Daily Food Hygiene Relationship with Acute Diarrhea

Comment [BH1]: Daily Food Hygiene Relationship with Acute Diarrhea among Medical Students of UKI

Abstract

Diarrhea is defecation with excrete, liquid, or semi-liquid (semi-solid); the water content of stools is more than normal, more than 200 g or 200 ml / 24 hours. Another definition using frequency criteria, the definition is watery stools more than three times per day. Acute diarrhea is diarrhea that is less than 14 days. The cause of diarrhea may include infection, food poisoning, and allergies. This study aims to analyze the relationship between daily food hygiene and acute diarrhea in Medical Students of UKI who live at boarding house. This type of research is analytic - cross-sectional. The population in this study is the student of the medical students of UKI. Determination of the sample in this study was done by probability sampling by using simple random sampling; a total of 100 boarding students living around the UKI were sampled. This study showed that of the 100 students living in boarding houses, 70 had suffered from diarrhea, and the other 30 had never experienced diarrhea. Of 100 students who assessed where they obtained food in a clean state, 26 people assessed the state where they obtained food less clean than 70 people, and the remaining four rated not clean. It is concluded that there is no relationship between everyday food hygiene with acute diarrhea in Medical Students of UKI who live at boarding house.

Keywords: *food hygiene, acute diarrhea, medical students*

Introduction

Comment [BH2]: There is no need to separate the introduction from the literature review; you have to merge both of them, i.e., the studies that support the idea and the aim of the current study do need to be included within the introduction.

Diarrhea is defecation with liquid or semi-solid stools; the water content of the stool is more than usual, more than 200 grams or 200 ml/24 hours [1]. Another definition uses the frequency criterion: loose stools more than three times per day. The watery bowel movements may or may not be accompanied by mucus and blood. Acute diarrhea is diarrhea that lasts less than 15 days. Meanwhile, according to the World Gastroenterology Organization global guidelines 2005, acute diarrhea is the passage of liquid or soft stools in greater quantities than normal, lasting less than 14 days. [2] Acute diarrhea also causes symptoms such as nausea, vomiting, and abdominal pain. [3]

It is estimated that as many as 99,000,000 cases of acute diarrhea or gastroenteritis are experienced in adults yearly [4]. In the United States, an estimated 8,000,000 patients see a doctor, and more than 250,000 patients are hospitalized yearly (1.5% are adult patients) due to diarrhea or gastroenteritis. The frequency of diarrhea in developing countries, including Indonesia, is 2-3 times more than in developed countries. [5] WHO estimates that 4 billion cases of diarrhea occurred worldwide in 2007, and 2.2 million of them died, mostly children under the age of 5 years. [6] To the integrated surveillance report in 1989, the number of cases of diarrhea was found to be 13.3% at the health center, 0.45% in the hospital for inpatients, and 0.05% for outpatients. Based on Indonesia's health profile in 2011, in 2010, diarrhea sufferers increased to 8,443 cases with 209 deaths. [7] Acute diarrhea has many causes, including infections (bacteria, parasites, viruses) and food poisoning [8]. Diarrheal infection is often acquired through food or drink contaminated with pathogens from human or animal feces. [9]

Students, in their daily activities, carry out lectures with a busy schedule. As a result, students often neglect their health. With such a busy schedule, students often do not maintain the cleanliness of the food and drinks they buy. Often students buy food and drinks on the side of the road or in places where the level of cleanliness is said to be low. Especially students who live far from their parents or in boarding houses tend to have a higher chance of these things happening. No data shows the relationship between daily food hygiene and acute diarrhea at boarding house. Based on the above background, researchers are interested in the relationship between daily food hygiene and acute diarrhea among children who live in boarding house.

Considering the background of the problems above, the problem of this study is formulated as follows: Is there a relationship between daily food hygiene and acute diarrhea who live in boarding house? This research aims to determine the relationship between daily food hygiene and acute diarrhea.

