

LEVEL OF KNOWLEDGE AND PRACTICES OF FOOD HANDLING HYGIENITY AND ESCHERICHIA COLI CONTAMINATION IN FOOD AT “B” CATERING

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ABSTRACT

Level of Knowledge and Hygiene Practices of Food Handlers and Escherichia Coli Contamination of Food in “B” Catering. A food handler is a person who performs food processing activities, ranging from raw materials to food served. Knowledge of food hygiene and the attitude of food stewards will certainly influence sanitary hygiene practices, especially when processing food, resulting in foods not contaminated by physical, chemical, or biological substances. The study aimed to determine the level of knowledge and hygiene practices among food stewards and the presence of Escherichia coli in the food at “B” Catering in Samarinda City. The research method was quantitative with a descriptive approach, a total sampling technique for food handler samples, and then, for food samples, the menu of interest was selected. Results The knowledge level of food stewards was 83.3%, comparable to 13.3%, while less than 3.3% possessed this level of knowledge. Food inspectors who practiced good hygiene accounted for 66.7%, those who practiced sufficient hygiene accounted for 30.0%, and those who practiced less hygiene accounted for 3.3%. Additionally, laboratory tests revealed that food samples in the excellent quality category, with a 0 CFU/gr value, were not contaminated with Escherichia coli. The conclusion of the knowledge level overview, the hygiene practices of food handlers, and the contamination of food by Escherichia coli all yielded positive results.

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INTRODUCTION

Food plays a crucial role in sustaining life in this world. It serves as a vital source of energy for various living creatures, including animals, plants, and humans. Food supports the growth of the body by providing various nutritional sources, and it also serves as food for microorganisms. According to Republic of Indonesia Minister of Health Decree No. 1096 of 2011, sanitation is an effort to ensure that food is safe for consumption; hygiene and sanitation are efforts to control risk factors for pollution that can come from food, people, places, or equipment ⁽²⁾. The cleanliness of food handlers is essential for the success of food processing because poor food hygiene can cause health problems for buyers ⁽³⁾.

Food handlers are individuals who have direct contact with food, starting from the planning, cleaning, handling, transportation, and serving stages ⁽⁴⁾. Based on previous research, humans are one of the causes of contamination by biological, chemical, or physical substances ⁽⁵⁾. Lack of knowledge and awareness of personal hygiene will have a negative impact on the food that will be served ⁽⁶⁾. Poor sanitation hygiene will affect the quality of consumer health. Poor food hygiene will cause health problems ⁽⁷⁾. The first and second paragraphs do not seem well

structured. The introduction to the importance of food and sanitation hygiene is somewhat mixed, with no clear distinction.

Every food handler must possess knowledge about food sanitation hygiene and adhere to guidelines that emphasize the importance of maintaining the health and cleanliness of individuals and their surroundings, thereby promoting awareness of good disinfection hygiene practices. Food handlers' attitude plays a crucial role in influencing sanitary hygiene practices, particularly during food processing. Food handlers can prevent food contamination during the food processing process by using personal protective equipment, such as gloves, food tongs, spoons, forks, head coverings, and an apron ⁽⁹⁾. Then, knowledge-based human behavior will endure longer than non-knowledge-based behavior ⁽¹⁰⁾. Knowledge is closely related to education, and higher education is expected to expand a person's knowledge ⁽¹¹⁾.

According to Samarinda City Health Service data, there were 22,443 cases of diarrhea in 2022. Furthermore, according to data from the Harapan Baru Community Health Centre, there were 153 cases of diarrhea in 2022. Diarrhea is a common disease in the community, and food handlers have a significant risk of spreading the disease or contaminating food ⁽¹²⁾.

One of the catering services that is commonly known by the public is catering. Catering is an effort to process food that will be served outside the place of business; in other words, the food is ordered by consumers ⁽¹³⁾. Every catered meal plays an important role in meeting people's food needs ⁽¹⁴⁾. Of course, this catering business's ability to provide hygienic food is influenced by the parties directly involved in food processing ⁽¹⁵⁾. Based on initial observations, "B" Catering is a caterer that uses a contract system to serve food orders to industry workers. Therefore, "B" Catering will only send food to industries that have entered into contracts with them. The sanitary hygiene of "B" Catering must, of course, be considered based on the results of observations. It was found that every food handler who works in "B" Catering does not have a certificate regarding food sanitation hygiene; therefore, there is a need for research regarding the level of knowledge, hygiene practices, and bacterial contamination of the food that will be produced.

