



The Relation between Either of Hygiene Food Handlers or Presentation Food and *Coliform* Bacteria Contamination in the Food Street of Elementary School

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Abstract

The aim of this research was to know the relation between hygiene of food handlers, food presentation, and the *coliform* bacteria contamination in food street of elementary school in Sidodamai Village. Based on BPOM observation 2013, poisoned data were 342 cases and the highest causes were food and drink (45.91%). According to BPOM bulletin, the highest causes of food quality lowering were microbiology contamination. Usually hygiene lowering and food sanitation causes diarrhea. Samarinda health department data stated Sidomulyo clinic has increasing diarrhea cases every year, and it mostly happens in Sidodamai Village. Student is very susceptible influenced many disease, because the children immunity is more susceptible than adult. This research used total sampling of the population which are 15 samples. The type of this research was descriptive research with *cross sectional* approach. It also used *Rank Spearman* test as bivariate analysis. The univariate analysis result showed that 6 samples are contaminated by *coliform* bacteria, 53.3 % respondent had good hygiene, 46.7% had less good hygiene, 60% respondents were good in food presentation, 40% were less good in food presentation. Therefore the bivariate analysis result showed there was relation between the food handlers hygiene (p value = 0.018), food presentation (p value = 0.007) and *coliform* bacteria contamination in Elementary School food street in Sidodamai Village Samarinda.

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To sum up, the food handlers hygiene and food presentation has relation with the *coliform* bacteria contamination in Elementary School food street in Sidodamai Village Samarinda. This research suggests to optimize canteen at the school and pay attention to the container of food presentation.

Keywords: *Coliform*; Hygiene; Food Street.

1. Introduction

Efforts in improving the health of course can be concerned about the quality of food daily energy intake. Food handlers play an important role in the attempt to rescue and affect the quality of the food was handled because of poor hygiene can cause microbiological contamination. Therefore, the hygiene of food handlers is an important thing to be considered in order of quality and safe food products consumed [1]. From the results of monitoring conducted by the BPOM Samarinda in 2013 obtained the data as many as 342 cases of poisoning cases. The cause of poisoning among others for food and beverages (45.91%), household pesticide (9.06%), household chemicals (2.63%), drugs (5.26%), drugs (23.39%), chemical industry (2.63%), agricultural pesticide (1.46%), dietary supplements (0.29%) and others (8.77%). From the data that has been collected, it can be analyzed that the cause of the poisoning is often caused by food and beverages [2].

Based BPOM bulletin published in 2014 in the Ministry of Health, the decline in the quality of the food and drink of the highest causes for 2009-2014 which are caused by microbial contamination, the second of Food Additives (BTP) excess, and the last use of hazardous substances. Age school children are very susceptible to various kinds of diseases for example, just diarrhea, immunity is because children are more susceptible than adults. Consumption of snack foods that contain chemical or biological contamination is very dangerous to the health and safety of children due to biological contamination of contaminated food can contain bacteria, viruses, worms and others [3]. Traders hygiene practices affect the quality of food in hand, bad practice can cause microbiological contamination in food karean food handlers is someone in charge of handling food and be directly involved in menyiapkan, processing, transporting and serving food [4].

2. Materials and Methods

This type of research is descriptive with the approach taken using cross sectional and use of laboratory tests. This study aimed to determine the hygiene of food handlers and food preparation by using a questionnaire and observation sheet and accompanied by laboratory investigations to determine the bacterial contamination of food. The population in this study amounted to 15 respondents and the sample used is the entire population or total sampling. The data analysis technique used is ANLISI univariate and bivariate statistical test used was Spearman Rank test

3. Results

3.1 Characteristics of Respondents

Characteristics of respondents food handler at SD villages Sidodamai by Gender, Age and education level can be seen in the table below:

Table 1: Distribution of Respondents by Gender

No	Gender	Number (n)	(%)
1	Male	11	73.3
2	Female	4	26.7
	Total	15	100

Based on Table 1, note that most of the food handlers at the village school snack Sidodamai is the male sex that is a total of 11 respondents (73.3%) and female sex amounted to 4 respondents (26.7%).

