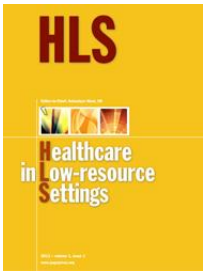
Healthcare in Low-resource Settings



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Original Article

Analysis of diarrhea incidence based on demographic characteristics and hygiene behavior of adults in Indonesia and Taiwan

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Significance for public health: Diarrhea is a significant public health problem that has serious impacts on individuals, families, and communities. In regions with limited access to healthcare facilities, diarrhea can lead to death if not treated quickly and effectively, specifically in developing countries. Consequently, prioritizing the prevention and control of diarrhea is very important for public health, emphasizing the significance of educating people about the importance of maintaining good health practices.

Abstract

Diarrhea is a common manifestation of gastroenteritis, affecting both children and adults globally. Subsequently, gastroenteritis is particularly prevalent in developing countries such as Indonesia and Taiwan. This research aimed to analyze the incidence of diarrhea based on socio-demographics and personal hygiene in Indonesia and Taiwan.

The method used in this research was a quantitative design with a cross-sectional approach, and the data collection involved interviews with adults, using a structured questionnaire. The primary goal of the analysis was to examine the bivariate relationships between each variable and the incidence of diarrhea, and the logistic regression test was applied for the multivariate test.

A result from Taiwan respondents, the statistical tests showed significant relationships with age with a p-value of 0.009, education with a p-value =0.010, and personal hygiene with a p-value =0.010. Factors that influenced diarrhea in Indonesia were education with a p-value =0.038 and income with a p-value =0.08.

In summary, several socio-demographics and personal hygiene practices played a significant role in the incidence of diarrhea. The differences in results obtained from Taiwan and Indonesia were attributed to differing respondent characteristics, emphasizing the importance of promoting clean and healthy behaviors, including handwashing with soap before eating and maintaining a clean environment, as effective measures to prevent diarrhea.

Introduction

Adult period includes diverse biological and psychosocial changes. However, diarrhea is a manifestation of gastroenteritis, which is prevalent in both children and adults globally and can be triggered by poor hygiene behavior in teenagers.[1] Gastroenteritis is a condition where the feces resulting from defecation have a liquid or semi-liquid consistency, and contain more air than feces. Apart from its consistency, it can be accompanied by nausea, vomiting, and increased defecation frequency exceeding three times a day.[2,3] Gastroenteritis is more prevalent in developing countries compared to developed countries where the level of hygiene and sanitation is better.[4-6] According to data from the World Health Organization (WHO) and UNICEF, 1.87 million people die globally due to cases of gastroenteritis every year. 6 Globally, it is estimated that there are about 179,000,000 incidents of acute gastroenteritis in adults every year with some patients being hospitalized as many as 500,000 and more than 5000 patients dying.[7,8] In America, at least 8,000,000 acute gastroenteritis patients are treated by doctors and more than 250,000 patients are hospitalized according to data from The American Journal of Gastroenterology.[9] Meanwhile, developing countries such as Indonesia and Taiwan are at risk of experiencing diarrhea. Numerous factors influence incidence of diarrhea in adults, contributing to its increase and prevalence. Diarrhea in adults can be caused by various factors, such as infection, food intolerance, or diseases of the digestive tract, and therefore, proactive efforts should be made to prevent its incidence.[10-12]

This research provides additional literature regarding the pooled prevalence of diarrhea prevention in adults. Additionally, it can add to the literature regarding the pooled prevalence of diarrhea prevention in adolescents. Observing the phenomenon of the increased incidence of diarrhea, proactive prevention efforts are needed to mitigate its impact. Following this, maintaining good hygiene, such as washing hands properly, cooking food properly, and avoiding consumption of potentially contaminated water or food, are effective measures to prevent diarrhea.[13]

Materials and Methods

This research was carried out using an observational analytical method with a cross-sectional method, from May - June 2021 in Surabaya, and continued in August within the PCINU Taiwan

Working Area. The eligibility criteria established for the study are as follows: 1) Inclusion Criteria: Adults who are in good physical condition and possess the ability to read and write; 2) Exclusion Criteria: Individuals who are not willing to participate as respondents. This research aims to focus on a population of 100 migrant adults who are affiliated with PCINU Taiwan, comprising 100 adults from Taiwan and an additional 100 from Indonesia. The targeted population encompasses adults from diverse regions in Surabaya, including the East, West, North, and South, and they were selected at random from the overall population of interest. A questionnaire was employed as the data collection tool to ascertain demographic characteristics and the incidence of diarrhoea. The statistical analysis utilized logistic regression with hypothesis testing at $p<0.05$.

