



Knowledge, Attitudes and Practices Regarding Food Hygiene and Sanitation of Food Street Handlers in the Public Elementary School at Greater Jakarta, Indonesia

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Abstract— This study was conducted to determine the level of knowledge, attitudes and practices of food street handlers at public elementary school in Greater Jakarta, a major capital of Indonesia, regarding food hygiene and sanitation. Data were collected from 400 food handlers using cross sectional study method through questionnaires which consisted of questions about the knowledge, attitude, and practice (KAP) of handling food. The results show that the food handlers have excellent knowledge and attitude, but slightly good practices towards food hygiene and sanitation with mean score (SD) of 82.32 (± 11.55), 80.15 (± 10.1), 53.04 (± 10.67), respectively. There is a significant correlation between the level of education and the participation of food hygiene training on the KAP level ($p < 0.05$). The results of the correlation test show that there is a significantly positive correlation between knowledge and attitudes ($p = 0.000$; $r = 0.758$), attitudes and practice ($p = 0.000$; $r = 0.367$), and knowledge and practice ($p = 0.000$; $r = 0.300$). Logistic regression shows that food handlers that have excellent knowledge level have 3 times greater tendency to have excellent food hygiene practices.

Keywords— attitude, food handlers, food hygiene, food street, knowledge, practice

INTRODUCTION

Street food is very diverse and rapidly growing in Indonesia. According to the World Health Organization (WHO), street food is comprised of food and beverages prepared and/or sold by street vendors in crowded places and on other public places, without further processing or preparation, then directly consumed. Street food becomes the preferred food of all ages, especially among school-aged children. The role of street food in Indonesia is very strategic, very much found in the neighborhood around the school, and routinely consumed by most school-aged children. However, consuming street food is also a problem that needs to be of concern to the public. Due to there are some street food that are not hygienic, so it is very risky to health. Children are vulnerable to health problems because they lack of knowledge about food hygiene. Usually school children always buy snacks from street food vendors around the school. Food handlers are directly related to food and equipment because the spread of pathogenic microbes may occur during the production, processing, distribution, until serving food, so that food handlers play an important role in food hygiene. (Githiri et al., 2013; TyasSuci, 2009; Setiyani, 2013). The behavior of food handlers who do not practice food safety will certainly cause problems to the food

(Nurlaela, 2011). One of the factors that contribute to the spread of foodborne diseases is the wrong practice and lack knowledge by food handlers regarding food hygiene (Webb and Morancie, 2015).

Outbreaks monitoring results in Indonesia showed that 3,351 people were reported ill and 7 others died from 60 incidents. From this incident, 20.34% of the incidence was caused by street food and 30% occurred in the education environment (BPOM, 2016). The high outbreak can be caused by food handlers. According to the results of the Monitoring and Verification of the National Food Safety Profile in 2008 conducted by the Southeast Asian Food & Agricultural Science & Technology Center (SEAFST) and the National Agency of Drug and Food Control of Republic of Indonesia (NADFCI), as much as 70% of food vendors applied the poor food security practice (Andarwulan et al., 2009). In Sukabumi (part of Java Island) and Jakarta, there are 74.1% of food handlers who have not implemented food safety practices (Yasmin and Madanijah, 2010). Until now, there is still lack of food safety practices by food handlers due to their lack of KAP on the food hygiene. The above conditions indicate the risk of disease occurrence in primary school-age children due to consuming snacks. For this reason, it is necessary to conduct an analysis of the KAP level of food handlers against food hygiene.

This study aims to analyze aspects of KAP of food hygiene and sanitation to determine the correlation between demographic characteristics with these three aspects and the correlation between these three aspects among food street vendors in the Greater Jakarta primary school environment.

MATERIALS AND METHODS

Research population and data collection

The study was conducted among 400 food handlers from the public school in Greater Jakarta. A cross-sectional study was conducted in April until May 2018 to evaluate the food hygiene KAP of food.