Table 2: Distribution of Respondents by Age

No	Age group	Number (n)	(%)
1	25-29	5	33.3
2	30-34	1	6.7
3	35-39	1	6.7
4	40-44	3	20
5	45-49	4	26.7
6	50-54	1	6.7
7	55-59	0	0
	Total	15	100

According to the table 2, it is known that food handlers with the 25-29 age group numbered five respondents (33.3%), 30-34 age group numbered 1 respondent (6.7%), age group 35-39 amounted to one respondent (6.7%), class 40 -44 totaling 3 respondents (20%), the 45-49 group amounted to 4 respondents (26.6%), and the 50-54 age group numbered 1 respondent (6.7%).

Table 3: Distribution of Respondents by Education Level

No	Education level	(n)	(%)
1	Basic school	3	20.0
2	Junior high school	5	33.3
3	Senior high school	7	46.7
	Total	15	100

3.2 Total Coliform Bacteria

Laboratory tests on food samples:

Table 4: Distribution of Total Coliform Bacteria

No	Sampel	Total Coliform (colony/gr)	Maximum limit
			Maksimum Mikroba
1	Chhese corn	1.52 x 10 ⁴	
2	Tape Ice	0	
3	Fried tofu	0	
4	Balado Cassava	0	
5	Noodle	2.17 x 10 ⁴	
6	Strup ice	6.2 x 10 ⁴	
7	Scissed tofu	2.6 x 10 ³	1 x 10 ²
8	Siomay	0	
9	Pentol ayam	0	
10	Pukis	0	
11	Pentol pangsit	0	
12	Pentol goreng	0	
13	Pentol kentang	0	
14	Burjo Ice	2 x 10 ²	
15	Egg Pentol	1.1 x 10 ⁴	

Based on the above table, it can be seen that after incubation of 15. Examined contained 6 samples were contaminated with coliform bacteria.

Contaminated sample include corn cheese, ice strup, out scissors, dumplings, ice burjo, and bulb eggs.

Table 5: Frequency Distribution of Coliform Bacteria in Food Snacks in SD Village Sidodamai

No	Total bakteri coliform on Samples	Number (n)	(%)
1	Bactery exist	6	40
2	No Bactery exist	9	60
	Total	15	100

Based on Table 5 it can be seen that of the 15 samples of food and beverage snacks that in laboratory tests there are 9 samples (60%) are not contained coliform bacteria in it da tone 6 samples (40%) contained coliform bacteria in it.

Hygiene of food handlers

The results of observation of 15 respondents of food handlers, the distribution of food handlers in the village primary school Sidodamai can be seen in the table below:

Table 6: Distribution of respondents Berdasarkna hygiene of food handlers

No.	Food handler hygiene	Number (n)	(%)
1	Good	8	53.3
2	Not good	7	46.7
	Total	15	100

Based on the description of the data in Table 6 shows that the 15 respondents of food handlers in Primary Schools Sub Sidodamai, as many as eight (53.3%) of respondents have a level of hygiene that have been classified as good, while seven respondents (46.7%) have high levels of hygiene are still relatively less about hygiene food handlers presentation of Food

Distribution of food handlers in food preparation Sidodamai SD villages can be seen in the table below:

Table 7: Distribution of respondents based Serving Food

No.	Food servicer	Number (n)	(%)
1	Good	9	60
2	Less good	6	40
	Total	15	100

Based on the description of the data in Table 4 shows that the 15 respondents of food handlers in Primary Schools Sub Sidodamai, the number of respondents who value presentation quite well there are 9 respondents (60% 0, while the number of respondents who memili value of food preparation are classified as poor as many as 6 respondents (40%).

Relations hygiene of food handlers with Coliform Bacteria Contamination in SD Snacks in the Village Sidodamai.

