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The Correlation between Personal Hygiene and Food Processing in Diarrhea Occurrences on Post-Earthquake and Liquefaction Toddlers in Refugee Camps of Biromaru Public Health Center

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Abstract

Diarrhea can infect victims of disasters due to the poor sanitation and the unavailability of clean water facilities caused by disaster damage. Biromaru Public Health Center is the health center with the highest diarrhea cases in earthquakes and liquefaction disasters. The purpose of this study was to determine the relationship between personal hygiene and food processing on the incidence of diarrheal diseases in post-disaster toddlers in the evacuation area of Biromaru Public Health Center. This research is analytic observational. Samples in the study were 130 respondents, taken using the proportional stratified random sampling method. Data were analyzed using univariate and bivariate analysis with a chi-square test using α = 5%. Chi-square test results showed hand washing with soap habits (ρ = 0,000), nail hygiene (ρ = 0,000) and food processing (ρ = 0,000). The conclusion of this study there is a relationship between hand washing with soap habits with the incidence of toddler diarrhea in the refugee working area of the Biromaru Public Health Center, there is a relationship between nail hygiene with the incidence of toddler diarrhea in the refugee working area of the Biromaru Public Health Center, and there is a relationship between food processing and the incidence of toddler diarrhea in the refugee working area of the Biromaru Public Health Center. We expected mothers/caregivers of toddlers to take hand washing with soap actions, maintain nail hygiene, and process food properly.

Keywords : Diarrhea, Personal Hygiene, Food Processing

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I. INTRODUCTION

Diarrheal disease in young children (toddlers) seems increasingly common in various tropical countries, especially in dirty and dense urban areas. The method of bottle-feeding results in very dangerous things. Diarrhea can last several days and can cause the body to lose the fluids needed for survival. Most people who die from diarrhea due to severe dehydration and fluid loss (Irianto, 2014). Diarrhea ranks 9th out of 10 diseases that can cause death in the world. Deaths caused by diarrheal diseases decreased by almost 1 million cases between year 2000 and 2016 but still caused 1.4 million deaths in 2016. Countries with low-income levels, diarrhea is a disease that can cause the second-largest death after Acute Respiratory Infection (ARI) with a Crude Death Rate (CDR) reaches 60 per 100,000 population. Countries with a low-income level down, diarrhea is still one of the 10 diseases that cause death. Diarrhea occupies the 6th position with a CDR reaching 40 per 100,000 population (Oza et al., 2014). Diarrhea is the disease that causes the most deaths in children, accounting for around 8% of deaths in children under 5 years worldwide in 2016. Most deaths in children less than 2 years old due to diarrhea living in South Asia and Sub-Saharan Africa (Murray & Newby, 2012).

Diarrhea case finding in Indonesia reached 7,077,299 cases and only 4,274,790 cases were handled (60.4%). The highest diarrhea cases were in the province of West Java with 1,297,021 cases. While the lowest diarrhea cases are in the province of North Kalimantan with a total of 18,659 cases. Central Sulawesi ranks 22nd with 80,091 cases of diarrhea. Only 57,500 cases can be handled. This means that only 71.8% of cases can be handled. Based on death data, there were 4 cases of death caused by diarrhea (Kurniawan, 2019).

Diarrhea cases that occurred due to the PASIGALA disaster (Palu, Sigi, and Donggala) totaled 2244 cases. For the Palu area, there were 837 cases, Sigi Regency had 444 cases, and Donggala District had 963 cases. Sigi Regency ranks 3rd for diarrhea cases. Sigi Regency has 9 Health Center. Diarrhea cases that occur in each Health Center, namely for Baluase HC 11 cases, Biromaru HC 259 cases, Dolo HC 80 cases, Kaleke HC 40 cases, Kamaipura HC 9 cases, Kinovaru HC 0 cases, Marawola HC 11 cases, Pandere HC 20 cases, and Tinggede HC 14 cases (Purnama et al., 2020).

