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SHORT COMMUNICATION

Knowledge, attitude, and practices regarding food safety among food employees in Ambon City, Indonesia

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ABSTRACT

Introduction: It is estimated that each year, 1.8 million people worldwide die as a result of diarrhoeal diseases attributed to contaminated food. This cross-sectional study was conducted to determine the knowledge, attitude and practices regarding food safety and hygiene among food employees in Ambon Capital City, Maluku Province, Indonesia. **Methods:** A validated questionnaire was self-administered and completed by 135 food employees in small food companies in Jan-March, 2017. The knowledge section consisted of 19 yes-no questions. For knowledge, the score was considered acceptable if total score was >10. Fourteen 4-point Likert-scale questions were constructed for the attitude section, whereby a score of 3.0 and above for each question was considered positive. The practice section consisted of 13 4-point Likert scale items, and a score of ≥3 was considered good practice. The WHO Five Keys to Safer Food Manual was used as reference. **Results:** The respondents had an acceptable level of knowledge about food safety and personal hygiene (mean score=13.08±2.55), a positive attitude (mean score=3.38±0.55) and good practices toward food hygiene measures (mean score=3.98±0.55). A significant correlation was observed between education level, training experience, knowledge, attitude and practices, indicating that having good knowledge and attitude toward food safety could have positive influence on food handling practices. **Conclusions:** It is recommended that regular food safety training and adequate guidelines should be provided to improve food safety practices of food service employees in Ambon City.

Keywords: Knowledge, attitude, practice, food safety, personal hygiene

INTRODUCTION

Foodborne related diseases are among the leading causes of morbidity and mortality worldwide (Centers for Disease Control and Prevention, 2015). According to the foodborne outbreak database published by Centres for Diseases Control and Prevention (CDC), 37% of the foodborne disease outbreaks reported in 2010 were associated with food handling process. It has been estimated that each year 1.8 million people die as a result of diarrhoeal diseases and most of these cases can be attributed to contaminated food or water (Chapman *et al.*, 2010). A meta-analysis study highlighted that proper food preparation can prevent most foodborne diseases (Soon, Baines & Seaman, 2012).

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The World Health Organization (WHO) has long been aware of the need to educate food handlers about their responsibilities for food safety. In the early 2006, WHO developed the Five Keys to Safer Food Manual to provide guideline of food handling and inform more details on the reasoning behind the suggested measures. The aims were to improve the knowledge and skills as well as reapplication of practical food safety among food handlers (World Health Organization, 2006).

Past studies have shown that food employees lack food safety knowledge and follow improper food safety practices. A study by Webb *et al.* (2015), showed that food service workers did not always wash their hands, and 22% did not change gloves between touching raw meat and ready-to-eat (RTE) food. More striking findings were that 33% of food service workers did not wear gloves when touching RTE food, and only 47% used a food-grade thermometer to check the temperature of cooked food for doneness (Webb & Morancie, 2015).

Previous studies have shown mixed results when examining whether increased knowledge leads to better food safety attitudes, practices, and behaviours. Adesokan, Akinseye & Adesokan (2015) found that enhancing knowledge can change behaviours and practices, while Meysenburg *et al.* (2014) argued that improving knowledge through training alone may not result in behavioural changes. Rowell *et al.* (2013) found significant discrepancies between self-reported food safety knowledge and food safety practices. Mizanur *et al.* (2012) identified a number of factors, which affected employees' food safety behaviour. These included time pressure, equipment and resource availability, management and co-workers' attitude to food safety, and food safety education and training. A study in Malaysia in 2014 argued that food safety improvement requires more than food safety training and that training should be multidimensional (Sani & Siow, 2014).

Research studies on knowledge, attitudes and practices regarding food safety among food employees in the meat processing industry in Indonesia are limited. The objectives of the present study were to determine food employees' knowledge, attitudes and practices (KAP) regarding food safety in Ambon city, Maluku province.

