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The Increased Likelihood of Diarrhea in Older Population: Result of a Household Health Survey in Laha Village, Ambon City

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ABSTRACT

Diarrhea is defined as three or more liquid bowel movements in one day. Apart from being a cause of high morbidity and mortality in infants and toddlers, diarrhea is also a health problem in the elderly, especially in developing countries like Indonesia. This study aimed to analyze factors related to diarrheal in the people of Laha Village, one of the coastal villages in Ambon City. The data were derived from a household health survey carried out in the coastal area of Laha Village in November 2022. The dependent variable in this analysis was diarrhea. The independent variables were demographic status, sanitation, dietary patterns, and other diarrhea-related problems. Data analysis used a multivariate logistic regression method. The results of this study showed that the prevalence of diarrhea in Laha Village was 9.5%. Diarrhea was found in infants, children, young adults, and the elderly. We found a significant association between diarrhea and respondents aged >60 (aOR=3.6; 95CI%: 1.04-12.8; p=0.043). Although not significant, the percentage of diarrhea cases was higher in people who did not use latrines for defecation (11.8%) compared to people who used latrines (9.1%). These results indicate the need to conduct regular diarrhea prevention programs to prevent diarrhea, particularly for the elderly, in addition to efforts to improve hygiene and sanitation in the community.

Keywords: Diarrhea, coastal areas, sanitation, elderly

Introduction

Diarrhea is defecation with a liquid consistency; the frequency is more than three times or even more daily (WGO, 2012; Riddle et al., 2016). Diarrhea has been known since ancient times, especially in low-income countries. Diarrhea is an infectious disease with a relatively high morbidity and mortality rate. Diarrhea could be caused by various bacteria, viruses, and parasites (WGO, 2012; Riddle et al., 2016; Nemeth & Pfleghaar, 2023). The infection is spread through contaminated food and drinking water (WGO, 2012). In addition, it could occur from person to person due to poor personal hygiene and the environment (sanitation). Diarrhea is often found in various circles of society in infants, children, adults, and the elderly (Melese et al., 2019). Diarrhea that lasts for a long period may lead to fluid deficiency, which could cause dehydration (WGO, 2012; WHO, 2023; National Center for Environmental Health, 2023).

According to data from the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF), there are two billion cases of diarrhea yearly (Kemenkes RI, 2021). In Indonesia, diarrheal disease is among the endemic diseases with the potential for outbreak, often accompanied by death. According to data from the Ministry of Health Republic of Indonesia, the number of diarrhea cases showed an increased trend between 2015 and 2017 (Depkes RI, 2017).

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Diarrhea was also reported to be one of the most common diseases in Maluku, with around 4775 cases in 2020 (Dinas Kesehatan Provinsi Maluku, 2019). Knowledge about the current trend of diarrhea is vital for planning and evaluating diarrheal prevention programs. Information about the risk factors for diarrheal disease will provide insight into disease prevention programs.

In November 2022, Pattimura University conducted a household survey in Laha Village, Ambon City. Using data from this survey, this study aimed to examine factors associated with diarrhea in the coastal community of Laha Village. The results of this study are expected could provide input for policymakers and program managers in the diarrhea prevention program in Laha Village.

Material and Methods

Data source and survey design

Data were derived from a household health survey conducted in November 2022 in Laha Village, Ambon City, by the Faculty of Medicine Universitas Pattimura.

Study sites and respondents

This research was conducted in Laha Village, a fostered village of the Faculty of Medicine, Pattimura University. Laha Village is included in the coastal area in the Ambon City area, located on the north coast of Ambon Island and is about 37 km from the center of Ambon City, precisely located at the bay of the island of Ambon, which is bounded by the Alang promontory and the Nusaniwe promontory (Serang & Hiariej, 2023). Laha Village has a population of 7,167 people (Serang & Hiariej, 2023). The total population of men and women is almost equal. Respondents in this study were the community of Laha Village, who were willing to be respondents. In total, 653 people met the inclusion criteria to participate in this study.

