-economic (Rahma et al., 2020). Even though the Helminth infection rate is low, preventive measures to reduce the incidence of Helminth infection need to be done.

Based on gender, helminthic infections in this study were dominated by male toddlers, namely 3 toddlers and the remaining 1 toddler was a girl toddler. The results of this study are in accordance with Annida's research which showed that male toddlers experienced more helminthic infections than female toddlers (Annida, 2018). These results are the same as Elfu's 2018 study regarding the epidemiology of hookworm in school-age children, namely that hookworm attacks more male than female children. However, the difference is not too far (Elfu Feleke, 2018). 5 Male toddlers experienced higher helminthic infections due to high outdoor play activity and the majority of play areas using soil. But toddler girls also have the same habit. Tapiheru's 2021 research reinforces this that helminthiasis infection is not influenced by age but is more influenced by personal hygiene and environmental sanitation (Tapiheru, 2021). Based on the results of observations conducted in Jebuk and Panduman villages, males and female play the same way, namely playing using soil media and rarely wearing footwear when playing.

Based on sociodemographic data, Helminthinfection in this study was found in toddlers aged 2 and 4 with the same number of 2. In toddlers aged 3 and 5 years, no helminthic infections were found. There was no significant difference between the ages of toddlers and Helminth infections.

Based on the analysis carried out on the indicators of clean water facilities, the results of the analysis test using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.304 which shows that there is no relationship between the level of knowledge of mothers regarding water and helminthiasis toddlers. However, In Table 7, As many as 4 toddlers with worms were found in mothers with good knowledge about clean water facilities. Good knowledge is often not accompanied by appropriate behavior so helminthic infections are still found in knowledge in the good category. Based on the observations of researchers, most of the mothers of toddlers using clean water facilities in the form of old drilled wells and around the wells, which are still soil. This allows worm infection to occur due to polluted water (Novianty, 2018).

Based on the analysis carried out on the indicator of the availability of healthy latrines, the analysis using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.111 which shows that there is no relationship between the level of knowledge of mothers regarding the availability of healthy latrines and worms in toddlers. However, in Table 7, findings of helminthic infection were found in toddlers who had mothers with good knowledge. The behavior to have healthy latrines begins with good knowledge about the benefits of building healthy latrines. However, socio-economic factors prevent the community from building healthy latrines (Novianty, 2018). Healthy latrines are very important to prevent helminthic infections because, according to Idialusi research, most children with worm infections have unhealthy latrines (IdiaLusi, 2018).

Based on the analysis carried out on the indicators of house cleanliness, the results of the analysis test using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.027 which shows a relationship between mothers' knowledge level regarding home cleanliness and worms in their toddlers. This analysis is strengthened with the results of the study in Table 7 which shows that helminthic infections were experienced by 4 toddlers (13.8%) who had mothers with good knowledge of house hygiene. Knowledge is the basis Based on the analysis that has been carried out on the indicators of house cleanliness, the results of the analysis test using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.027 which shows a relationship between mothers' knowledge level regarding home cleanliness and worms in their toddlers. This analysis is strengthened with the results of the study in Table 7 which shows that helminthic infections are experienced by 4 toddlers (13.8%) who have mothers with good house cleaning knowledge. Knowledge is the basis for someone to do something. Mothers who have less knowledge about house cleaning, can apply this to daily life so that helminthic infections are found in their children. The house's condition that is not kept clean can cause helminth infections (Ideham, 2012). According to Prof. Imam Suprayogo in 2016, the knowledge a person has is only sometimes in line with the behavior applied. this is me because there are still worm worms found in mothers with good knowledge about house hygiene. According to the researchers' observations, in addition to the knowledge possessed by mothers, behavior in implementing good home hygiene is influenced by economic factors. Questions about a good house floor and ideal room capacity were mostly answered incorrectly by women with a low economic level who have a house floor made of dirt and rooms filled with more than 4 people.

Based on the analysis carried out on the smoking indicator, the analysis test results using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.036 which shows that there is a relationship between the level of knowledge of mothers about smoking and helminthiasis in children. Table 7 also shows that helminthic infection, is experienced by toddlers with mothers with good smoking knowledge. Good knowledge is often not accompanied by appropriate behavior so helminthic infections are still found in knowledge in the good category. According to researchers, most of the respondent's families still have good smoking habits at home and outside. Cultural factors influence this in the

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village, where most are still active smokers (Salsabila, 2022). According to the CDC in 2014, smoking habits can reduce the performance of the body's immune system to fight infectious diseases, both smokers and those who inhale cigarette smoke. The mother who has a history, if you are exposed to cigarette smoke during pregnancy, the baby you are carrying will be at risk for Low Birth Weight (LBW). This causes the baby to have a low immune system and is prone to infection (Hanum, 2016).