MATERIALS AND METHODS

The study was conducted among 135 food employees from various small food companies in Ambon City. The respondents were selected through purposive sampling with technical assistance from the staff of National Agency of Drugs and Food Control regional office. A self-administered questionnaire modified from previous studies was used (Tokuça, Berberoğlua, Bilgeb & Dedelera, 2009; World Health Organization, 2006). Content validation of the questionnaire was done by cross-reference and verification by food safety experts. Reliability of the questionnaire was tested among pharmacy students in Gadjah Mada University with Cronbach's alpha for each set of the questions range within the acceptable limit (>0.7). The assessments evaluated the knowledge, attitude, and practice of the food employees on food preparation, reheating food, food storage, working area, handling raw and cooked food and others.

The respondents' socio-demographic characteristics, such as gender, age, educational level, work duration and certification grades were collected during the study. The age groups were classified according to less than 30 years old and more than 30 years old, have "low educational level" (received

education up to secondary level) and "high educational level" (that received education after their secondary level), "working experience" (work for five year and more, and working for less than five year), and small industries certification (yes or no).

Knowledge section consisted of 19 questions. Respondents were required to choose 'yes' or 'no' answers for this section. Fourteen questions were constructed for attitude section. The respondents were required to choose one of the four options provided which were 'strongly agree', 'agree', 'disagree' and 'strongly disagree'. For knowledge, the score was considered acceptable if its value was above 10. The attitude mean-average score was considered positive if a score of 3.0 and above was achieved. The practice section consisted of 13 4-point Likert scale items. The marks were converted to poor (marks below 3) and good practice (3 and above). The WHO Five Keys to Safer Food Manual was used as reference (WHO, 2006).

Data were analysed using SPSS software version 16. Chi-square test was used to determine the relationship between the socio-demographic characteristics of the food employees and their knowledge-attitude-practice (KAP) level. Logistic regression was used to determine the predictor variables for food employees KAP level. This survey was reviewed by Medical and Health Research Ethics Committee (MHREC) Universitas Gadjah Mada with reference number UGM/MHREC/317/2017.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

More than half of the respondents were male (55.6%) with 61.5% aged <30 years. Majority of the respondents passed junior high school (65.9%). It was found that 67.4% of the respondents had working experience <5 years, while 52.6% have not attended any training related to food safety. The majority (67.4%) had certification for working in the small food industry. This finding revealed the need for relevant training including in food safety among food processing workers.

Knowledge about food safety

Mean score for knowledge was 13.08±2.55 (max score was 19), indicating that the food employees had an acceptable level of knowledge on food handling. However, more than half of the respondents (57.7%) had a low level of knowledge (score <10). Only one third of the respondents knew the answer for questions about cross-contamination (39.3%), temperature and time control (40.0%), as well as the procedures in handling food (24.0%). Most of them (99.2%) knew that it was necessary to always wash their hands when handling foods and remove their personal effects when processing food (81.8%). These results were similar to the findings of a in Ghana where they also found that >90% of their respondents believed that the use of protective clothing, gloves and proper storage of foodstuffs were vitally important in reducing food spoilage and health hazards to consumers (Akabanda, Hlortsi & Owusu-Kwarteng, 2017). Stratev *et al.* (2017) in Bulgaria also reported that their participants answered correctly to questions on washing of hands. In contrast, a study by Harrison *et al.* (2013) indicated a lack of knowledge about microbial food hazards in the majority (67–78%) of their respondents.

Attitude on food safety

This survey found the food employees obtained a mean score of 3.97±4.67 (max score was 4), indicating that the food employees had a positive attitude regarding the importance of safe food handling. Most respondents agreed

that washing hand before handling raw or cooked foods reduces risk of food poisoning. However, they obtained a low score for the question on using different cutting boards for raw and cooked foods to avoid contamination. This indicates a potential problem arising from cross contamination of food-borne pathogens.