Questionnaire design

A structure questionnaire was designed which contains 45 core questions or statements: 15 questions for knowledge, 15 questions for attitude and 15 questions for practice on food hygiene and sanitation. Basic demographic data information was also included. Reliability of the questionnaires had also been tested among students in Universitas Bakrie. The assessments evaluated the KAP of the food handlers on personal hygiene, food preparation, reheating food, food storage, working area, handling raw and cooked food, handling food equipment and others. The respondent's socio-demographic characteristics such as gender, age, selling location, highest educational qualification, income level (monthly) and participation in food hygiene training were collected during the study. The age groups were classified according to "youth" (17-35 years old), "adult" (36 years old and above), "primary school" (that received education to elementary school and junior high school) and "secondary school" (that received education to senior high school). Respondents were required to choose "correct" or "incorrect" answer for the knowledge section, "agree" or "disagree" answer for attitude section, "yes" or "no" answer for practice section. For both knowledge and attitude part the correct answers were converted to 100% and marks below 50% was considered as lack knowledge or attitude, 50%-75% was considered as acceptable knowledge and attitude and marks above 75% was considered as excellent knowledge and attitude. For the practice section, the marks were converted to poor (marks below 50%) and good practice (50% and above).

Statistical analysis

The data was coded, entered and analysed using SPSS statistical computer program in which its response is set as categorical variable (right or wrong answer). For questionnaire in knowledge, right answer is considered as "having knowledge" and wrong answer as "no knowledge". For attitude questionnaire, right or wrong answer is considered as "positive or negative attitude" and for practice questionnaire. Data analysis was performed using Microsoft Excel 2016 and SPSS software for Windows, version 16.0. The descriptive statistics was used for analysis data of all parts in this study. Chi-square test was used to determine the relationship between the socio-demographic characteristics of the food handlers and their KAP level. A p-value that was less than .05, is considered as statistically significant. Spearman test was used to determine the significance of the

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RESULTS AND DISCUSSIONS

Demographic characteristic of respondents

Table 1 Distribution of socio-demographic characteristics of the respondents (N=400).

Variables	n (%)
Gender	
Male	319 (79.8)
Female	81 (20.2)
Age Group	
Youth	121 (30.2)
Adult	279 (69.8)
Selling location	
Jakarta	106 (26.5)
Bogor	116 (29)
Depok	18 (4.5)
Tangerang	84 (21)
Bekasi	76 (19)
Highest Educational Qualification	
Lower educational level	324 (81)
Higher educational level	76 (19)
Income Level (monthly)	
2.000.001 – 3.000.000 IDR	13 (3.2)
3.000.001 – 4.000.000 IDR	63 (15.8)
4.000.001 – 5.000.000 IDR	122 (30.5)
>5.000.000 IDR	202 (50.5)
Participation in food hygiene training	
Yes	59 (14.8)
No	341 (85.2)

The results show that 79.8% of the respondents were male. Similar results are shown by Siau et al (2015), Sani and Siow (2014), Al Shabib et al. (2016), Mustaffa et al. (2017), Liu et al. (2015), Ismail et al. (2016), MolinCortese et al. (2016), Choudhury et al. (2011), Mjoka and Selepe (2017), Joglekar and Bhoi (2013) and Prabhu and Shah (2012) that most food handlers are also male. According to Syachroni (2012), male food handlers are considered to be more resilient and agile workers in carrying out work, because men have more energy levels than women. The majority of food handlers are adults with age above 35 years (69.8%). Similar research results are shown by research conducted by MolinCortese et al. (2016); Akabanda et al. (2017); Soares et al. (2012); and Joglekar and Bhoi (2013), that the age of food handlers is mostly aged above 35 years. According to Siow and Sani (2011) and Akabanda et al. (2017) study showed aged food handlers usually have better hygiene knowledge and experience compared to young food handlers even under the age of 20. In addition, almost 81% of food handlers have lower educational level. According to Muthmainnah (2012), that one's level of education will influence other's way of thinking and on the other hand, higher level of education will