Literature Review

Diarrhea is defecation with liquid or semi-liquid (half solid) feces; the water content of the stool is more than usual, more than 200 grams or 200 ml/24 hours, with a frequency of defecation of more than three times per day. The watery bowel movements can or without mucus and blood. Acute diarrhea is diarrhea that lasts less than 15 days. [2] Acute diarrhea is caused by many causes, including infections (bacteria, parasites, viruses) and food poisoning, listed in the following table. WHO estimates that 4 billion cases of diarrhea occurred worldwide in 2007, and 2.2 million died. [10] It is estimated that in adults each year, there are 99,000,000 cases of acute diarrhea or acute gastroenteritis. In the United States, an estimated 8,000,000 patients see a doctor, and more than 250,000 patients are hospitalized yearly (1.5% are adult patients) due to diarrhea or gastroenteritis. [5] Based on Indonesia's health profile in 2011, in 2010, the number of diarrhea sufferers increased to 8,443 cases with 209 deaths, and outbreaks occurred in 15 provinces, while in 2011, diarrhea outbreaks occurred in 11 provinces with a total of 4,204 sufferers, the number of deaths was 73 people. In 2012 a total of 5,870 sufferers. [7] The epidemiology of infectious diarrhea is listed in the following table.

Diarrhea can be caused by one or more pathophysiologies: [11] osmotic diarrhea, secretory diarrhea, abnormal intestinal motility and transit time, inflammation of the intestinal wall (inflammatory diarrhea), and infectious diarrhea. Acute diarrhea due to infection can be accompanied by vomiting, fever, and abdominal pain. Besides that, there will also be disturbances in other organs, namely the lungs, and heart. Due to the loss of bicarbonate ions, the ratio of bicarbonate ions decreases, which results in a decrease in blood pH. This decrease will stimulate the respiratory center so the respiratory rate is faster and deeper. This reaction is the body's attempt to excrete carbonic acid so the pH can rise to normal. Cardiovascular disturbances in severe hypovolemia can include a rapid pulse and decreased blood pressure [12]. The patient also looks restless, has a pale face, cold extremities, and sometimes cyanosis. [13]

This diarrhea complaints lasted less than 15 days. Patients with acute invasive diarrhea have typical complaints, namely nausea, vomiting, abdominal pain, fever, and watery or bloody diarrhea depending on the specific pathogenic bacteria. [14] Patients who have ingested the toxin or those who have had toxigenic infections or non-invasive acute diarrhea typically have nausea, vomiting, and watery diarrhea but rarely have a fever. [15] Complaints in patients who experience acute diarrhea due to intestinal wall

inflammation show symptoms of bloody stools; there is mucus in the stool, fever, and abdominal pain [16]. The most important examination in the physical examination is the degree of dehydration. The patient generally looks sick; mucous membranes look dry, increasing heart rate. Three levels of dehydration: [17] a) Mild dehydration (2-5% body weight fluid loss); b) The clinical picture is less turgor and hoarseness; c) Moderate dehydration (5-8% body weight loss); and d) Severe dehydration (8-10% fluid loss).

Fluid loss and electrolyte abnormalities are major complications, especially in the elderly and children. In acute cholera diarrhea, sudden fluid loss often results in rapid hypovolemic shock. Loss of electrolytes via the stool can lead to hypokalemia and metabolic acidosis. In cases where it is too late to seek medical help so that the hypovolemic shock can no longer be overcome, acute tubular necrosis can arise in the kidneys, resulting in multi-organ failure. This complication can also occur if the handling of fluid administration is inadequate so that optimal rehydration is not achieved. [18] With adequate fluid replacement, supportive care, and antimicrobial therapy when indicated, the prognosis for infectious diarrhea is excellent, with minimal morbidity and mortality.

Food hygiene is the health and hygiene of food, which focuses on the cleanliness and integrity of food and is influenced by the food processor. Food sanitation is the cleanliness and health of food that focuses on the environment where the food is processed, which includes the quality of food ingredients, reception and storage, food washing techniques, food processing techniques, and personal hygiene. Food sanitation includes efforts aimed at cleanliness and purity of food so as not to cause disease.

Food processing into ready-to-eat food is one of the points prone to poisoning; many poisonings occur due to processing workers who do not pay attention to sanitation aspects. Good food processing follows the rules and principles of hygiene and sanitation, known as Good Manufacturing Practice (GMP) or good food production methods. [19] GMP requires that cleaning and sanitizing with sufficient frequency be carried out on all surfaces of food processing machines, whether in direct contact with food or not. GMP also requires that every surface that comes into contact with food and in wet conditions must be dried and sanitized. Because water is a place for microbial growth. Cases of food poisoning are caused by inadequate sanitation at food processing sites and cooking utensils used. [20]

Serving food is also one of the factors that can cause food poisoning. Serving by catering services is different from restaurants. In a restaurant, the serving place is relatively close to the processing kitchen, so there is very little contamination with the outside environment, whereas, in a catering service, the place for serving can be many kilometers from the processing place [21] Therefore the food transportation factor becomes important because it will affect the serving conditions.