Biromaru Public Health Center is one of the health services in Sigi Biromaru District with inpatient facilities. Out of the 9 Health Center in Sigi district, Biromaru Public Health Center is the Health Center (HC) with the highest diarrhea cases in the earthquake and liquefaction disaster. According to preliminary data, the number of cases of diarrhea is 259 cases. Biromaru Public Health Center has a work area that is divided into 18 villages. Of the 18 villages, only 4 villages have refugee points, namely Pombeve Village, Mpanau Village, Lolu Village, and Sidera Village. In 2017, there were 404 cases of diarrhea in infants at Biromaru Health Center. Whereas in 2018,

cases of diarrhea in infants occurring at the Biromaru Health Center increased to 647 cases. Case data in the month before the disaster, namely January-August, the highest number of diarrhea cases occurred in July amounted to 46 cases. In the aftermath of the disaster, there was an increase in cases from 30 cases in September, 81 cases in October, 172 cases in November 2018. While in December 2018 there was a decrease of 70 cases (PUSKESMAS Biromaru, 2018).

Data from the village area of Pombeve, cases of diarrhea for infants amounted to 25 cases with the number of family heads (KK) 140 and the number of toddlers 261 inhabitants (9.58%). In the Mpanau village area under five cases of under-five diarrhea occurred with a total of 299 HHs and 63 under-fives (30.16%). Data from the Lolu Village area occurred in cases of toddler diarrhea by 8 cases with a KK of 428 and several toddlers 150 people (5.3%). Data from the Sidera Village area occurred in 15 cases of under-five diarrhea with 115 HHs and 30 under-fives (50%) (PUSKESMAS Biromaru, 2018).

Based on these problems, researchers are interested in researching the relationship between personal hygiene and food processing to the incidence of diarrheal disease in post-disaster toddlers in the refugee area of the Biromaru Public Health Center.

II. METHOD

This type of research is an analytic observational epidemiological study using a cross-sectional study approach. This research was conducted in 4 points of evacuation posts in the working area of Biromaru Public Health Center, namely in the villages of Pombeve, Mpanau, Lolu, and Sidera in March to April 2019. The population in this study were all toddlers (0-59 months) who were in 4 posts evacuation of Biromaru Public Health Center working area as many as 504 children under five. In determining the sample size, the Standley Lemeshow formula was used with the results of 130 respondents. Data analysis was performed with the Chi-Square test with a degree of confidence of 95% ($\alpha = 0.05$).

III. RESULTS

Based on table 1 shows that the most age group of respondents is in the age group of 25-34 years which is 80 people (61.5%), while the lowest in the age group >55 years are as many as 1 people (0.8%). Most of the respondents had the most recent elementary and high school education as many as 38 people (29.2%), while the lowest in the last education did not go to school namely as many as 10 people (7.7%).

Based on the type of work, the majority of respondents did not work as many as 105 people (80.8%), while the lowest in other types of work were as many as 3 people (2.3%). The highest

age group of toddlers is in the age group 13-24 months with some 33 toddlers (25.4%), while the lowest age group of toddlers is in the age group 49-59 months with some 15 toddlers (11.5%).

Table 1. Univariate Analysis of Respondent

Characteristics	n	%
Respondents Age		
15 – 24	18	13,8
25 – 34	80	61,5
35 – 44	25	19,2
45 – 54	6	4,6
> 55	1	0,8
Education		
Uneducated	10	7,7
Elementary School	38	29,2
Middle School	29	22,3
High School	38	29,2
College	15	11,5
Occupation		
Unemployment	105	80,8
Farmer	6	4,6
Entrepreneur	8	6,2
Civil Servant	8	6,2
Others	3	2,3
Toddlers Age (in Month)		
0 – 12	30	23,1
13 – 24	33	25,4
25 – 36	27	20,8
37 – 48	25	19,2
49 – 59	15	11,5
Toddlers Gender		
Male	67	51,5
Female	63	48,5
Total	**130**	**100**