MATERIALS AND RESEARCH METHODS

This research uses quantitative methods with a descriptive approach. The goal of this study is to determine the level of knowledge and hygiene practices of food handlers, as well as the quality of food in a food processing facility.

Operational definition

1. The characteristics of the respondents who work at "B" Catering are described.
2. This illustrates the presence of *E. coli* bacteria in the food menu.
3. The document outlines the level of knowledge that food handlers possess regarding hygiene, serving, and handling food.
4. A food handler's hygiene practices or actions during food preparation and serving are described.

Processing and analysis of data

The data is derived from laboratory research that focuses on *Escherichia coli* bacterial contamination in food. Then other data is generated by filling out the respondent's questionnaire and then processing it using SPSS.

Research Instrument

The following are the research instruments used in this study:

1. The questionnaire sheet regarding the characteristics of respondents includes name, gender, age, and length of work.
2. We use a questionnaire sheet to gauge the level of knowledge and hygiene practices among food handlers.

3. Laboratory tests are needed to determine *Escherichia coli* contamination in food. In this research, there were two stages, namely sampling and laboratory testing. Sampling was carried out on May 29, 2023. The food sampling location was "B" Catering, Samarinda City. The tools and materials used are as follows:

Tool

- a. Sterile plastic bag
- b. Handscoon
- c. Cooling box
- d. Face mask
- e. Label

Material

Food samples

Work procedures

The work procedures for taking food samples are as follows:

- a. Prepare tools and materials
- b. Handscoons and masks are used to take food samples
- c. Place food samples in sterile plastic bags
- d. Labeled with the day, date and type of food
- e. Placed in a cooling box.
- f. Once the food is ready, it is taken to the laboratory

Next, laboratory-tested food samples

Laboratory testing of food samples uses the TPC method. This method is used to see the number of germs contained in a food sample. In this study, the number of germs that will be seen is *Escherichia coli* bacteria. This laboratory test was carried out at the East Kalimantan Province Health Laboratory, accredited by KAN ISO 15189:2012. The tools and materials that will be used are as follows:

Tool

- a. Analytical scales
- b. Sterile spoon and tweezers
- c. Handscoonand masks
- d. Sterile Plastic
- e. Erlemeyer
- f. Measuring pipette
- g. Food chopper
- h. Petri dish
- i. Incubator

Material

- a. Meal sample
- b. Aquades 250 ml
- c. Agar media

Work procedures

The work procedures for testing food samples using the TCP method are as follows:

- a. Prepare tools and materials
- b. To weigh food samples, a sterile spoon or tweezers are used.
- c. Using analytical scales, 25 grams of food samples were weighed.
- d. Next, place the weighed food samples into sterile plastic bags for chopping.
- e. Next, diluent 250 ml of distilled water into a sterile plastic bag.

- f. Then, put the food samples that have been mixed with distilled water into the food chopper.
- g. After mixing, prepare 4 cups of solder labeled E. coli, media control, diluent control, and E. coli control.
- h. Next, put 1 ml of the mixture into a petri dish labeled E. coli.
- i. Next, they receive the provided agar medium.
- j. Next, wait until the media freezes or solidifies.
- k. Next, put it in an incubator at a temperature of 35°C.
- l. Then, it underwent a single 24-hour incubation. Following a series of food sample testing procedures, the appearance of purple dots in a petri dish after a single 24-hour incubation period indicated the presence of E. coli bacteria. These dots are bacterial colonies that can be counted.