make it easier for someone to receive information (knowledge) which leads to change in attitude so that it can be implemented (practiced) into daily life. 50.5% of respondents have higher than five million rupiah income level monthly, while 14.8% respondents are participated in food hygiene training. Similar research results are shown by Akabanda et al. (2017), Sani and Siow (2014) that most snack food handlers have not attended training related to food hygiene. According to Webb and Morancie (2015); Sani and Siow (2014); and Al Shabib et al. (2016), training and counseling is one way to increase knowledge of street food vendors related to food hygiene and foodborne diseases (foodborne illness).

Food Hygiene and Sanitation Knowledge, Attitude, and Practice

Table 2 Food handlers’ knowledge on food hygiene and sanitation

Low (<50%)	Acceptable (50-75%)	Excellent (>75%)
Reheating cooked food can lead to food contamination (21.2%)	Using excessive food additives may increase the risk of food contamination (64.5%)	Food poisoning can be suffered by humans through food (99.8%)
	Touching hair while handling food may increase the risk of food contamination (64.2%)	Washing hands before work reduces the risk of food contamination (99.2%)
	When the hand is injured or the skin is irritated, you should immediately stop the job (58%)	Using raw water as food can increase the risk of food contamination (99.2%)
	Cross-contamination is when microbes from contaminated food move to other food through hands or kitchen utensils (54.2%)	Properly cleaning equipment can reduce the risk of food contamination (98.8%)
		Using cooking oil that has been used over and over can increase the risk of food

contamination (98.5%)
 Contaminated food has some changes in color, smell, and taste (98%)
 Expired foods can’t be used or consumed (98%)
 Smoking while handling food may increase the risk of food contamination (97.5%)
 Using gloves when handling food reduces the risk of food contamination (97%)
 Washing the food with soap makes them free of contamination (86.8%)

Table 3 Food handlers’ attitude on food hygiene and sanitation

Low (<50%)	Acceptable (50-75%)	Excellent (>75%)
A small towel (hand) can be a source of food contamination (36.2%)	Stopping work if you have a wound on the hand (62.5%)	Food should be cooked well to be free from contamination (99.8%)
Use a different washcloth to clean the place and equipment (35.2%)		Washing food with clean water can reduce the risk of food contamination (99.2%)
Food can be stored in a can or jar closed (6.8%)		A clean hand can prevent foodborne diseases (98.8%)
		Clean the knives and cutting board properly to prevent contamination (98.8%)

Incorrect food storage may increase the risk of food contamination (98.8%)
 Wearing masks is an important practice to reduce the risk of food contamination (96.8%)
 Wearing a hat is an important practice to reduce the risk of food contamination (95.8%)
 Food handlers must know the knowledge about food hygiene (95.2%)
 Wearing gloves is an important practice to reduce the risk of food contamination (95%)
 Closes mouth and nose while coughing and sneezing (91.5%)
 Raw and finished raw materials must be separated to avoid cross-contamination (90.2%)

Wear aprons when handling food (19.8%)
 Use a cleanser when washing the food (13.2%)
 Do not taste food by hand directly (11.8%)
 Do not use extra food additives (8%)
 Use a different cutting board for raw food with cooked food (6.2%)
 Wash hands first after sneezing / coughing (1%)
 Use gloves during food handling (0.5%)

Table 2-4 show the KAP results of the respondents. After converting the scores to 100 points, the mean score (SD) for food handlers knowledge, attitude and practice are 82.32 (11.55), 80.15 (10.1), 53.04 (10.67), respectively. The response of food handlers knowledge questionnaire regarding food hygiene is presented in Table 2. In general, the results study reveal excellent knowledge of food handlers. The excellent knowledge consists of statements regarding personal hygiene, clean water use, cleaning agents use, proper foodstuffs to prevent contamination and characteristic of food contaminant. Low knowledge is shown on the question about reheating cooked foods can lead to food contamination, only 21% of respondents who correctly answer the question. The results shows that many food handlers still sell the food even though it is not fresh. Some knowledge that needs to be improved is cross-contamination understanding the hazard of processing food while hand is injured or skin is irritated and the hazard of the uses of food additives in excess. The food handlers who do not pay attention to cleanliness consider it has no effect on food hygiene.