Instruments

This study used a questionnaire adapted from the 2018 Basic Health Research questionnaire by the Ministry of Health of the Republic of Indonesia (Kemenkes RI, 2018). Data collection was conducted using an Android-based handheld device with the Commcare platform. This questionnaire was in Indonesian Language and covered several topics, including characteristics of sociodemographic status, sanitation, dietary patterns, and other diarrhea-related problems. The survey used a total sampling technique to select respondents who met the inclusion criteria, i.e., the community of Laha Village aged 18 years or older. In total, 653 respondents were interviewed in this study.

Data collection procedure

The data collection process started by obtaining a research permit from the Faculty of Medicine, Pattimura University, and the administrative leaders of Laha Village. The data collection process was carried out in ten days by the Faculty of Medicine, Pattimura University students.

Variables

The dependent variable in this study was diarrhea, formed based on the question: *'In the last month, have you ever been diagnosed with diarrhea by a health worker?*' When respondents answered 'yes', they would be given codes 1 and 0 for 'no' answers.

The independent variables in this study were divided into five groups: 1) characteristics of sociodemographic status, 2) personal hygiene, 3) dietary patterns, 4) mental health, and 5) healthcare-seeking behavior. **Sociodemographic status characteristics** consisted of age (<25 years, 25-59 years, and ≥60 years), gender (male and female), occupation (not working and/or housewives, formal workers, and informal workers), and marital status (not married, married, and divorced). **The characteristics of the dietary pattern** consisted of sweet foods, sweet drinks, meat foods, and fruit consumption in the past month (often, rarely, and never during the last month). **Personal Hygiene**, namely washing hands with soap, **mental health**, consisting of (not

having any mental disorder, had mental disorder), and **health care seeking behavior** (use of traditional medicine) are classified into (yes and no).

Mental health problems were determined based on the Self-Rating Questionnaire (SRQ-20) consisting of 20 questions with the answer options 'Yes' coded one and 'No' coded 0. Respondent was considered as having mental health disorder when the total score was ≥6.

