Jurnal Epidemiologi Kesehatan Komunitas
9 (2), 2024, 139-156

JEKK

Factors Water Characteristic and Exclusive Breastfeeding as Predicting Diarhea Under 5 Years

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ABSTRACT

Background: The incidence of death diarrheal disease for children under 5 years are 5 million. The prevalence of diarrhea up to 24.8%. The exclusive breastfeeding for infants up to 6 months will provide immunity to against various diseases such as diarrhea. The proportion of Infants not exclusive breastfeeding up to 65.8%. Factors such as washing hands, consumption of drinking water are factors caused diarrhea in children. The study aims to known at the prediction of the risk of diarrhea and the dominant factors related the incidence of diarrhea in Kebumen District.
Methods: The study design used case control. The population is mothers who have toddlers 1-4 years in the working area of Berbah Health Center Services was estimated 3,407 toddlers. The sample of case is a toddler who suffers from diarrhea and the control is a toddler who does not suffer from diarrhea in the surrounding environment. The sample was estimated of 50 cases of diarrhea and 50 control without diarrhea who qualified inclusion and exclusion criteria. The instruments were used questionnaires and medical records of diarrhea. Data were analysis with chi square test and logistic regression with 95% confidence interval.
Result: Based on bivariate analysis shown that the exclusive breastfeeding was significant risk of diarrhea incidence OR = 3.22 (1.41-7.35). Based on Handwashing that the handwashing variable has no significant risk of diarrhea incidence OR = 1.792 (0.80-4.01). Based on multivariate analysis that exclusive breastfeeding significant caused diarrhea for children OR = 2.76 (95%CI: 1.18-6.47) whereas hand washing did not significantly cause diarrhea in children OR = 1.15 (95% CI: 0.66-3.64) and drinking water did not significantly affect diarrhea in children OR 2.19 (95% CI: 0.91-5.27).
Conclusion: The study concluded that the dominant risk factor significantly for diarrhea in toddlers is exclusive breastfeeding.

Keywords*:* Diarrhea ; breastfeeding; water.

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Introduction

Based on the WHO report, estimated that in 2021 there will be 5 million deaths of children under 5 years old. The causes of death in children are diarrheal diseases, malaria, pneumonia associated with complications.[1] The Indonesia Government was estimated 10 outbreaks of diarrhea, 756 cases with 36 deaths, the Case Fatality rate was 4.76%.[2]

Based local government of Kebumen district in 2022 was estimated number of diarrhea 5,521 cases of toddler diarrhea. [3] Diarrhea in children is caused by maternal knowledge, breastfeeding, hand washing behavior and drinking water sources. Based on previous study maternal knowledge is significantly related to exclusive breastfeeding.[4] The maternal knowledge is significant in the incidence of diarrhea. [5]

The breast milk provides protection against diarrheal diseases..[6] Breastfeeding babies up to 6 months of age increases immunity against diseases such as diarrhea.[7] Previous study [8] shown that the proportion not providing exclusive breastfeeding was relatively large up to 65.8%. Previous study shows that 82.4% of mothers aged > 35 years not provide exclusive breastfeeding. [9]

The hand washing behavior a risk factor for diarrhea in toddlers because bacteria can enter the baby through milk bottles or baby food containers.[10] Previous study conducted surveillance in Ethiopia found that the prevalence of diarrhea was 24.8%. the drinking water consumption is significantly associated with diarrhea. Utilization of well drinking water requires attention to environmental conditions related to the content of pathogenic bacteria which addressed of the causes of diarrhea. [11]

The study in South Africa showed that the death rate for children under 5 years of age up to 31% due to the consumption of drinking water in patients with detected microbiological pathogens. [12]

The efforts for reduce diarrhea are carried out through prevention of disease agents such as strengthening the body's immunity.[13] the efforts can be made to provide exclusive breastfeeding correctly until the child is 6 months old. The study aims to known at the prediction of the risk of diarrhea and the dominant factors related the incidence of diarrhea in Kebumen District.

