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Behavioral determinants related to the incidence of diarrhea among students in Samarinda City

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Abstract

Purpose: This study aims to investigate behavioral determinants associated with the incidence of diarrhea among elementary school students in Samarinda City. **Methods:** This research employed a Cross-Sectional design. There was a population of 126 students in the 5th and 6th grades. The number of samples was calculated using the Slovin formula, resulting in 78 respondents selected through simple random sampling. **Results:** Behavioral determinants of diarrhea consist of hand washing with soap, toilet use, nail cleanliness, snack habits, and peer influence. Statistical analysis revealed significant findings. Snack habits and peer influence were found to have no significant effect on the incidence of diarrhea (ρ-value = 0.063 and ρ-value = 0.083). However, factors such as hand washing with soap (p-value = 0.023), toilet use (p-value = 0.000), and nail cleanliness (p-value = 0.002) had significant effects on the incidence of diarrhea. The use of toilets received an OR value of 35, indicating that respondents with toilet hygiene behaviors have a 35 times higher risk of experiencing diarrhea. **Conclusion:** Toilet use is the strongest predictor (35 times higher risk when proper toilet hygiene is not practiced).

Keywords: determinants of behavior; diarrhea; elementary school; students

INTRODUCTION

Diarrhea is the second largest cause of death in children under five and the cause of death in 370,000 children in 2019 in the world [1]. Diarrhea is the leading cause of death in children, accounting for around 9% of deaths in children under five around the world. This means that more than 1300 child deaths occur per day, or around 484,000 child deaths, despite easy and simple treatment [2]. The prevalence of diarrhea, as diagnosed by health workers and reported by symptoms, in Indonesia is 8%. This figure has increased compared to Riskesdas Data in 2013. The prevalence of diarrhea in East Kalimantan Province is 7.5%. This figure has increased compared to Riskesdas data in 2013 of 5%. This indicates an increase in diarrhea cases in East Kalimantan Province over the past 5 years [3]. Diarrhea is included in the 10 most common types of disease in Samarinda city in 2021, with a total of 3,595 cases. The number of diarrhea cases in the Samarinda Seberang district was 419 [4]. The 2016 diarrhea outbreak data reported 65 cases, which increased to 76,511 cases in 2017 [5].

Unfavorable environmental conditions and community behavior cause the emergence of diarrhea disease. Several factors can influence the incidence of diarrhea in a given area, including pathogens that spread through the mouth, environmental cleanliness, age, geographic location, and individual behavior [6].

Previous research in rural Nepal has suggested that improving child health depends on a variety of community health improvements, such as providing

better nutrition and promoting health behaviors, including hand washing [7]. Another study conducted in Ethiopia found a relationship between personal hygiene, including hand washing with soap, and the incidence of diarrhea in children [8]. Meanwhile, another study conducted in Ethiopia found a relationship between ignorance of information on preventing diarrhea, hand washing with soap, and the incidence of acute diarrhea [9]. According to other research, demonstrations of hand washing with soap in childcare facilities and elementary schools can prevent diarrhea incidence by 30% in high-income countries [10]. Nevertheless, diarrhea was associated with poor handwashing. School-based WaSH interventions are recommended to provide water in school WaSH facilities, promote handwashing, and improve hygiene-related knowledge [11].

In Indonesia, a research study conducted in Jember found that Islamic Boarding Schools can promote personal hygiene practices and environmental sanitation, thereby preventing diseases in school-based environments [12]. Another study in Surabaya found that social demographics, personal hygiene, breastfeeding, and nutritional status play significant roles in influencing the occurrence of diarrhea among children [13]. Moreover, a study in Samarinda stated that several private schools have implemented a policy prohibiting the sale of street food due to hygiene concerns; however, for public schools, these policies have had a significant impact [14].

Based on the results of a preliminary study, students in SDN 004 Samarinda Seberang have a level of knowledge regarding the importance of breakfast and healthy snack habits of only 51%. It was also stated that 2 of them experienced stomachaches while at school.

This study examines behavioral factors related to the incidence of diarrhea among elementary school students in Samarinda City.