More than 99% of the respondents gave the correct answered to the question about “Washing hands before work reduces the risk of food contamination” in the knowledge section. This knowledge has become common knowledge practice in daily life. This is in accordance with the other study that showed a high level of knowledge (over 90%) on washing hands before handling food reduce the risk of contamination (Mutalib, et al., 2012), (Sharif & Al-Malki, 2010), (Ansari-Lari, 2010), (Soares, 2012), This knowledge also related to the statement on the attitude section "a clean hand can prevent foodborne diseases". About 98.8% of the respondents agree with the statement. It indicates a positive relationship between the knowledge and attitude on the concept of hand washing. Surprisingly enough, the statement on the practice section regarding hand washing, "wash hands properly before and after touching raw foods" shows a poor score, only 43.8% of respondents practiced hand washing. This can happen due to there are no adequate facilities for food handlers to wash their hands such as the absence of a sink, clean toilets, and clean water source.

The prevalence of the bacteria in the skin

Table 4 Food handlers’ practices on food hygiene and sanitation

Low (<50%)	Good (50-100%)
Wash hands properly before and after touching raw food (43.8%)	Wash hands after toilets (95%)
Do not eat and drink while handling food (39.8%)	Use a cleanser when washing the equipment (93.8%)
Do not use accessories when processing food (38.8%)	Check the shelf life of food when it will be used (71.5%)
Do not extend your nails (24.8%)	Wear a hat while handling food (70.8%)

population is so high that it is likely impossible to completely eliminate them. However, hand washing has been identified as one of the most important ways to prevent the spread of foodborne diseases (Soares, 2012), (Mutalib, et al., 2012). A virus can be introduced by unwashed hands of food handlers who are themselves infected. Therefore, good personal hygiene as well as sanitary handling practices at work are essential parts of any prevention programs for food safety (Ansari-Lari, 2010).

Knowledge of the use of gloves is excellent, but in practices food handlers rarely use it. This needs important attention for consumers, due to the hands will come into contact with food and various other activities will have an impact cross contamination. Besides gloves, the use of masks and aprons is considered unusual for most of them. The majority of respondents food handlers considers that the weather around the place of sale is not conducive (heat) so that the hands and face are easily sweaty and it makes food handlers feel uncomfortable. This is related to the lack of knowledge of cross contamination (54.2%). Knowledge possessed by food handlers is very important because the lack of knowledge of food handlers regarding personal hygiene and food safety can be one of the factors that cause food-borne diseases (Tan et al., 2013).

Regarding personal hygiene attitude, using a different cloth to clean the place and equipment has not been properly addressed (35.2%), in which they assume that there are too many cleaning cloth they must provide to clean different equipment or places. The use of cleaning cloth must be distinguished between cleaning hands with equipment.

The attitude towards coughing and sneezing when processing food shows excellent results. Respondents already know that coughing or sneezing will spread normal pathogenic flora microbes from food handlers and surely this will give an unfavorable impact on the food processed, which can increase the number of microbes. About 36% of the respondents show disagreement toward statement about small towel can be a source of food contamination. Disagreement that is shown by food handlers may be due to trust or belief, as well as lack of knowledge about food handlers. The attitude of food handlers themselves is one of the most important psychological factors and can predict the habits of food handlers in terms of food safety (Cuprasitrut et al., 2011). The response of food handlers to some of these statements involves the opinion or emotional (important-not important) factor which is one of the main components in attitude formation (Notoatmodjo, 2014). This is the concern of the government and other community organizations to provide education through continuous training and coaching. Due to laps that have been dirty can have an adverse effect on processed food in case it in contact with food or spread from the air.