Methods

The population is mothers who have toddlers at the Buayan Community Health Center estimate up to 3,407 subjects. The sample taken was 50 mothers who had children under 5 years old who experienced diarrhea and 50 subjects who were not diagnosed with diarrhea were obtained based on information from medical records from the Buayan Community Health Center according to the inclusion and exclusion criteria, such as 1). Residing in the working area of the Buayan Community Health Center, 2). Have a toddler under 5 years old. Exclusion Criteria: 1). Over the past year he has moved from the Buayan Community Health Center work area. 2). Subjects with congenital abnormalities.

Sample were addressed systematic random sampling. The study variables are the independent variables: maternal knowledge, exclusive breastfeeding, hand washing and drinking water. The dependent variable is the incidence of diarrhea.

Data were collected using a questionnaire containing several questions for the variables of maternal knowledge, exclusive breastfeeding, hand washing behavior and drinking water sources. The diarrhea incidence variables were collected through a review of medical records of patients seeking treatment at the Buayan health center and controls were taken from respondents who had the same characteristics in the subject's environment.

Data were drawing with descriptively by presenting the frequency distribution in tabular form. The statistical test used chi square test and prediction analysis using logistic regression test at 95% Confidence Interval.

The study design used was Case Control. This study has been tested for Ethical Clearance at Respati University, Yogyakarta and received ethical approval with No. 012.3/FIKES/PL/II/2023.

Results

The study was collected 50 sample as cases addressed in diarrhea and control as able who did not suffer from diarrhea estimated 50 subjects so that the total subjects were 100 sample. Based on the results of the analysis of the characteristics of the research can be seen in Table 1.

Table 1. The characteristic variable of the study addressed case and control.

Variable	Frequency	
	N	Percent (%)
Pendidikan		
Elementary School	2	2,0
Junior High School	16	16,0
Senior High School	58	58,0
Colledge	24	24,0
Knowledge		
Low	38	38,0
High	62	62,0
Exclusive Breastfeeding		
No	56	56,0
Yes	44	44,0
Hands wash		
No	41	41,0
Yes	59	59,0
Water drinking		
No Pam	63	63,0
Pam	37	37,0
Diarrhea		
Yes	50	50,0
No	50	50,0

Based Table 1 was shown that the Education variable majority subjects have a high school education of 58%, the subject's knowledge has a high level of knowledge of 62%, the majority of subjects do not provide exclusive breast milk, 56%, the majority of subjects often wash their hands, 59%, the majority of subjects drink water used non PAM were 63%. Based on Chi-Square test analysis for known related risk factors for diarrhea. Based on bivariate analysis between variable Education, knowledge, exclusive breastfeeding, hand washing, and source of drinking water on the incidence of diarrhea can be seen in Table 2.

Tabel 2. Correlation education, knowledge, exclusive breastfeeding, hands washing, water consumption related diarrhea

Variable	Diarrhea			
	Case	Control	OR	95% CI
Education			1.31	0.17 – 3.65
Low	10	8		
High	40	42		
Knowledge				
low	18	20	0.84	0.37-1.89
High	32	30		
Exclusive Breastfeeding	35	21	3.22*	1.41-7.35
No	15	29		
Yes				
Hand washing				
No	24	17	1.79	0.80-4.01
Yes	26	33		
Water dringking				
No Pam	37	26	2.62*	1.13-6.09
Pam	13	24		

*significant

Based on Table 2, it shows that education is not significantly related to the incidence of diarrhea OR 1.313 (0.17 – 3.65). Based on the subject's knowledge, the subject's knowledge has no risk of diarrhea in babies aged 1-4 years OR = 0.844 (0.37-1.89). Based on exclusive breastfeeding, it was found that exclusive breastfeeding has a significant risk of diarrhea incidence OR = 3.22 (1.41-7.35). Based on Handwashing, the handwashing variable has no significant risk of diarrhea incidence OR = 1.792 (0.80-4.01). Based on drinking water, drinking water has a significant risk of diarrhea in children aged 1- 4 years, 2,627 (1.13-6.09).