Results and Discussion

The survey collected 200 respondents, from which the questionnaire was distributed to 100 respondents (adults) in Taiwan and 100 respondents from Indonesia. Table 1 shows the results of incidence of diarrhea in Taiwan among 100 adults, with a focus on socio-demographic factors, obtained from 62 young adults. Subsequently, 61.3% reported no occurrence of diarrhea in the last month, while 8.1 had diarrhea. Regarding gender, 84 respondents were female, 76.2% did not experience diarrhea, and out of the 68 married respondents, 75% did not experience diarrhea, and 25% experienced it. Out of the 55 respondents who live in Taipei, 74.5% did not experience diarrhea and 25.5% did. Out of the 41 respondents whose length of stay was >6 years, the majority of 78.0% did not experience diarrhea, and 22.0 did. Regarding education, there were 57 respondents with low education, and 78.9% did not have diarrhea. 57 respondents had an income of 20-24.99, out of the 78 respondents with good behavior, 83.6% did not experience diarrhea.

Table 2 shows the results of the logistic regression test. The factors that influence incidence of diarrhea in Taiwan are age with a p-value = 0.009, education with a p-value = 0.010, and personal hygiene with a p-value = of 0.010 which does not affect gender, marital status, place of residence, length of stay, income. Table 3 shows the results of incidence of diarrhea in the last month in Indonesia, specifically in the city of Surabaya, based on the socio-demographics of 100 adults, with a focus on 70 young adults. The majority, consisting of 62.9% did not experience diarrhea, while

37.1% did. Regarding the gender of the 83 respondents, the majority of women did not experience diarrhea, namely 73.5%, while 26.5% did. Out of the 58 respondents who were married, 77.6% did not experience diarrhea, while 22.4% did. Of the 47 respondents who live in North Surabaya, 66.0% did not experience diarrhea, while 34.0% experienced it. Regarding education, there were 42 respondents with low education, 57.1% had no diarrhea and 42.9% did. There were 40 respondents with an income of 5-7 million, 82.5% had no diarrhea and 17.5% did, of the 72 respondents with good behavior there were 73.6% and 26.4% did not suffer from diarrhea. Table 4 from the results of logistic regression shows that the factors that influence diarrhea are socio-demographics, namely education with a p-value = 0.038 and income = 0.008 which does not affect age, gender, marital status, or place of residence.

In this research, socio-demographic results show that age significantly influences incidence of diarrhea in Taiwan, shown by a p-value of 0.009. Conversely, in Indonesia, the p-value = 0.058 as shown in Table 1, emphasizing the largest age group affected—individuals aged 20-40, totaling 62 respondents, and this age group is vulnerable due to poor diet. This is in line with previous researches which reported that at this age, most respondents often eat out or eat unclean food, having a higher risk of developing diarrhea.[14,15] Poor nutrition or changes in the gut microbiome that occur and their potential,[16,17] to an unhealthy relationship with food development, and the diet of young adults can influence the likelihood of diarrhea. Contamination and spread of disease through food must comply with hygienic procedures in handling food.[18] Another socio-demographic factor that influences diarrhea is education in Taiwan with a significant result of p-value = 0.01 and in Indonesia with a significant result of p-value = 0.008. In Table 2, in Taiwan, there are 57 respondents with low levels of education, while in Table 4, in Indonesia, 42 respondents fall into the low education category, including individuals who did not attend school, or did not complete elementary school. The significance of education is underscored as it profoundly shapes an individual's mindset. Inadequate education affects the dissemination of necessary information about the importance of personal hygiene and environmental sanitation in preventing infectious diseases, including diarrhea.[19] The level of education can increase health knowledge, acting as a key component influencing an individual's

awareness.[20,21] Moreover, a higher level of education makes it easier to gain access to health-related information.