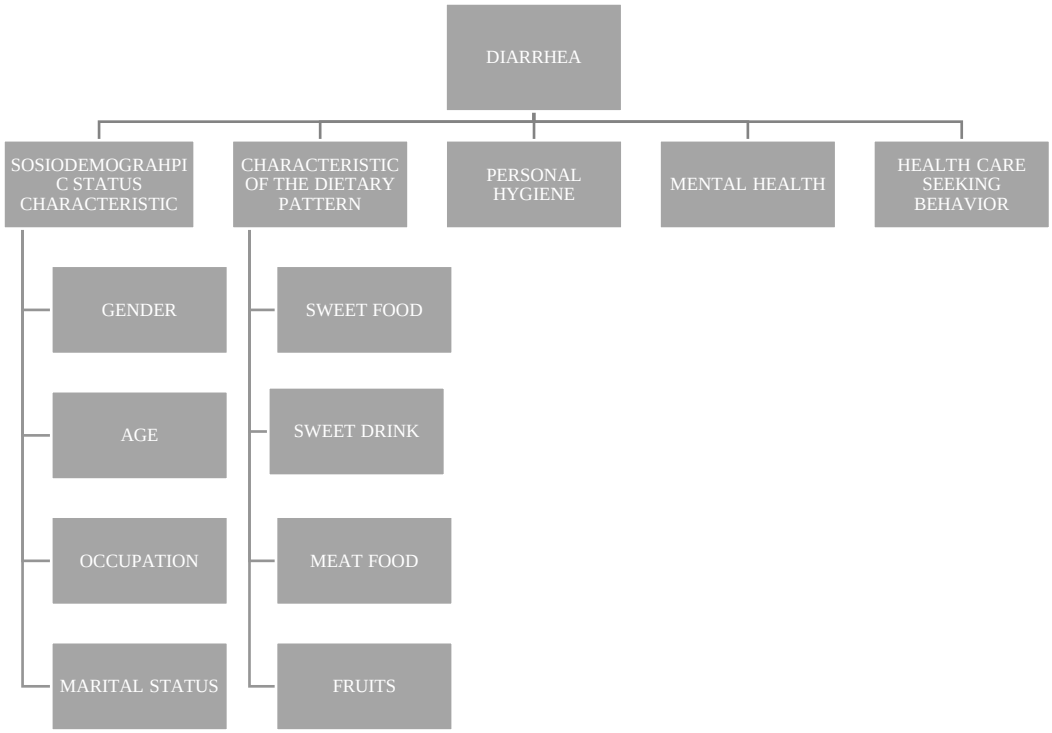

Figure 2. Variables included in data analysis

Statistical analysis

In the first stage, descriptive statistics were used to examine the distribution of all variables in the analysis. In the second stage, bivariable logistic regression was performed to obtain each potential predictor's unadjusted odds ratio (OR) to measure the estimated relationship between the dependent and independent variables without adjusting for other covariates. In the final stage, multivariable logistic regression was performed to obtain the adjusted odds ratio/aOR). All analyses were performed using STATA/MP 17.0.

Ethics clearance

The research ethics in this analysis was obtained from the ethical commission of the Faculty of Medicine, Pattimura University no. 160/FK-KOM. ETIK/VIII/2022. All respondents were explained to participate in this study.

Results and Discussion

This analysis used information from 653 respondents living in the coastal area of Laha Village. The prevalence of diarrhea was 9.5% of respondents. Table 1 shows the distribution of respondents based on the various characteristics analyzed in this study.

Table 1. Characteristics of respondents based on various factors analyzed

Variable	n	%	Diarrhea		
			n	%	*p*
Socio-demographic Characteristics					
Sex					
Male	257	39.4	20	7.8	*0.913*
Female	396	60,6	42	10.6	
Age (years)					
<25	100	15.3	6	6.0	
25-59	485	74.3	46	9.5	*0.168*
>60	68	10.4	10	14.7	
Occupation					
Informal Workers	401	61.4	34	8.5	
Formal Workers	119	18.2	11	9.2	*0.339*
Not Working/Housewife	133	20.4	17	12.8	
Marital Status					
Not Married	112	17.2	9	8.0	
Married	506	77.5	49	9.7	*0.946*
Divorced	35	5.4	4	11.4	
Personal Hygiene					
Hand Washing (Soap)					
Yes	630	95.2	58	9.5	*0.924*
No	32	4.8	3	10.0	
Dietary Pattern					
Sweet Food Consumption					
Often	433	64.4	40	8.8	
Rarely	192	28.6	17	11.3	*0.657*
Never	47	7.0	4	9.5	
Sweet Drink Consumption					
Often	475	70.7	33	7.9	
Rarely	155	23.1	23	12.2	*0.229*
Never	42	6.3	5	10.9	
Meat Consumption					
Often	170	25.3	13	7.9	
Rarely	197	29.3	20	10.6	*0.684*
Never	47	45.4	28	9.5	
Fruits Consumption					
Often	73	10.9	9	12.3	

To be continued…

Rarely	475	70.9	36	7.9	*0.118*
Never	122	18.2	16	13.4	
Mental Health					
Yes	29	4.4	58	9.3	*0.419*
No	624	95.6	4	13.8	
Traditional Medicine					
Yes	466	68.8	42	9.4	*0.856*
No	211	31.2	20	9.8	

Table 2 shows the results of the logistic regression univariable, showing that factors associated with diarrhea were demographic status, age >60 years, and rarely consuming sweet drinks (Table 2). After performing the logistic regression multivariable analysis, we found that the respondent's age was the only factor significantly associated with diarrhea. Respondents with demographic status aged >60 years had higher odds of experiencing diarrhea than those aged 25-59 years (aOR=3.65; 95%CI: 1.04-12.8; *p=0.043*). The elderly are more vulnerable to diarrhea than young people (Prasetyoningsih, 2015). This is due to the decreased function of the body's organs so that the activity and metabolism of the body automatically decrease, followed by decreased energy and decreased digestive capacity (MacGill, 2020). Diarrhea in the elderly is most commonly caused by gastrointestinal diseases, certain drugs, food-borne illnesses, and bacterial infections. Not all parents experience bouts of diarrhea, but many are frustrated by symptoms that can pose more serious health risks if they persist (MacGill, 2020). The body's immune response in older individuals weakens (MacGill, 2020). This could be due to a reduction in several metabolic activities, such as producing immune-related proteins, and a diminished capacity for water uptake in the digestive tract (Prasetyoningsih, 2015). If there's a decline in immune function, bacterial infections could be the underlying cause of diarrhea in the elderly (MacGill, 2020). Our results show the need to carry out regular diarrhea prevention programs to increase understanding of diarrhea transmission, especially in the elderly. This evidence showed the importance of conducting health promotion activities among the elderly and their family members to prevent the transmission of diarrhea preventive measures are taken, such as proper hand hygiene, safe food handling, and timely medical consultations. This will safeguard the health of the elderly and protect the broader community.