The score for practice section is lower compared to knowledge and attitude section (Table 4). In personal hygiene practices such as not lengthening nails and not using accessories when processing food shows good practice.

Regarding aspects of handling raw materials and equipment, food handlers pay little attention to the use of different cutting boards for the processing of raw and cooked foods and the use of cleaners to wash food. Stages in practice

Journal online <http://journal.bakrie.ac.id/index.php/APJSAFE> that are still lacking in application are important aspects to be considered, because these aspects can be a source of bacterial contamination, so that when preparing food, food handlers must meet all relevant aspects, including washing food properly so it can reduce the risk of contamination (Cuprasitrut et al., 2011).

Food handlers have a good level of practice related to checking the shelf life of raw materials, using cleaners when washing equipment, and not using excess food additives.

Other bad practices that need to be observed is the use of closed storage containers used by food handlers. When both raw material and ready-to-eat food exposed to the air, it will speed up its decay process. Microbes will be easy to breed, and the amount will be huge because of the presence of airborne. Existing oxygen will accelerate the oxidation process, rancidity, and other types of decay. This will be harmful to consumers. The use of containers without cover can occur due to lack of food handlers knowledge about the importance of closed containers, lack of facilities owned and the absence of complaints addressed by consumers in this case children to food handlers. This should be a great concern to stakeholders for example by providing adequate facilities for hand washing and providing clean water around the school environment, facilitating facilities to support food hygiene, making regulations and commitment to food handlers who sell their food in the school environment, providing rewards and punishment for food handlers so that they are eager and committed to maintain food hygiene and sanitation.

Association between demographic characteristic toward food handlers' behaviour level

Table 5 The relationship between food handlers' highest educational level toward their KAP level

Behaviour	Education level (%) χ^2		P
	Lower education level	Higher education level	
Knowledge			
Acceptable	39.5	10.5	23.039 .000
Excellent	60.5	89.5	
Mean	80.43	90.35	
Score			
Attitude			
Acceptable	41.7	13.2	21.650 .000
Excellent	58.3	86.8	
Mean	78.72	86.23	
Score			
Practice			
Acceptable	42	18.4	14.572 .000
Excellent	58	81.6	
Mean	51.45	59.82	
Score			

Based on Table 5, there is a significant relationship between the level of education and the KAP level of food handlers ($p < 0.05$). This is in accordance with the study by Choudhury (2011); Pokhrel et al. (2015); Soares et al. (2012); Yasmin and Madaniyah (2010), Jianu and Chis (2012) and Rosnani et al. (2014), that a high level of education will be followed by good hygiene knowledge on food handlers. According to Al-Shabib et al. (2016); Lorraine et al. (2013); Alimi (2016); and Sani and Siow (2014), school (education) is a very effective medium to increase the level of knowledge related to food hygiene as well as awareness of food handlers related to hygiene issues.

Based on the study of Planned Behavior by Ajzen (2002), measuring the level of food hygiene attitudes is an important thing to do because people act based on intentions and wills which can be influenced by attitudes.

Table 6 The relationship between food handlers' food hygiene training towards their KAP level

Behaviour	Food hygiene training (%)		χ^2	P
	Yes	No		
Knowledge				
Acceptable	20.3	36.4	5.756	.016
Excellent	79.7	63.6		
Mean	88.47	81.25		
Score				
Attitude				
Acceptable	23.7	38.4	4.695	.030
Excellent	76.3	61.6		
Mean	83.84	79.51		
Score				
Practice				
Acceptable	22	40.2	7.063	.008
Excellent	78	59.8		
Mean	57.06	52.34		
Score				

The results of the average score indicate that food handlers who have attended training have a higher score than food handlers who have not or have never attended training. These results are supported by Liu et al. (2015) and Pichler et al. (2014) which states that food handlers who have attended food hygiene training have a better level of knowledge about food hygiene.