Based on multivariate analysis, to see the most dominant contribution among the risk variables, a logistic regression test was carried out on significant variables using the chi square test, including the variables of exclusive breastfeeding, hand washing and drinking water sources with the incidence of diarrhea as in Table 3.

Tabel 3. Multivariate analysis contributing exclusive breastfeeding and hands washing related diarrhea under 5 years.

Model	Beta (β)	OR 95% CI	R^2
Model 1			
Exclusive breastfeeding	1.17	3.22 (1.41-7.35)	0.078
Model 2			
Exclusive breastfeeding	1.126	3.08 (1.34-7.08)	0.089
Hand washing	0.480	1.61 (0.69-3.73)	
Model 3			
Exclusive breastfeeding	1.018	2.76 (1.18-6.47)	0.117
Hand washing	0.442	1.15 (0.66-3.64)	
Water consumtion	0.786	2.19 (0.91-5.27)	

Based on the multivariate results in Table 3, the model with the highest contribution is model 3. In model 3, exclusive breastfeeding has a significant risk of causing diarrhea in children OR = 2.76 (1.18-6.47) while washing hands does not significantly cause diarrhea in children OR = 1.15 (0.66 -3.64) and drinking water did not significantly influence diarrhea in children OR 2.19 (0.91-5.27).

Discussion

The study results showed that the majority of mothers' education was high, the subjects did not provide exclusive breast milk, frequently washed their hands, the source of drinking water was non-PAM. Previous research [14] which conducted research in India stated that 21.6% of the 430 households surveyed had diarrhea. Previous research [15] stated that the proportion of subjects who did not provide exclusive breastfeeding was 53.9%.

Based on surrounding environmental factors such as drinking water use, most of it comes from non-PAM or drinking water sources from dug wells. This situation shows that water use relies on the surrounding environment so that environmental factors are important in explaining the occurrence of diarrhea in children.

The results of previous research [16] which conducted research in Nigeria stated that it was found that 12.1% of people consumed unsafe water.

Based on mothers' behavior, it was found that the majority had the habit of washing their hands. Previous research [15] stated that the proportion of subjects who had the habit of washing their hands was 70%. Based on research results, it was found that maternal education contributed to the incidence of diarrhea. Study [17] which conducted research in East Africa stated that education level was significantly related to the incidence of diarrhea [AOR = 1.10, 95%CI; 1.03, 1.18).

The study show that exclusive breastfeeding is a factor that influences diarrhea aged 1-4 years. This is because exclusive breast milk contains components that increase the body's immunity. The results are in line with research [18] which conducted a journal review which stated that exclusive breastfeeding is significantly beneficial in reducing morbidity rates in children related to digestive, respiratory and other infections.

Research [19] which conducted research in developing countries such as Pakistan and Egypt stated that there was an increasing trend in exclusive breastfeeding behavior from 2016 to 2020. Education, employment, promotional media influenced mothers' patterns of providing exclusive breastfeeding. Exclusive breastfeeding significantly reduces the incidence of diarrhea.

The drinking water consumed significantly influences the incidence of diarrhea in children. This situation can be caused by contaminated drinking water which can cause diarrhea. The results of the study are in line with research [20] which conducted study in Ethiopia which stated that waste had a significant risk of diarrhea (AOR = 2.3, 95% CI; 1.98, 4.56).

Previous research[21] stated that the prevalence of diarrhea was 25.6%. The research results show that improving drinking water consumption can reduce the incidence of diarrhea by OR 0.25 (95% CI 0.18–0.36), management of hygienic drinking water consumption significantly reduces the incidence of diarrhea OR = 0.37 (95% CI 0, 27–0.51). the previous study [11] which conducted surveillance in Ethiopia found that the prevalence of diarrhea up to 24.8%. There

is a relationship between drinking water and sanitation and diarrhea.