Based on the gender of toddlers, namely the male as many as 67 children (51.5%), while the female as many as 63 children. In table 2 shows that the distribution of respondents based on the incidence of diarrhea, namely 96 toddlers with diarrhea with a percentage of 73.8%, while those without diarrhea as many as 34 people with a percentage of 26.2%. Based on handwashing using soap the most is 107 people with bad hand washing with soap with a percentage of 82.3%, while good CTPS with 23 people with a percentage of 17.7%. Distribution of respondents based on nail hygiene is the most, namely not treating nails as many as 79 people with a percentage of 60.8% while caring for nails as many as 51 people with a percentage of 39.2%. Based on the most food processing, namely 93 people with poor processing with a percentage of 71.5%, while good processing as many as 37 people with a percentage of 28.5%.

Table 2: Univariate Analysis of Respondent Frequency Distribution Based on Diarrhea Occurrence, Handwashing with Soap, Nail Hygiene and Food Processing

Variables	n	(%)
Diarrhea Occurences		
Yes	96	73,8
No	34	26,2
Hand washing with soap		
Good	23	17,7
Bad	107	82,3
Nail Hygiene		
Caring	51	39,2
Not Caring	79	60,8
Food Processing		
Good	37	28,5
Bad	93	71,5
Total	**130**	**100**

Table 3. Bivariate Analysis Based on Handwashing with Soap, Nail Hygiene, and Food Processing Against Incidence of Diarrhea in Toddlers in the Work Area of Biromaru Public Health Center

Variabel	Diarrhea Occurrences				Total		*P*
	Yes		No				
	n	%	n	%	N	%	
Hand washing with soap							
Bad	94	87,9	13	12,1	107	100	0,000
Good	2	8,7	21	91,3	23		
Nail Hygiene							
Caring	76	96,2	3	3,8	79	100	0,000
Not Caring	20	39,2	31	60,8	51		
Food Processing							
Bad	91	97,8	2	2,2	93	100	0,000
Good	5	13,5	32	86,5	37		
Total	**96**	**73,8**	**34**	**26,2**	**130**	**100**	

In table 3, bivariate analysis based on washing hands with soap with diarrhea shows that of the 107 respondents who had poor hand washing with soap behavior, 94 children (87.9%) had diarrhea and 13 children (12.1%) did not suffer from diarrhea, whereas from of the 23 toddlers who have good hand washing with soap there are 2 toddlers (8.7%) who suffer from diarrhea and 21 toddlers (91.3%) do not suffer from diarrhea. Chi-Square test results $\rho = 0{,}000$ so that $\rho < 0.05$ then H0 in this study was rejected, meaning that there is a relationship between handwashing with soap and the incidence of diarrhea in infants in the working area of Biromaru Public Health Center.

Based on the variable of nail hygiene with the incidence of diarrhea showed that of 79 respondents who did not care for nails there were 76 toddlers (96.2%) who suffered diarrhea and 3 toddlers (3.8%) did not suffer from diarrhea, whereas of 51 respondents who treated nails there were 20 toddlers (39.2%) who suffer from diarrhea and 31 toddlers (60.8%) do not suffer from diarrhea. Chi-Square test results $\rho = 0{,}000$ so that $\rho < 0.05$ then H0 in this study was rejected,

meaning that there is a relationship between nail hygiene and the incidence of diarrhea in infants in the working area of Biromaru Public Health Center.

Based on the variable food processing with the occurrence of diarrhea shows that of 93 respondents who have poor processing there are 91 toddlers (97.8%) who suffer from diarrhea and 2 toddlers (2.2%) do not suffer from diarrhea, whereas of 37 respondents who have good processing there are 5 toddlers (13.5%) who suffer from diarrhea and 32 toddlers (86.5%) do not suffer from diarrhea. Chi-Square test results ρ = 0,000 so that ρ <0.05 then H0 in this study was rejected, meaning that there is a relationship between food processing and the incidence of diarrhea in infants in the working area of Biromaru Public Health Center.