METHODS

The type of research used in this study was quantitative, with an observational component. The research design was Cross-sectional. The population in this study consisted of 126 students from 5th and 6th grade. The combination of more mature cognitive, communication, and memory skills in 5th and 6th grade is expected to yield more accurate and reliable research results, enabling the identification of determinants related to incidents of diarrhea. The number of samples was calculated using the Slovin formula [15] and resulted in 78 respondents. The students were selected by simple random sampling. The data analyzed in this research were obtained through quantitative research, utilizing both primary and secondary sources. Primary data is data obtained directly from the source. Secondary data is obtained from library reviews, books, or literature related to the research theme.

Univariate analysis was displayed in the frequency distribution table. This analysis was conducted to describe the characteristics of each variable under study. Bivariate analysis employed the Chi-Square Test to determine the association between the independent and dependent variables. Multivariate analysis, including multiple regression and logistic tests, was used to identify which variable has the most dominant influence on the dependent variable. Analysis was carried out using SPSS version 25.

This research has obtained ethical approval from the Health Research Ethics Committee, Health Polytechnic, Ministry of Health, East Kalimantan, No DP.04.03/F.XLII.25/0130/2024.

RESULTS

Table 1 shows the univariate variables of the respondents. The diarrhea variable had the most respondents answering 'yes' with 42 (53.8%). Hand washing with soap yielded similar results, with both good and bad categories, among 39 respondents (50%). Toilet use had the most good category with 53 respondents (67,9%). Nail cleanliness had the highest category with 43 respondents (55.1%). The snack habit was the most common category, with 70 respondents (89.7%). Peer influence had the most responses with 'yes' among 61 respondents (78.2%).

Table 1. Univariate variables (n=78)

Variable	n	%
Diarrhea		
Yes	42	53.8
No	36	46.2
Hand washing with soap		
Good	39	50
Bad	39	50
Toilet use		
Good	53	67.9
Bad	25	32.1
Nail cleanliness		
Clean	43	55.1
Dirty	35	44.9
Snack habit		
Often	70	89.7
Seldom	8	10.3
Peer influence		
Yes	61	78.2
No	17	21.8

Table 2. Bivariate variables

Variable	Diarrhea		ρ-value
	Yes	No	
Hand washing with soap			
Good	26	13	0.023
Bad	16	23	
Toilet use			
Good	40	13	0.000
Bad	2	23	
Nail cleanliness			
Clean	30	13	0.002
Dirty	12	23	
Snack habit			
Often	35	35	0.063
Seldom	7	1	
Peer influence			
Yes	36	25	0.083
No	6	11	

Table 2 shows the bivariate variables. Snack habits and peer influence were found to have no significant effect on the incidence of diarrhea (ρ-value = 0.063 and ρ-value = 0.083). However, factors such as hand washing with soap (p-value = 0.023), toilet use (p-value = 0.000), and nail cleanliness (p-value = 0.002) were found to have significant effects on the incidence of diarrhea. Based on Table 3, the multivariate variables are presented. The variable toilet use received an OR value of 35, indicating that respondents with poor toilet use have a 35 times higher risk of diarrhea.

Table 3. Multivariate variables

Variable	B	Sig.	Exp (B)	95% CI for Exp (B)	
				Lower	Upper
Toilet use	3,566	0,000	35,385	7,328	170,861

DISCUSSION

Hand washing with soap

Hands are the main pathways of germ transmission during healthcare. Hand hygiene is therefore the most important measure to avoid the transmission of harmful germs. The WHO recommends practicing good hand hygiene by using an alcohol-based hand rub or soap with running water, following the correct recommended techniques [16]. A person's personal hygiene behavior is a factor that is closely related to the incidence of diarrhea [13].

The findings indicate that factors such as hand washing with soap, toilet use, and nail cleanliness have a significant impact on the incidence of diarrhea. This study aligns with previous research conducted in Ethiopia, which found that children whose mothers or caregivers practiced poor hand washing at critical times were 2.5 times more likely to experience acute diarrhea than their counterparts [17]. Similar research conducted in Ethiopia reported that weekly personal hygiene inspections were conducted in schools. It is crucial to enhance personal hygiene among elementary school students [18]. Progress made in Water, Sanitation, and Hygiene (WASH) practices between 2000 and 2016 in Ethiopia, and their contribution to the reduction in diarrhea and stunting in children under 5 years of age [19].