Research Method

Study design

Current study is ~~This type of research is~~ analytic-cross-sectional, describing the relationship between daily food hygiene and acute diarrhea who live in boarding. ~~The analytical research method identifies and measures variables and looks for relationships between variables to explain observed events or phenomena. By taking a momentary measurement, the cross-sectional research method looks for the relationship between the~~

~~independent variable (risk factor) and the dependent variable (effect).~~ [13] The study was conducted at the Faculty of Medicine at UKI, Jakarta. Data collection and collection were carried out during December 2021-January 2022.

Comment [BH3]: UKI???

Sampling method

The population in this study were students of the Faculty of Medicine at UKI. Determination of the sample in this study was carried out employing probability sampling using simple random sampling. ~~Probability sampling is that each subject in the population has the same opportunity to be selected or not as the research sample. Simple random sampling is randomly taking samples from the population based on the probability frequency of all population members.~~ [13] Samples were taken according to inclusion and exclusion criteria. The number of samples needed in this study is 100 people.

Data collection tool

The research tool used is a list of questions (questionnaire) tested for validity and reliability. Validity test to test whether the instrument used, in this case, the questionnaire meets the validity requirements. Pearson correlation is used. Pearson correlation, namely the number of questions, is called valid if r count > r table. Reliability test to test the reliability of question numbers. The question numbers tested are only valid question numbers. [14] The type of data collected is in the form of primary data by filling out a questionnaire. Data processing is done through several stages: editing, coding, data entry, and cleaning.

Result and Discussion

Comment [BH4]: Too many tables; authors need to merge them and reduce the number to a maximum of 3 tables (as descriptive data) and 1 table (as statistical data).

Comment [BH5]: Separate the discussion from the results i.e., in new section this is not a thesis

~~The research was conducted at UKI from December 2021 to January 2022, with 100 questionnaires distributed.~~ The number of respondents involved was 100 UKI Faculty of Medicine students living in boarding houses around UKI. More than half of the respondents were women, with a percentage of 67% or 67 people, while men had 33% or 33%, as shown in Table 1.

Table 1. Characteristics of respondents based on gender

Gender	Total	Percentage (%)
Male	33	33
Female	67	67
Total	100	100

The number of female respondents was 67, and male respondents were 33.

Based on age, most respondents were 21, with a percentage of 60% or 60 people. Respondents aged 22 years have a percentage of 20% or 20 people. Respondents aged 23 years have a percentage of 4% or four people. The youngest respondent is 20, with a percentage of 16% or 16 people. While the oldest respondent, namely 24 years, has the smallest percentage of only 2% or two people, as shown in Table 2.

Table 2. Characteristics of respondents based on age

Umur	Total	Percentage (%)
20 years	16	16
21 years	60	60

22 years	20	20
23 years	4	4
Total	100	100

The number of respondents aged 20 years was 16, the number of respondents aged 21 years was 60, the number of respondents aged 22 years was 20, and the number of respondents aged 23 years was four.

Of all the respondents who were sampled in this study, namely as many as 100 respondents, as many as 70 people, or a percentage of 70%, said they had experienced diarrhea, and as many as 30 people, or a percentage of 30%, said they had never experienced diarrhea. For more details, see Table 3. Of the 70 respondents who stated defecation > 3 times/day, 70 for more details can be seen in Table 4.

Of the 70 respondents who stated that they had diarrhea, all respondents with a percentage of 70% stated that they had diarrhea for < 14 days or, in other words, experienced acute diarrhea (see Table 5). Most respondents with a percentage of 45.7% or 32 respondents, said they did not remember the last time they had diarrhea. At the same time, the smallest number is the respondent who experienced diarrhea <1 week ago, with a percentage of 11.5% or eight people. When could the last time the respondent had diarrhea be seen in Table 6?

Respondents' complaints when experiencing diarrhea varied quite a lot. From the data obtained, most respondents complained of stomach pain while having diarrhea, with a percentage of 41.3% or as many as 69 people. Then followed by complaints of nausea with a percentage of 27.5% or as many as 46 people. Meanwhile, complaints with the smallest percentage were bloody stools, with a percentage of 0.6% or only experienced by one respondent. Complaints of respondents while experiencing diarrhea can be seen in Table 7.

Table 3. Respondents who have experienced diarrhea

Diarrhea	Total	Percentage (%)
Yes	70	70
No	30	30
Total	100	100

Of the 100 respondents who said they had experienced diarrhea, 70 and 30 said they had never experienced diarrhea.