IV. DISCUSSIONS

Correlation between Handwashing with Soap and Diarrhea in Toddlers.

Hand washing is an activity that is often considered trivial but has many health benefits. Washing hands is an effective way to prevent the transmission of disease from germs that stick to the hands which is one of the chains of disease transmission. Especially in preventing diarrhea that can be done by washing hands which is the best way to prevent infections that can spread from person to person (Nita, 2016).

Based on the results of this study it was found that the results of the chi-square test ρ = 0,000 So that ρ <0.05, the H0 in this study was rejected, meaning that there is a relationship between handwashing with soap with the incidence of diarrhea in infants in the working area of Biromaru Public Health Center. Respondents who had poor hand washing with soap habits had more toddlers suffering from diarrhea compared to respondents who had good hand washing with soap habits more had toddlers who did not suffer from diarrhea.

This study is in line with other studies that show that there is a significant relationship between handwashing with soap and the incidence of diarrhea with a value of ρ = 0,000 (ρ <0.05). This study is similar to other studies that show that there is a significant relationship between the habit of washing hands with soap with the incidence of diarrhea with a value of ρ = 0,000 (ρ <0.05). Personal hygiene, especially hand hygiene should get high priority but often underestimated. Dirty or contaminated hands can move pathogenic bacteria and viruses from the body, feces, or other sources of food. The habit of not washing hands with soap is a habit that can be dangerous, especially when mothers cook food (Ferllando & Asfawi, 2015),(LESTARI, 2017).

Other studies have shown that there is a relationship between handwashing with the incidence of diarrhea with a value of ρ = 0.002 (ρ <0.05). For effective prevention of diarrheal diseases, hands should be washed during critical times: before eating, before preparing food, using latrines, before breastfeeding children, and after cleaning the baby's feces (Kamau & Njiru, 2018).

Other research also shows that there is a relationship between handwashing with the incidence of diarrhea with a value of ρ = 0.002 (ρ <0.05). Lack of mother's knowledge of hand washing with soap is significantly associated with diarrhea in childhood. Children whose mothers do not practice washing their hands after visiting the toilet are more likely to get diarrhea than their peers (Alebel et al., 2018).

This study is not in line with one of the studies that showed that there was no relationship between hand washing with diarrhea with a value of ρ = 0.978 (ρ> 0.05). Regarding the results of the study, the relationship between mother's behavior washing hands with the incidence of diarrhea is said to be meaningless because of various factors including no active monitoring by researchers in seeing firsthand the actual behavior of mothers daily (Trikora & Siwiendrayanti, 2015).

Correlation of Nail Hygiene with Diarrhea in Toddlers

Nails are one of the places where germs develop. Nail-biting is also not allowed, because it can cause disease transfer of germs from the nails into the mouth, which can cause various diseases, including diarrhea (Nita, 2016).

Based on the results of this study it was found that the results of the chi-square test ρ = 0,000 So that ρ <0.05, the H0 in this study was rejected, meaning that there is a relationship between nail hygiene and the incidence of diarrhea in infants in the working area of Biromaru Public Health Center. Respondents who did not treat nails had more toddlers suffering from diarrhea compared to respondents who treated nails more had toddlers who did not suffer from diarrhea. This study is in line with other studies that show that there is a significant relationship between nail hygiene and the incidence of diarrhea with a value of ρ = 0,000 (ρ <0.05). In his research, some mothers do not cut their nails at least once a week so that mothers and toddlers who have long nails are still visible and have dirt. Dirt that is between the nails will cause disease if it enters the mouth (Ferllando & Asfawi, 2015).

This study is also in accordance with other studies that show that there is a relationship between nail hygiene and the incidence of diarrhea with a value of ρ = 0.005 (ρ <0.05). The role of parents in maintaining the cleanliness of children's hands and nails is very important, especially mothers. All activities of children/toddlers are assisted by parents, so parents also participate in maintaining the cleanliness of the child's hands and nails. This aims to reduce the risk of diarrhea in children (Biswas et al., 1990).