Correlation analyzes were conducted to explain the existence of a significant relationship between the hygiene of food handlers with coliform bacterial contamination on snacks Elementary School in the Village Sidodamai. The correlation results are presented in the table below.

Table 5: Correlation Results hygiene of food handlers with Coliform Bacteria Contamination in SD Snacks in the Village Sidodamai

	Variabel	Koefisien Korelasi	Sig. 5%	P value
Spearman's rho	Food handler hygiene	0.600	0.05	0.018

Based on Table 5, it seems that the significance value that is owned by a food handler hygiene variables of 0.018 or less than 0.05, so that H_0 refused H_a accepted, which means there is a significant relationship between the variables hygiene of food handlers with coliform bacterial contamination. In addition, the correlation coefficient variable numbers hygiene of food handlers for 0600 indicate that the positive correlation (+) where there is a unidirectional relationship between hygiene of food handlers with coliform bacterial contamination, meaning that if the level of hygiene of food handlers contamination increases, the numbers will increase as well.

Food Presentation relationship with Coliform Bacteria Contamination in Hawker Primary School in the Village Sidodamai. Correlation analyzes were conducted to explain the existence of a significant relationship between the presentation of the food at the hawker coliform bacterial contamination in the Village Primary School Sidodamai. The results of the analysis are presented in the table below.

Table 6: Correlation Results Presentation Coliform Bacteria Contamination of food with the SD Snacks in the Village Sidodamai

	Variabel	coefisien Korelasi	Sig. 5%	P value
Spearman's rho	Food handler	-0.667	0.05	0.007

Based on table 6, it seems that the significance value that is owned by the variable presentation of food by 0007, or less than 0.05, so that H_0 refused H_a accepted, which means there is a significant relationship between the variables of food preparation with coliform bacterial contamination. In addition, the correlation coefficient variable number of food preparation at -0667 is a negative correlation (-) where there is an inverse relationship between the presentation of the food with coliform bacterial contamination, meaning that if the

rate of food preparation increases the number of coliform bacteria contamination will decrease.

4. Discussion

4.1 Characteristics of Respondents

While doing research in Sub Sidodamai are gender distribution of food handlers in this study is more dominant in the male gender, where there are 11 male respondents of the total respondents amounted to 15. While there are four female respondents (26.7%). The number of male respondents than female respondents could be due to being taken in this study is the food handlers outside the school, which is where most of the respondents were food handlers can move and using vehicles such as bicycles, motorcycles or wheelbarrows. When views of gender on the characteristics of the respondents in this study it appears that there is no difference between the sexes of men and women in higienenya and presentation of food. When viewed by age, belonging to the age group most distributions were between the ages of 25-29 years of the five respondents (33.3%) while the lowest is the age distribution at the age of 30-34 years, 35-39 years and 50-54 years ie respectively of one respondent (6.7%). based on the results of field observations anyway besides age 35-29 years, age 45-49 also one percentage age who usually sells as food handlers that there are four respondents (26.6%) and 40-44 years of age there is a third of respondents (20%). At the time of field observations indeed seen many respondents aged 25-27 years, it could happen due to very productive for selling circumference compared to age 50 years and older and some are aged 45-49 years in which they usually already have a working period in the field of food handlers is quite long.

In addition to the observation of the characteristics of respondents by sex and age of the respondent, the researcher also viewed by education level of respondents. Based on observations to the field on this research in getting the data level of education of the 15 respondents of food handlers in SD Village Sidodamai ie, three respondents (20%) elementary school education, 5 respondents (33.3%) junior high school education, and 7 respondents (46.7%) educated High School.

4.2 Relations hygiene of food handlers with Coliform Bacteria Contamination in SD Snacks in the Village Sidodamai

Results of research on the hygiene of food handlers with contamination of coliform bacteria in hawker Elementary School in the Village Sidodamai using correlation test of Rank Spearman obtain the result that the hygiene of food handlers to the presence of coliform bacteria has a value of p value is 0.018 less than the value α (0.05), which means H_0 refused H_a received so that it can be concluded that there is a relationship between hygiene of food handlers with coliform bacteria contamination in school snack food in the Village Sidodamai. This is in line with research conducted by Romanda [5], in a study stating that there is a relationship of personal hygiene of food handlers to the presence of *Escherichia coli* is shown with a probability value of 0000 where the value of p value smaller than the value α (0.05).