RESEARCH RESULTS AND DISCUSSION

Respondent Characteristics

Respondents in this study consisted of 30 food handlers with characteristics such as gender, education, age, and length of work. These respondents' characteristics are then presented in table form. As follows:

Table 1. Frequency Distribution of Characteristics of Respondents for Food Handlers in "B" Catering, Samarinda City

No.	Respondent Characteristics	N	%
Gender			
1.	Man	14	46.7
2.	Woman	16	53.3
Last education			
1.	Finished elementary school	6	20.0
2.	Finished middle school	6	20.0
3.	Completed high school/vocational school	12	40.0
4.	Completed D3-S1	6	20.0
Respondent's Age			
1.	17-26	13	43.3
2.	27-36	4	13.3
3.	37-46	6	19.9
4.	47-56	7	23.3
Length of working			
1.	<5 Years	29	96.7
2.	>5 Years	1	3.3
TOTAL		30	100

Source: Primary Data 2023

Based on the results of the table above, the characteristics of food handler respondents illustrate that in terms of gender category, female food handlers' number more, namely 53.3%, compared to the number of male food handlers, namely 46.7%. Furthermore, in the final education category of food handlers, it was found that there were higher school/vocational school graduates, namely 40.0% compared to elementary school, junior high school, or D3-S1 graduates. Then, in the age category of food handlers, it was found that the age range of 17–26 years was greater, namely 43.3%, and the age range of 27–36 years was less, with a percentage of 13.%. Finally, in the category of length of work <5 years for food handlers, the percentage was found to be 96.7%, while the length of work >5 years was obtained with a percentage of 3.3%.

Laboratory Test

Based on the research that has been carried out, the results of food sample testing are obtained in table form as follows:

Table 2. Laboratory Test Results on Food Samarinda City "B" Catering

No.	Parameter	Unit	Test results	Method Specifications		
MICRO FOOD/DRINK PACKAGES						
1.	Escherichia coli germ numbers	CFU/gr	0	Total (TPC)	Plate	Count

Source: Primary Data 2023

Based on the table above, it was found that laboratory testing on food samples taken from "B" Catering resulted in the Escherichia coli germ number in the food samples being 0 CFU/gr. In this case, it illustrates that the negative food samples are contaminated with E. coli bacteria and are of good quality and suitable for consumption.

Food of good quality is not contaminated by physical pollution, substances, or natural pollution. Laboratory testing is one way to determine the nature of food. Using the TPC method, lab tests were done on food samples from "B" Catering in Samarinda City to see if they were contaminated with Escherichia coli bacteria. This was part of the research. Based on laboratory tests on food samples, negative results were obtained for Escherichia coli bacterial contamination with a value of 0 CFU/gr. This means that the food samples taken at "B" Catering are not contaminated with bacteria. It is concluded that the food produced by "B" Catering is of good quality and suitable for human consumption.

This pertains to the level of knowledge and adherence to good hygiene practices among food handlers, enabling them to produce high-quality food. Since E. coli bacteria can cause diarrhea in humans, maintaining good food quality is crucial for maintaining public health, particularly for those who consume this food. With excellent results, "B" Catering should be able to continue to maintain the cleanliness of employees, facilities, and the food they produce.

One of the bacteria that can cause diarrhea in humans is Escherichia coli. These bacteria include those that inhabit living creatures' digestive tracts. Their presence can cause diarrheal disease, which can be caused by inadequate environmental sanitation and poor personal hygiene ⁽¹⁷⁾. This diarrheal disease can spread through disease vectors, dirty hands, and food that has been contaminated by bacteria, e.g., Coli ⁽¹⁸⁾.

Knowledge level

The research conducted on the catering staff at "B" Catering has yielded the following tabular results regarding their level of knowledge:

Table 3. Frequency Distribution Based on Level of Knowledge of Food Handlers
at "B" Catering, Samarinda City

Level Knowledge	N	%
Good	25	83.3
Enough	4	13.3
Not enough	1	3.3
Total	30	100.0

Source: Primary Data 2023

Based on the table above, the level of knowledge of food handlers can be described as follows: food handlers have a good level of knowledge with a percentage of 83.3%, while food handlers have a poor level of knowledge with a percentage of 3.3%.

Knowledge related to food hygiene is a must for food handlers, as this will support their hygiene practices. Of course, this is critical in running food service businesses such as catering. Food hygiene is an effort to maintain the cleanliness and quality of food that will be consumed properly by humans ⁽¹⁹⁾. Based on the research results, the food handlers at “B” Catering in Samarinda City described food handlers who had a good level of knowledge with a percentage of 83.3%, food handlers who had a sufficient level of knowledge with a percentage of 13.3%, and finally food handlers who had a poor level of knowledge. with a percentage of 3.3%.