Table 4. Defecation in a day during diarrhea

Defecate in a day	Total	Percentage (%)
> 3 times/per day	70	70
< 3 times/per day	0	0
Total	70	70

There were only 70 respondents because only 70 had experienced diarrhea, and of the 70 respondents who had experienced diarrhea, all had defecation > 3 times/day during diarrhea.

Table 5. Duration of diarrhea

Duration of diarrhea	Total	Percentage (%)
< 14 days	70	100
> 14 days	0	0

Total	70	100

There were only 70 respondents because only 70 had experienced diarrhea, and all had diarrhea for < 14 days.

Table 6. Last time having diarrhea

Last time diarrhea	Total	Percentage (%)
< 1 week ago	8	11,5
1-3 weeks ago	10	14,2
> 1 month ago	20	28,6
Do not remember	32	45,7
Total	70	100

There were only 70 respondents because only 70 respondents had experienced diarrhea. Of the 70 respondents who experienced diarrhea, 32 said they did not remember the last time they had diarrhea. Twenty respondents stated that the last time they experienced it was > 1 month ago. Ten respondents stated that the last time they had diarrhea was 1-3 weeks ago, and eight respondents stated that the last time they had diarrhea was <1 week ago.

Table 7. Complaints during diarrhea

Complaint	Total	Percentage (%)
Fever	26	15,6
Stomach ache	69	41,3
Nauseous	46	27,5
Vomit	25	15
Bloody stools	1	0,6
Total	167	100

The total answers in this table exceed the number of respondents who have experienced diarrhea, namely 70 respondents, because respondents may answer more than one answer. Of the 70 respondents who experienced diarrhea, 69 stated that they had stomach pain during diarrhea. A total of 46 respondents stated nausea during diarrhea. A total of 26 respondents stated that they had a fever, and 25 respondents stated that they vomited while experiencing diarrhea. Only one respondent stated that the stool was bloody during diarrhea.

Of the 70 respondents who experienced diarrhea, all stated they had a history of eating food before experiencing it. The type of food eaten by most respondents was rice and side dishes before experiencing diarrhea, with as many as 39 people or a percentage of 55.7%. Then followed by eating fried foods with a percentage of 18.6% or as many as 13 people. At the same time, the rest varied types of food consumed before experiencing diarrhea can be seen in Table 8.

Table 8. Types of food

Food type	Total	Percentage (%)
Rice and side dishes	39	55,7
Fried food	13	18,6
Spicy food	12	17,1
Meatball	6	8,6
Total	70	100

There were only 70 respondents because only 70 respondents had experienced diarrhea. Of the 70 respondents who experienced diarrhea, 39 said they had eaten rice and side dishes before experiencing diarrhea. As many as 13 respondents said they ate fried foods, and 12 said they ate spicy food before experiencing diarrhea. The remaining six respondents stated that they ate meatballs before experiencing diarrhea.

Out of 100 respondents, 44 respondents, with a percentage of 44%, stated that they obtained food at rice stalls. Then those who stated that they obtained food on the roadside were 32 respondents, or with a percentage of 32%. As many as 24 respondents, or a percentage of 24%, stated that they obtained food in the canteen. For more details, see Table 9. Of the 44 respondents who received food at the rice stall, ten respondents, or with a percentage of 22.7%, visited the place 2x/week. With the same number of respondents visiting rice stalls 1x/day. The rest varies, as can be seen in Table 10.

Of the 24 respondents who received food in the canteen, eight respondents, or with a percentage of 33.3%, visited the place once a day. Followed by six respondents or with a percentage of 25% visiting the place as much as 1x/month. The rest varies, as can be seen in Table 11. Of the 32 respondents who received food on the side of the road, 12 respondents, or with a percentage of 37.5%, visited the place once a month. The rest can be seen in Table 12.

More than half of the respondents considered the place where they got food to be less clean, namely as many as 70 respondents or with a percentage of 70%. As many as 26 respondents, or a percentage of 26%, assessed the place where they obtained clean food. The smallest percentage, namely 4% or as many as four people, assessed where they obtained food that was unclean. It can be seen in Table 13.

As many as 38 respondents, or a percentage of 38%, stated that they wash their hands before consuming food. As many as 31 respondents, or a percentage of 31%, stated that they sometimes wash their hands before consuming food. The rest varies; more details can be seen in Table 14.