In Indonesia, incidence of diarrhea is significantly influenced by income, as shown by a p-value = 0.008. In Table 3, despite a monthly income range of 5-6 million, the individuals experiencing the highest frequency of diarrhea fall within the income range of 1-2 million. Income can influence the risk and impact of diarrhea, including poor food consumption patterns. This is in line with Derek Headey's statement that low income influences many diseases because it affects nutritional status, food quality, and less clean food consumers, resulting in diarrhea.[22] Subsequently, Socio-demographic factors in both Taiwan and Indonesia regarding gender, marital status, and place of residence did not affect incidence of diarrhea.

In Taiwan, the cleaning staff is a significant factor influencing diarrhea, as showed by a p-value of 0.010. From Table 2, it was found that 78 respondents had personal hygiene. In Indonesia, of the 72 respondents, the majority, 73.6%, had good behavior. Respondents exhibiting poor personal hygiene simultaneously contributed to a higher incidence of diarrhea, leading to an increased occurrence of the condition. With respect to personal hygiene, researchers asked about washing hands, cleaning nails, and protecting food. Subsequently, washing hands regularly and correctly is an important step to prevent the spread of infection and maintain cleanliness, which includes using soap and clean water as well as correct hand-washing methods. Washing hands is behavior that reduces the risk of cross-infection transmission. With “Clean Care is Safer Care” at the top of the agenda of WHO's global initiative on patient safety programs, it is time for developing countries to formulate much-needed policies for the implementation of basic infection prevention practices in healthcare settings.[23,24] Cutting nails is often considered a trivial matter in society, and even though nail cleanliness can contribute to improving people's health status, cutting nails also prevents intestinal parasites.[25] Safeguarding food is to prevent contamination and the spread of disease through food.[12] Maintaining cleanliness, eating healthy food, and preventing diarrhea can help reduce the risk of its development. Behavior that can reduce the risk of diarrhea is washing vegetables and fruit before consumption, one way of transmitting diarrhea is through serving undercooked or raw food. The pathogenic causes of foodborne diseases vary due to different eating places and eating habits. The

proportion of outdoor food consumption is increasing rapidly and, in turn, increases the possibility of pathogenic microorganisms if stored improperly. The Taiwanese government's policy is to carry out cross-domain management, including food quality inspection, monitoring, proper treatment, packaging, and food preservation with international regulations and standards, industrial discipline, and private participation to achieve food security.[26] Policy from Indonesia is facilitated through public services through BPOM (Food and Drug Supervisory Agency).

Conclusions

In conclusion, this research shows that diarrhea is a global problem with high levels of morbidity and mortality in various countries, specifically in developing countries, namely Indonesia and Taiwan. Several factors that cause diarrhea are socio-demographics and personal hygiene. Subsequently, socio-demographic factors that influence incidence of diarrhea in Taiwan are age, education, and personal hygiene, while in Indonesia, education and income are the most influential factors in incidence of diarrhea.

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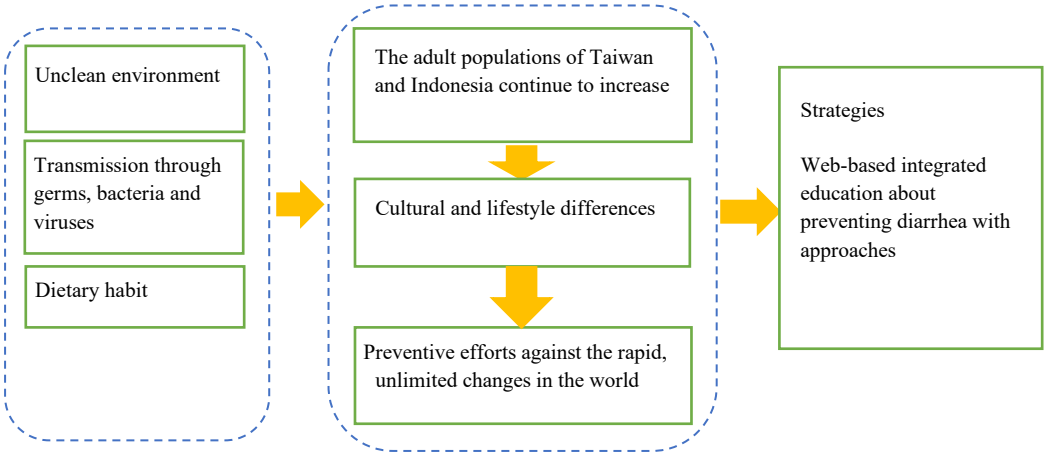