Based on the results of research on the hygiene of food handlers with coliform bacteria contamination in the village primary food hawker Sidodamai of 15 respondents there were 8 respondents (53.3%) still had a good handler hygiene and 7 respondents (46.7%) had poor hygiene handlers. Hygiene of food handlers in this research is how the food handlers berperilaku when hawking wares and food handlers know how to know about food hygiene. Personal hygiene handler plays a very important in the attempt to rescue the food, because the handler has the potential to spread diseases that are transmitted through food or drinks, which of itself to food or drink is processed and presented to the person who consumes, or known as cross-contamination [6].

These food handlers themselves can cause cross-contamination because the food handlers are directly related to food and equipment ranging from preparation, cleaning, processing, transporting up to the presentation of food [7].

Based on the findings in the research that merchants who sell outside the primary school in the village Sidodamai totaling 15 respondents, on the question "whether the respondent still handle food when suffering from infectious diseases (such as coughs, colds influenza, diarrhea and other stomach)" although there has been 7 respondents who answered correctly, that they do not handle food when respondents were sick like that, but there are eight respondents who answered incorrectly that they are still dealing with the food that will be sold. The respondents said that it does not matter if only a mild illness such as cough, flu and stomach ache, and they will handle it themselves. As said in the study Rachmawati [4] explains that in order for food is not contaminated with the bacteria *Echerichia coli* food handlers should not suffer from diarrheal diseases, if suffering from diarrhea are not allowed to touch the food was sold.

Presentation of Food Contamination relationship with Coliform Bacteria in Food Snacks Elementary School in the Village Sidodamai The presentation of the food in question is the final stage rangakian food hygiene and sanitation. When serving food to note is that these foods to avoid contamination, equipment used in good condition and clean, the officer must menjaga meyajikan health and hygiene clothes [7].

Based on calculations using Rank-Spearman correlation obtain the results that the presentation of the food with the contamination of coliform bacteria in food hawker Elementary School keluarahan Sidodamai menghasilkan probailitas of 0007 with an error rate of 0.05. Wherein the probability value is lower than the error rate may establish an association between the two variables studied were serving food anantara relationship with coliform bacterial contamination in food jajajan in Sd Sidodamai village. Thus it can be disimpulkan H_0 rejected and H_a accepted which means the research hypothesis is received ($p < 0.05$).

This is similar to research Sumantri [8] that the proportion of *E. coli* contamination in food preparation where the statistical test showed p value 0.002, it can be concluded that there is a significant relationship between the presentation of the food with *E. coli* contamination in food snacks. But the research turned to the research conducted by Makalew [9] which states that there is no relationship between the presentation of the food with the presence of bacteria *Escerichia colli* with p value $0.033 > 0.05$. Thus it could happen because in this Makalew study the respondents already use a permanent storefront to put his wares while on a study

conducted on the food handlers at the Village Elementary School this Sidodamai the respondents still rarely use permanent storefront.

In addition to seeing the place selling the food handlers, also conducted interviews at the respondent on storage after processing food, whether the food handlers storing processed in a special place (cupboard pajan). Based on the results down the field in find 5 respondents or 33.3% has been put on a special place such as a small glass cabinet or directly put the pots were covered. While 10 respondents or 66.7% had not put the food processed in a special place. Mostly they just put it on a cart with an open spot.

Also based on the results of research on the observation sheet, the respondents had the highest number of correct statement is that when the food was served neatly ie 14 respondents or 93.3% was already arranging the food to be sold at a tidy, by arranging the food to be sold with a neat course can add buyer appeal also to buy food snacks. Although there are 1 or 6.7% of respondents still arranging his wares neatly.