Table 9. Places of obtaining food

Place of obtaining food	Frequency	Percentage (%)
Rice shop	44	44
Canteen	24	24
Roadside	32	32
Etc.	0	0
Total	100	100

There are 100 respondents in Table 9 because respondents who had never experienced diarrhea during boarding also filled out a questionnaire about where to get food to see the effect of cleanliness of the food placed on diarrhea. Of the 100 respondents who stated that they obtained food from rice stalls, there were 49 respondents. As many as 24 respondents stated that they obtained food from the canteen, and 32 respondents stated that they obtained food from the roadside. None of the respondents obtained food from other places.

Table 10. Frequency of visiting rice shop

Frequency	Total	Percentage (%)
1x/day	10	22,7
2x/day	3	6,8
3x/day	4	9,1

1x/week	4	9,1
2x/week	10	22,7
3x/week	9	20,5
1x/month	3	6,8
2x/month	1	2,3
Total	44	100

This table contains 44 respondents who obtained food from rice stalls with varying frequencies.

Table No. 11. Frequency of visiting the canteen

Frequency	Total	Percentage (%)
1x/day	8	33,3
2x/day	3	12,5
1x/week	3	12,5
2x/week	1	4,2
5x/week	3	12,5
1x/week	6	25
Total	24	100

This table contains 24 respondents who obtained food from the canteen with varying frequencies.

Table 12. Frequency of visiting roadside food

Frequency	Total	Percentage (%)
1x/day	2	6,25
1x/week	6	18,75
2x/week	4	12,5
3x/week	2	6,25
1x/month	12	37,5
2x/month	6	18,75
Total	32	100

This table contains 32 respondents who received from the roadside with varying frequencies.

Table 13. Conditions where food is obtained

State of the place	Total	Percentage (%)
Clean	26	26
Not clean enough	70	70
Unclean	4	4
Total	100	100

This table contains the circumstances under which the respondent obtained food. Of the 100 respondents, 26 rated where they obtained clean food. Seventy respondents rated the place where they obtained the food as not clean enough, and four respondents rated the place where they obtained the food as unclean. This rater follows the operational definition.

Table 14. Washing hands before consuming food

Washing hands	Total	Percentage (%)

Yes	38	38
No	12	12
Sometimes	31	31
No need/to use a spoon	19	19
Total	100	100

The table contains the habits of the respondents before eating. Bivariate analysis on samples processed with SPSS 17.0 using the chi-square test to determine the relationship between daily food hygiene and acute diarrhea in boarding students at the Medical Faculty of UKI. The results obtained can be seen in the following table:

Table 15. Relationship between food hygiene and acute diarrhea

		Conditions where food is obtained				
		Clean n (%)	Not clean enough n (%)	Unclean n (%)	Total n (%)	P
Diarrhea	Yes	17 (24,3)	49 (70)	4 (5,7)	70 (70)	0,372
	No	9 (30)	21 (70)	0	30 (30)	

This table is a chi-square test table using SPSS 17.0. The data used is the number of respondents who experienced diarrhea and did not experience diarrhea during the boarding house, which was related to the respondent's assessment of the conditions in which they obtained food. Based on the analysis results with the chi-square test using SPSS, it was found that the p-value = 0.372, greater than the predetermined α value (α <0.05). So it can be concluded that there is no relationship between daily food hygiene and acute diarrhea.

From Table 15, it can be seen that there is no relationship between food hygiene and acute diarrhea. It is not following the theory which states that processing food into ready-to-eat food is one of the points prone to poisoning; many poisonings occur due to processing workers who do not pay attention to sanitation aspects. 11 This study gave no relationship because the cross-sectional study had a weakness, namely the conclusion that the correlation was the weakest compared to case controls or cohorts.

Conclusion

Comment [BH6]: Please no need to repeat the results give conclusion according to the objectives of the study

Based on the results of a study conducted from December 2021 to January 2022 regarding the relationship between daily food hygiene and acute diarrhea who lives at boarding house, it can be concluded as follows: a) There is no relationship between daily food hygiene and acute diarrhea. It can be seen from the chi-square test results on SPSS with the result p value = 0.372, greater than the predetermined α value (α <0.05); and b) This has broken the hypothesis that daily food hygiene is associated with acute diarrhea. Thus, it is expected that students will maintain daily food hygiene. Besides that, it is hoped that this research can be additional material for students who want to do the same research. Besides that, this research is expected to add insight to researchers, and it is hoped that future researchers can further examine the relationship between daily food hygiene and acute diarrhea.

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