This study also found that the percentage of diarrhea cases was higher in people who did not use latrines for defecation (11.8%), compared to people who used latrines (9.1%), although the difference was not significant. Research indicates that limited access to clean water and proper sanitation facilities could spread pathogens that cause diarrheal illnesses (Grabovac et al., 2023; Giri et al., 2022; Birhan et al., 2023). Insufficient hygiene and sanitation might result in the consumption of harmful microbes, such as bacteria, viruses, or parasites, that could infect the digestive system and result in diarrhea. Therefore, enhancing sanitation is important in decreasing the occurrence of diarrheal illnesses, underscoring the importance of worldwide initiatives to provide communities with clean water and proper sanitation.

Table 2. Factors related to diarrhea dependent variables and independent variables

Variable	OR	Univariate 95% (CI)		*P*	aOR	Multivariate 95% (CI)		*p*
Socio-demographic Characteristics								
Sex								
Male	1.00				1.00			
Female	1.03	0.60	1.76	*0.913*	1.14	0.65	1.99	*0.644*
Age (years)								
<25	1.00				1.00			
25-59	1.64	0.68	3.95	*0.269*	1.87	0.71	4.94	*0.201*
>60	2.70	0.93	7.82	*0.067*	3.65	1.04	12.8	*0.043*
Occupation								
Informal Workers	1.00				1.00			
Formal Workers	1.09	0.53	2.24	*0.794*	1.18	0.54	1.99	*0.664*
Not Working/Housewife	1.58	0.85	2.93	*0.146*	1.76	0.86	2.56	*0.116*
Marital Status								
Not Married	1.00				1.00			
Married	1.01	0.60	1.72	*0.946*	0.57	0.28	1.16	*0.127*
Divorced	1.00				1.00			
Personal Hygiene								
Hand Washing (Soap)								
Yes	1.00				1.00			
No	1.06	0.31	3.60	*0.924*	1.08	0.31	3.79	*0.898*
Dietary Pattern								
Sweet Food Consumption								
Often	1.00				1.00			
Rarely	1.32	0.72	2.40	*0.361*	0.96	0.45	2.02	*0.917*
Never	1.09	0.37	3.23	*0.866*	0.79	0.22	1.84	*0.721*
Sweet Drink Consumption								
Often	1.00				1.00			
Rarely	1.61	0.92	2.84	*0.094*	1.75	0.85	3.60	*0.128*
Never	1.41	0.52	3.82	*0.493*	1.54	0.45	5.16	*0.484*
Meat Consumption								
Often	1.00				1.00			
Rarely	1.38	0.66	2.87	*0.384*	1.16	0.53	2.53	*0.700*
Never	1.22	0.61	2.42	*0.568*	0.93	0.44	1.98	*0.866*
Fruits Consumption								
Often	1,00				1,00			
Rarely	0.60	0.27	1.32	*0.209*	0.75	0.33	1.72	*0.508*
Never	1.10	0.46	2.64	*0.823*	1.48	0.58	3.75	*0.407*
Mental Health								
Yes	1.56	0.52	4.64	*0.423*	1.59	0.50	5.05	*0.427*
No	1.00				1.00			
Tradisional Medicine								
Yes	1.05	0.60	1.84	*0.856*	0.97	0.54	1.75	*0.940*
No	1.00				1.00			

Conclusion

Our study showed that respondents with demographic status aged >60 years had an increased likelihood of developing diarrhea than the younger population. Health promotion activities should target the elderly and their families to prevent the occurrence of diarrhea. This should be accompanied by efforts to provide the communities with clean water and proper sanitation that will help to prevent diarrhea.

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