Utilization of drinking water sources that rely on drinking water sources from the surrounding environment or wells requires paying attention to the conditions of the surrounding environment related to the content of pathogenic bacteria which can cause diarrhea. Previous study [12] which conducted study in South Africa stated that the death rate for children under 5 years of age reached 31% during the study period. The results of the research stated that microbiological pathogens were detected in the drinking water consumed by sufferers.

The previous study[14] which conducted research in India stated that 21.6% of the 430 households surveyed had diarrhea. Water consumption and drinking water management significantly influence the incidence of diarrhea [AOR: 3.276; 95%CI: (1.463, 7.042)]. The study [22] which conducted a journal review stated that 124 journals stated that consuming quality water could reduce the incidence of diarrhea by 52% OR = 0.48 [0.26–0.87]. Good sanitation can reduce the risk of diarrhea by 47% OR = (0.76 [0.61–0.94]). and hand washing behavior can reduce the incidence of diarrhea by 30% (OR = 0.70 [0.64–0.76]).

The study[23] stated that the distance between the well and the septic tank < 11 meters significantly caused the incidence of diarrhea in children OR = 3.4 (2.0-5.7). The factor that contributed most to diarrhea was the distance between the well and the septic tank (Exp β = 1.70 CI; 1.701-4.906).

Analysis shows that education, maternal knowledge, and handwashing habits are not significantly related to diarrhea in children. Previous research[24] stated that there was no relationship between exclusive breastfeeding and the incidence of diarrhea in toddlers, because it was caused by several factors such as the use of unclean eating utensils or milk bottles.

The study[4] stated that low maternal knowledge significantly influenced the incidence of diarrhea (AOR=2.05, 95% CI: 1.10, 3.85), exclusive breastfeeding did not significantly influence the incidence of diarrhea (AOR=2.65, 95% CI: 1, 51 – 4.65).

Based on the results of multivariate analysis, exclusive breastfeeding is the dominant factor in the occurrence of childhood diarrhea. This situation can be caused by the content of exclusive breast milk which is able to improve immunology and immunity for children. The results of the study are in line with research[17] which conducted research in East Africa which stated that not exclusive breastfeeding had a significant impact on the incidence of diarrhea AOR = 1.15, 95%CI; 1.10-1.20. Exclusive breastfeeding has an influence on the baby's immunity. The longer duration of exclusive breastfeeding for babies can improve the baby's health status and avoid digestive disorders. [25]

The study [26] conducted that related to BMI in children showed that cortisol increased in the first month of lactation. Diarrhea in children can significantly affect the nutritional status of children. Research [27] stated that abnormal nutritional status reached 94.59%. Research[28] which conducted a journal review stated that low nutritional intake was an indicator of disease incidence and populations at risk of pneumonia. A 2022 study [15] which conducted research in Ethiopia stated that 53.4% of infant feeding practices were poor. Factors that risk diarrhea in children are not washing hands, drinking drinks p = <0.001.

The environmental factors also contribute to the risk of diarrhea in children, such as the water content in the environment around the house which is related to the use of drinking water sources from wells. In the study results, it is possible that diarrhea can also be caused by the water content used by study subjects being contaminated by bacteria that caused diarrhea such as Escherichia coli, shigella, enterotodigenic.

Previous study shown[29] that diarrhea infections in children are *E. coli*, *Enteropathogenic Shigella Campylobacter*, *Vibrio, Clostridioides difficile, Vibrio cholerae* and *Salmonella*. The study [30] conducted research in southern Virginia stated that 44.4% found e coli at home as a pathogen of diarrhea. Consumption of bad water is a factor in polluted water that causes diarrhea.

Conclusion

The based on the study that concluded the variables significantly contributed of incidence of diarrhea in toddlers under 5 years are the exclusive breastfeeding and daily use of drinking water. The most dominant factor influencing the incidence of diarrhea in toddlers under 5 years is exclusive breastfeeding.

Acknowledgment

The authors would like to thank for staff in Sub District Buayan and staff help during research and specially for subject all community in around Puskesmas Buayan.

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