Figure 1. The roles faced by Indonesian Migrant Workers in Taiwan

Table 1. Frequency distribution of socio-demographics, hygiene behavior, on incidence of diarrhea in Taiwan

Categories	No Diarrhea		Diarrhea	
	F	%	F	%
Age				
Early adulthood	38	61.3	24	38.7
Middle adults	34	91.9	3	8.1
Late adulthood	1	100	0	0
Gender				
Woman	64	76.2	20	23.8
Man	9	56.3	7	43.8
Married Status				
Not married yet	9	56.3	7	43.8
Marry	51	75	17	25
Divorced	13	81.3	3	18.8
Residence area				
New Taipei	19	67.9	9	32.1
Taipei	41	74.5	14	25.5
Etc	12	75	4	25
Length of stay				
1-3 Years	13	52	12	48
4-6 years	28	82.4	6	17.6
>6 years	32	78.0	9	22.0
Education level				
Low	45	78.9	12	21.1
Intermediate	26	74.3	9	25.7
High	72	72.27	27	27
Income				
10-14.999 million	1	33.3	2	66.6
15- 19.99 million	4	57.1	3	42.8
20-24.99 million	43	75.4	14	24.56
25.99-14.99 million	23	74.19	8	25.8
≥ 30 million	2	100	0	0
Hygiene behavior				
Not good	12	54.54	10	45.45
Good	61	78.20	17	21.79

Table 2. Logistic regression results that influence incidence of diarrhea in Taiwan

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	-2.052	.790	6.752	1	.009	.128
	gender	.786	.760	1.070	1	.301	2.194
	Status	-.340	.488	.486	1	.486	.711
	Stay	-.112	.422	.070	1	.791	.894
	Long	.225	.396	.323	1	.570	1.253
	Educate	1.189	.459	6.702	1	.010	3.284
	wages	-.549	.380	2.087	1	.149	.577
	Hygiene	-1.731	.673	6.625	1	.010	.177
	Constant	3.976	2.329	2.914	1	.088	53.312

a. Variable(s) entered on step 1: Age, Gender, Status, Residence, Length, Education, Salary, Cleanliness.

Table 3. Frequency distribution of socio-demographics, and hygiene behavior, on incidence of diarrhea in Indonesia

Categories	No Diarrhea		Diarrhea	
	F	%	F	%
Age				
Early adulthood	44	62.9	26	37.1
Middle adults	25	86.2	4	13.8
Late adulthood	1	100	0	0
Gender				
Woman	61	73.5	22	26.5
Man	9	56.3	8	43.8
Married Status				
Not married yet	14	46.7	16	53.3
Marry	45	77.6	13	22.4
Divorced	11	91.7	1	8.3
Residence area				
East Surabaya	6	60.0	4	40.0
North Surabaya	31	66.0	16	34.0
South Surabaya	26	74.3	9	25.7
West Surabaya	7	87.5	1	12.5
Length of stay				
1-3 Years	13	52	12	48
4-6 years	28	82.4	6	17.6
>6 years	32	78.0	9	22.0
Education level				
Low	24	57.1	18	42.9
Intermediate	34	82.9	7	17.1
High	12	70.6	5	29.4
Income				
1-2 million	9	42.9	12	57.1
3- 4 million	20	66.7	10	33.3
4-5 million	33	82.5	7	17.5
6-7 million	7	87.5	1	14.3
≥ 30 million	7	100	0	0
Hygiene behavior				
Not good	17	60.7	11	39.3
Good	53	73.6	19	26.4

Table 4. Logistic Regression Results that influence incidence of diarrhea in Indonesia

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	-.898	.475	3.580	1	.058	.407
	gender	-.616	.692	.791	1	.374	.540
	Status	.991	.666	2.214	1	.137	2.693
	Stay	.267	.397	.452	1	.501	1.306
	Educate	-.799	.386	4.293	1	.038	.450
	wages	-.855	.324	6.982	1	.008	.425
	hygiene	-.639	.581	1.210	1	.271	.528
	Constant	4.033	1.841	4.799	1	.028	56.434

A. Variables entered in step 1: age, gender, status, residence, upbringing, salary, cleanliness.