This study is also in accordance with one study that showed that there was a relationship between nail hygiene and the incidence of diarrhea with a value of ρ = 0,000 (ρ <0.05). Personal hygiene is a major role in the promotion of healthy living. One that is included in personal hygiene is to maintain nail hygiene. Unclean nails can be a source of disease (Khatoon et al., 2017).

This study is not in line with other studies which show that there is no relationship between nail hygiene with the incidence of diarrhea with a value of ρ = 0.109 (ρ> 0.05). Other factors make the condition of the child's nail cleanliness unrelated. This might be because dirt contamination is not on the toddler's nails, but there is on a toddler's hand. When children hold contaminated items or toys, germs will stick to the surface of the hands (Yusniar Hanani, 2015).

Correlation between Food Processing and Diarrhea in Toddlers

One of the causes of diarrhea is food factors that can be stale food, toxic, allergic to food, food contaminated with bacteria or germs so that personal hygiene is needed involved in food processing that needs attention to ensure food safety. Food and drinks are basic human needs that are needed all the time and must be handled and managed properly and correctly to benefit the body. Good and correct management is managing food and drinks based on the rules of the principle of food sanitation hygiene (Satria & Indah, 2016).

Based on the results of this study it was found that the results of the chi-square test ρ = 0,000 So that ρ <0.05, the H_0 in this study was rejected, meaning that there is a relationship between food processing and the incidence of diarrhea in infants in the working area of Biromaru Public Health Center. Respondents who had bad food processing had more toddlers suffering from diarrhea compared to respondents who had good food processing more had toddlers who did not suffer from diarrhea. This study is in line with other studies that show that there is a significant relationship between food processing and the incidence of diarrhea with a value of ρ = 0.001 (ρ <0.05). Poor habits in feeding to infants can cause toddlers to experience diarrhea can be caused by poor hygiene of food, both during the manufacturing process and cleaning of food utensils and food dish that is not in accordance with the age of the toddler can cause diarrhea in toddlers (Meliyanti, 2016).

This study is also in line with research that shows that there is a relationship between food processing and the incidence of diarrhea with a value of ρ = 0.005 (ρ <0.05). When food is cooked in large quantities and may be handled by many people, it can increase the possibility of food contamination. Contamination of food that is unknown during cooking on a large scale can cause an outbreak of illness caused by food and harmful to consumers' health. Many cases of diarrhea occur due to contaminated food and cause death (Akabanda et al., 2017).

Other research also shows that there is a relationship between food processing and the incidence of diarrhea with a value of ρ = 0.007 (ρ <0.05). Food contamination is closely related to diarrheal diseases that occur in children who have been given complementary foods. Food hygiene practices can reduce the transmission of pathogens that cause diarrhea by 15-70%. Food contamination by microbes can be reduced through proper food hygiene and handling practices, including how to heat food and cover food (Acikel et al., 2008).

Poor food hygiene practices such as improper handling of kitchen utensils is a major cause of diarrhea transmission. Food can be microbiologically contaminated if prepared in unhygienic conditions, and research has shown that equipment, such as spoons, cups, bowls, baby bottles, and plates, are potential sources of pathogens (such as Escherichia coli, Salmonella, and Vibrio cholerae) in food (Chidziwisano et al., 2019).

V. CONCLUSION

Handwashing with soap, nail hygiene, and food processing are factors to the incidence of diarrhea in post-disaster toddlers in the working area of the Biromaru Community Health Center. The suggestions for mothers/caregivers of toddlers are expected to take action to wash hands with soap before processing food, before eating/feeding toddlers, after defecating, after dealing with BAB and toddlers after defecating. It is also expected to continue to maintain and pay attention to the hygiene of hands and nails of toddlers and yourself, as well as pay attention to the cleanliness of the kitchen, cooking utensils, and improve the way food processing.

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