Toilet use

Access to safe drinking water, sanitation, and hygiene is a fundamental right and essential for controlling infectious diseases [20]. A previous study in Kendari found that proper toilet use can prevent the transmission of diarrheal diseases, thereby protecting family members from these diseases. Every house should have its own toilet, which is one of the important things in efforts to maintain environmental health [21].

Similar research in Mozambique found that in rural areas, stakeholders emphasized the importance of handwashing, improving storage conditions for traditional medicine, and not administering traditional medicine to children under six months of age. Meanwhile, in urban areas, environmental hygiene, water treatment, and the use of ash in latrines were implemented. The two districts recognize that to be successful in implementing the action strategy, their strategy must focus on improving hygiene practices [22].

Nail cleanliness

In everyday life, personal hygiene behavior is crucial because it can significantly impact a person's physical and mental health. Personal hygiene encompasses skincare, hair care, nail care, and other related practices. A nailcare routine includes cleaning and clipping, as well as returning the skin boundaries at the edges of the nails to their normal state. Under the fingernails and toenails, many bacteria can become an infection or a source of disease. Personal hygiene maintenance is very crucial to individual health [23].

Biting nails is a common habit that children often exhibit, typically after playing or holding something in their hands. They tend to do it unconsciously. Apart from being unhealthy for nails, it can cause nails to become damaged or swollen. Parents must also participate in nail cleanliness because children cannot cut their nails [24].

Snack habits

School-age children require sufficient food in terms of both quantity and quality to maintain a good nutritional status. School-age children generally spend their time in school, so they often have many activities that tend to overlook meal times. The habit of children not having breakfast at home and their parents giving them pocket money are trigger factors for unhealthy snack habits. Students often buy snacks carelessly, choosing interesting options that are low in quality and made with poor ingredients. School-age children prefer snacks like ice or cakes. They tend to choose cheap types of snacks. The lower the price of a snack, the lower its quality tends to be. Moreover, consuming unhealthy foods will cause digestive problems, such as diarrhea [25]. Snack foods are susceptible to biological and chemical contamination [26]. Research conducted in Deli Serdang revealed that the habit of consuming random snacks in the canteen or school environment is prevalent and draws attention because the cleanliness of school snacks has not been proven [27].

Peer influence

It is the nature of children to imitate things easily based on their environment. The presence of peers can influence children's snack consumption habits, with the influence becoming stronger if they have a desire to be accepted into a specific group [27]. The snacking behavior of children is not only influenced by their peers. There are other things, such as attitude towards snacks, knowledge, habits of bringing lunch, and breakfast habits. Indeed, several efforts are needed to increase understanding about snacking behavior through nutritional education activities, as well as to enhance the role of parents in providing healthy food and drinks from home to reduce the desire for snacking. It is also intended to prevent children from becoming accustomed to snacking outside the house [28].

Associated factors with diarrhea in elementary school students

Bad toilet use is associated with a 35 times higher incidence of diarrhea. It is recommended to promote personal hygiene among elementary students to prevent diarrhea cases. Access to safe drinking water, sanitation, and hygiene is a fundamental right and essential for controlling infectious diseases [20]. The availability of water, sanitation, and hygiene is one way to protect health by reducing exposure to pathogens. The implementation of clean and healthy living behaviors in non-emergency situations has been shown to reduce the incidence of diarrhea and improve health status [29].

The results of previous research in Mozambique have shown that urban areas often lack adequate environmental and sanitary conditions, as well as poor personal and community hygiene. In this area, education and awareness about individual and community hygiene are considered crucial, as is promoting behavioral change in adopting good hygiene practices to prevent foodborne diseases and other infections [22].

CONCLUSION

Based on this research, it can be concluded that the most dominant variable related to the incidence of diarrhea is toilet use (RR 35.3), after controlling for the handwashing with soap variable (RR 0.3). It means that respondents with poor toilet hygiene practices were over 35 times more likely to experience diarrhea. It is recommended to promote personal hygiene among elementary students to prevent diarrhea cases. Behavioral determinants of diarrhea include hand washing with soap, proper toilet use, nail cleanliness, healthy snack habits, and peer influence. Additionally, it is also essential to gain awareness about environmentally based communicable diseases.

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