Based on the results of the frequency distribution of respondents' answers, it was found that 100% of food handlers answered that they must wash their hands before and after carrying out daily activities, must wash their hands before and after leaving the toilet, use an apron, headgear, mask and footwear when processing food, food handlers cut nails at least once a week and maintain cleanliness, must wear neat and clean clothes when working, do not wear jewelry when processing food, do not smoke while processing food, cover wounds (if any) while processing food, always clean food utensils with running water after processing food, and finally always dry food utensils and arrange them neatly after processing food, while as many as 96.7% of food handlers answered that they do not eat or talk while processing food, shower at least twice a day, use tools without using their hands directly while processing food, and finally shampooing your hair at least once every 2 weeks. Previous research on As-Sajadah's level of knowledge (2022) revealed that of 61 food handlers, 38 had a good level of knowledge and 23 had a poor level of knowledge ⁽²⁰⁾.

Then, to develop knowledge among food handlers who work in “B” catering, Samarinda city, it is necessary to carry out regular counseling and training on food hygiene to support food processing and serving activities at least once every 6 months or once a year and always control the hygiene activities of food handlers, which is an effort to produce good quality and healthy food.

Hygiene Practices

Based on research conducted on food handlers at “B” Catering, the results of hygiene practices were obtained in table form as follows:

Table 4. Frequency Distribution Based on Hygiene Practices of Food Handlers at “B” Catering, Samarinda City

Hygiene Practices	N	%
Good	20	66.7
Enough	9	30.0
Not enough	1	3.3
Total	30	100.0

Source: Primary Data 2023

Based on the results of the table above, the hygiene practices of food handlers can be described as follows: food handlers have good hygiene practices with a percentage of 66.7%, while food handlers have poor hygiene practices with a percentage of 3.3%.

Hygienic practices for food handlers are one of the important things that food handlers must have because these hygiene practices determine whether the quality of the food that will be produced is good or not ⁽²¹⁾. Good knowledge regarding food hygiene does not necessarily guarantee that a food handler's hygiene practices are good; therefore, this must be balanced or equally good to produce quality food that is suitable for consumption ⁽²²⁾. Based on these results regarding the hygiene practices of food handlers in “B” Catering, Samarinda City, food handlers who have good hygiene practices have a percentage of 66.7%, while food handlers who have good hygiene practices have a percentage of 30.0%, and finally, food handlers who have poor hygiene practices have a percentage of 3.3%.

According to the frequency distribution of respondents' observation sheets, 100% of food handlers washed their hands properly before processing food, did not use tools directly, did not scratch other body parts while processing food, and did not smoke. During food processing, food handlers did not get sick while preparing food, and they consistently wore neat and clean clothes, with 76.7% of them wearing aprons. It was conducted by Alviansyah (2022), stated that out of 54 respondents, there were still 36 who had poor hygiene practices ⁽²³⁾.

It's important to keep in mind that a food handler is defined as an individual who comes into direct contact with food during the food-making process, as stated in definition 24. Other definitions of food handlers include those who interact directly with food and all the equipment used in food preparation ⁽²⁵⁾. Therefore, it is necessary to develop the hygiene practices of food handlers who work in "B" Catering, Samarinda City. It is necessary to monitor the hygiene practices of each food handler. Furthermore, it is better to have health checks for food handlers at least once every six months in one year as a follow-up to these supervision activities.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the conducted research, the discussion described above has yielded the following conclusions.

The description of the characteristics of most respondents is female; the highest education category is SMA/SMK; the largest age category is in the range of 17–26 years; and the highest length of work category is <5 years.

The description of *Escherichia coli* bacterial contamination in "B" catering food, Samarinda city, was categorized as negative because it contained *E. coli* with lab test results of 0 CFU/gr. This is an overview of the knowledge level of food handlers at "B" Catering in Samarinda City. 83.3% of food handlers have a good level of knowledge, 13.3% have a sufficient level of knowledge, and 3.3% have a poor level of knowledge.

The study describes the hygiene practices of food handlers at "B" Catering in Samarinda City. 66.7% of food handlers have good hygiene practices; 30.0 have adequate hygiene practices; and 3.3% have poor hygiene practices.

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