Container means every kind of food is placed in a separate container and are attempting closed, the aim is that the food is not contaminated by cross [8]. In research done on this food handler found in the statement in questionnaire sheet about the food served discount sealed container, based on the observation there were 3 respondents or 20% already menyajiakn food with a closed container, such as mica diplastik wrapped. But there are 12 respondents or 80% who do not use a container presentation closed, nothing makes the container of eating brown paper. There is also a direct stab to use it just sticks. Seeing the results of the laboratory in which there are 6 samples were contaminated with coliform bacteria, but can be due to poor higene, the presentation can also be the cause. Although out of the 6 samples already have a good presentation, only one respondent poor presentation. Transporting food or drink fast could also be one of the factors of contamination, because the average vehicle used is open vehicle such as motorcycles, bicycles, and some use the wheelbarrow. As in the first sample of the corn cheese, respondents using the motor and then when the food menjajahkan respondents draw up a small plastic cup with no lid so that the food could be contaminated.

5. Conclusion

Based on the research relationship hygiene of food handlers and food preparation with coliform bacterial contamination in food snacks

SD in the Village Sidodamai Samarinda that there is a relationship between hygiene of food handlers with coliform bacterial contamination on school snack food with a figure of 0.018 linkages. Also there is a relationship between the presentation of the food with the contamination of coliform bacteria in food hawker Sd with linkages figures for 0007.

6. Recommendation

Efforts to create a policy in advance of the school by optimizing the existing cafeteria in the school so that the

food handlers who sell can be in control because they jajahkan food will be consumed by schoolchildren.

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References

- [1] Setyorini, Endah. 2013. Hubungan Praktek Higiene Pedagang dengan Keberadaan Escherichia Coli pada Rujak yang dijual disekitar Universitas Negeri Semarang. *Journal of Public Health*
- [2] BPOM Samarinda, 2013. Laporan Tahunan 2013. Samarinda : Badan POM
- [3] Puspitasari L, Riris. 2013. Kualitas Jajanan Siswi di Sekolah Dasar. *Jurnal Al-Azhar Indonesia Seri Sains Dan Teknologi*. Vol. 2, No.1, maret 2013
- [4] Rachmawati, Rodiatul, Prehatin T, Rahayu S. 2015. Praktik Higiene Personal dan Keberadaan Bakteri Escherichia coli pada Tangan Penjamah Makanan (Studi pada Pedagang Kaki Lima di Jalan Kalimantan Kecamatan Summersari Kabupaten Jember). *Jurnal kesehatan Masyarakat Universitas Jember*
- [5] Romanda, Fitka. 2012. Hubungan Personal Higiene Dengan Keberadaan Escherichia Coli pada Makanan di Tempat Pengolahan Makanan (TPM) Buffer Area Bandara Adi soemarmo Surakarta. *Jurnal Fakultas Kedokteran Universitas Muhammadiyah Surakarta*
- [6] Kurniasih P, Rizqi, Narjazuli, Yusniar. 2015. Hubungan Higiene dan Sanitasi Makanan dengan Kontaminasi Bakteri Escherichia Coli dalam Makanan Di warung Makan Sekitar Terminal Borobudur, Magelang. *Jurnal kesehatan Masyarakat*. Vol. 3, No.1, Januari 2015
- [7] Sarudji, Didik. 2010. *Kesehatan Lingkungan*. Bandung : Karya Putra Darwati
- [8] Sumantri, Arif. 2010. *Kesehatan Lingkungan*. Jakarta : Kencana Prenada Media Group
- [9] Makalew, Liliyani. 2013. Hubungan Hygiene Sanitasi dan Perilaku Penjamah Kue dengan Keberadaan Bakteri Escherichia colli Pada Kue Popaco Di Pasar Sentral Kota Gorontalo Tahun 2013. *Jurnal Kesehatan Masyarakat Universitas Negeri Gorontal*