Based on the analysis carried out on the garbage disposal indicator, the results of the analysis test using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.573, which shows no relationship between the level of mother's knowledge regarding garbage disposal with helminthic toddlers. Table 7 also shows that helminthic infections are experienced by toddlers who have mothers with good waste disposal knowledge, namely 3 toddlers (4.34%) and only 1 toddler (1.44%). Worm infection rates are still found in mothers with good knowledge. This is influenced by several factors, one of which is waste disposal. According to the researchers' observations, mothers in Jelbuk and Panduman villages must wash their hands properly after taking out the trash. This can be an entry point for helminthic infections (Alifariki, 2020). Therefore, helminthiasis rates are the same at good and sufficient knowledge levels.

Based on the analysis carried out on fruit and vegetable consumption indicators, the results of the analysis test using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.07 shows no relationship between the mother's knowledge about fruit and vegetable consumption level with helminthic toddlers. Table 7 also shows that helminthic infections are experienced by toddlers who have mothers with good knowledge of fruit and vegetable consumption, namely as many as 4 toddlers (12.5%). The worm infection rate is still found in mothers with good knowledge. This can be caused because the behavior applied by the mother is not in accordance with the knowledge she has. Consumption of fruits and vegetables can increase the immune system so that it can reduce the number of infectious diseases. Good knowledge about the consumption of vegetables and fruit, but not accompanied by the behavior of washing fruits and vegetables especially, will increase the risk of worm infection (Moreb,2021).

Based on the analysis carried out on the stunting indicator, the analysis test results using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.194 which shows that there is no relationship between the level of knowledge of mothers regarding stunting and helminthiasis in toddlers. According to Anita's research in In 2019, several factors influenced the knowledge level of mothers on stunting, namely information, age, and education.The most influencing factor was information with an OR (Odds Ratio) value of 30.988, which means information 30,988 times in increasing mother's knowledge (Anita, 2019). Based on the researchers' observations, the majority of mothers in Jelbuk District did not know about the basic definition of stunting and knew that stunting was measured based on underweight. Based on the researchers' interviews with midwives, socialization about stunting was carried out during the month of weighing, namely February and August. This can lead to mothers' lack of knowledge about stunting because mothers rarely get this information. The factors of education and age do not really affect because mothers who have less knowledge are owned by all levels of education and various ages (Novelia et al, 2021).

Table 7 also shows that helminthic infections are experienced by toddlers who have mothers with poor stunting knowledge, namely 4 toddlers (5.7%). Knowledge is very closely related to behavior. Poor knowledge of mothers about stunting makes toddlers prone to stunting. Stunting can cause many negative things, one of which is that the immune function cannot work perfectly so that children are susceptible to infectious diseases (Ministry of Health RI, 2018). This can cause worms in toddlers found in mothers with low knowledge of stunting. Therefore, preventive measures are needed in the form of increasing stunting knowledge and efforts to prevent stunting, namely the 1000 HPK program by midwives and Posyandu cadres so that all mothers are able to prevent stunting for generations to come.

Based on the analysis carried out on the nutrition indicator, the analysis test results using the Mann-Whitney test obtained a significance value (Sig. (2-tailed) of 0.194 which shows no relationship between mothers' level of knowledge about nutrition and helminthiasis in children. Mother's knowledge plays an important role in fulfilling nutrition in toddlers. This is supported by Nurmaliza's research in 2019 which showed that the majority of toddlers with good nutritional status have mothers with good nutritional knowledge (Nurmaliza, 2019). Children aged 5 years are vulnerable to infectious diseases because their immune systems are not yet developed perfectly (Unawekla, 2018). This can be overcome in various ways, including providing good nutrition for toddlers (Yendi, 2017). Mother's knowledge in determining nutritious food for children will also reduce the incidence of stunting in a child (Rudolfo et al., 2022). As explained above, reducing the risk of a child suffering from stunting improves the child's immune system. The immune system of toddlers also develops optimally by providing good and balanced nutrition. This makes toddlers resistant in dealing with infectious diseases. This statement is supported by the study's results in Table 7, namely that children with worms were found more often in mothers with poor nutritional knowledge, namely 2 toddlers (22.2%).

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e-ISSN: 2798-5067
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CONCLUSION

Based on the results and discussion of the study, it can be concluded that there is a relationship between the indicators of PHBS knowledge, namely smoking habits, and house cleanliness, with helminthic infections in toddlers. The PHBS knowledge indicators, namely clean water facilities, garbage disposal, healthy latrines, clean water consumption, and knowledge of stunting and nutrition have no relationship with helminthic infections in toddlers.

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