The results of the chi-square correlation test, there is a significant relationship between the participation of food handlers in training on food hygiene against KAP level of food hygiene ($p < .05$).

Food hygiene training is a very effective medium to increase knowledge about food hygiene and sanitation awareness (Al-Shabib et al., 2016; and Mohd. Firdaus Siau et al., 2015). According to Medeiros et al., (2011), the increasing knowledge of food hygiene through training can have a positive effect on food handling practices.

Association between demographic characteristic toward food handlers' behaviour level

Table 7 Correlation among food handlers' knowledge, attitude, and practice level

Variable	r	p-value
Knowledge-attitude	0.758	.000
Knowledge-practice	0.300	.000
Attitude-practice	0.367	.000

The results of the Spearman correlation test showed that there was a significant positive relationship between the level of knowledge and the level of attitudes ($r = .758$), between the level of knowledge and the level of practices ($r = .300$) and between level of attitudes and the level of practices ($r = .367$). These results indicate that the higher the level of knowledge of food handlers related to food hygiene, the higher the level of attitudes and the higher level of practices. This research is in accordance with a research conducted by Abdul Mutalib et al. (2012); Mohd. Firdaus Siau et al. (2015); Al Shabib et al. (2016); Sani and Siow (2014); Soares et al. (2012); Rosnani et al. (2014); and Ansari Lari et al. (2010). Having good knowledge can result in good food hygiene and sanitation attitudes towards food handlers (Abdul Muthalib et al., 2012). According to Ansari-Lari et al. (2010), knowledge of food hygiene can help improve behavior or attitudes related to food hygiene of respondents.

Knowledge and attitude are close behaviors that occur when the response to the stimulus cannot be clearly observed by others. Knowledge is also one of the factors that can determine attitudes because knowledge can be a stimulus that encourages someone's willingness to behave (Notoatmodjo, 2014). The level of knowledge influences a person's attitude and behavior because it relates to the reasoning, experience, and clarity about a particular object. This was explained further by Iwu et al. (2017) that practice refers to the way food handlers demonstrate their knowledge and attitudes towards their food hygiene through a behavior or action.

Logistic Regression

Table 8 Logistic regression predicting food handlers' practice with food hygiene training and knowledge level as independent variable

Variable	Wald χ^2	P value	Adjusted odd ratio	95% CI
Constant	12.992	0.009	1.489	
Food hygiene training	6.758	0.000	2.376	1.237 – 4,564
Constant	1.874	0.171	0.789	
Knowledge level	28.618	0.000	3.252	2.111 – 5.010

Food handlers who have attended training related to food hygiene have a tendency to be twice as large to obtain good practice levels ($p < .05$) compared to food handlers who have not or have never attended training.

Food handlers with a good level of food hygiene knowledge tend to be 3 times more likely to obtain good levels of practice ($p < .05$) compared to food handlers with a moderate level of food hygiene knowledge. The results of this study support the evidence that having good knowledge can improve food hygiene practices when processing food.

According to Efendi and Makhfudli (2009), knowledge is a very important factor in shaping one's actions. Knowledge itself has several levels, one of it which is the application, if someone has reached this level then the knowledge he has will be used or applied in accordance with known principles. In this study food handlers have reached the application level so that food handlers apply the food safety knowledge to an action (food safety practice) (Notoatmodjo, 2014).

CONCLUSIONS

In conclusion, the results showed that the food handlers who have good knowledge and attitude, but slightly good practices towards food hygiene with mean score (SD) of 82.32 (± 11.55), 80.15 (± 10.1), 53.04 (± 10.67), respectively. The last level of education and the participation of food handlers in food hygiene training has a significant relationship with food hygiene knowledge, attitude, and practice. The result of correlation test between knowledge, attitude, and food hygiene practice using Spearman test shows that there is a positive correlation between knowledge with attitude, attitude with practice, and knowledge with practice.

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