Tokuça *et al.* (2009) found that almost all (93.2%) of their food workers were aware of the danger of touching food with cut hands or fingers. A significant result from Aziz & Dahan (2013) was that 99% of their food employees said they did not touch food with cuts on their hands or fingers. This study found high proportion of the respondents was unsure about checking and discarding food that were beyond its expiry date. Food employees should be adequately trained to increase awareness and improve food handling behaviours (Ansari-Lari, Soodbakhsh & Lakzadeh, 2010; Worsfold & Griffith, 2010).

Food safety practice

Personal hygienic practice is extremely important to ensure delivery of safe food to consumers. The respondents' responses in terms of practices are summarised in Table 1. Overall, the respondents obtained a mean score of 3.98±0.55 out of a maximum of 10 for practices in personal hygiene and food safety, indicating that the respondents showed poor personal hygiene practices whereby they failed to maintain safe practices, such as removing personal effects (e.g. rings, necklaces, hairpins) when processing foodstuffs, and using caps, masks, protective gloves and adequate clothing. Lubran *et al.* (2010) found similar results in their study whereby only half of the street

Table 1. Food safety and personal hygiene practices

No	*Item (N=135)*	*Mean±SD*
1	I wash my hands before and during food preparation	4.37±0.55
2	I clean surfaces and equipment used for food preparation before re-using on other food	4.32±0.74
3	I use separate utensils and cutting-boards when preparing raw and cooked food	4.21±0.65
4	I remove my personal effects (e.g., rings, necklaces, hairpins) when process foodstuffs	3.09±0.74
5	I use caps, masks, protective gloves and adequate clothing reduce the risk of food poisoning	3.37±1.59
6	I consume food or beverages (e.g., coffee) inside processing areas	3.71±0.59
7	I will take leave when I am sick, or have a fever or cold	3.90±0.67
8	I separate raw and cooked food during storage	4.18±1.33
9	I check that meats are cooked thoroughly by ensuring that the juices are clear or by using a food grade thermometer	4.27±0.76
10	I reheat cooked food until it is piping hot throughout	4.32±1.63
11	I thaw frozen food in the refrigerator or other cool place	4.63±0.67
12	After I have cooked a meal, I store any left-overs in a cool place within two hours	3.51±0.78
13	I check and throw away food beyond its expiry date	3.72±1.08
14	I wash fruits and vegetables with safe water before eating/serving them	4.21±0.74
	Overall practice score (Mean score±SD)†	3.98±0.55

†The score scale ranges from 1 to 4 Likert scale

vendors (53.7%) in the Philippines knew that wearing accessories could cause bacterial contamination. According to the Codex Alimentarius Commision (2013), improper food handling is a major cause of foodborne diseases and poor hand hygiene is an important risk factor in the occurrence of food contamination. Food employees should always wash their hands at every stage of food production, particularly before handling foods, after eating, after touching contaminated materials, and after using the washroom.

Although most of respondents in this study said that they always wash their hands with soap and water, but not many of them were observed to do so in actual practice. As a matter of fact, handlers who directly prepare foods should wash their hands thoroughly using soap under hot running water and dry with a single-use towel; hand sanitisers may be used as a proper step in hand washing before wearing waterproof gloves. We recommend guidelines on food handling be disseminated among the small food companies.

Relationship between independent variables and food handling practice

The relationship between socio-demographic factors, food handling KAP are summarised in Table 2. The result of the correlation coefficient between educational level, training experience, and food handling KAP was significantly

Table 2. Relationship between independent variables and food handling practice

Variable	*Practice in food handling*		X^2	*p-value*
	Negative	*Positive*		
Gender			3.164	0.075
Male	39(52.0)	36(48.0)		
Female	22(36.7)	38(63.3)		
Age			2.469	0.650
<30	39(47.0)	44(53.0)		
>30	22(42.3)	30(57.7)		
Educational level			6.930	0.008*
Low	33(71.7)	13 (28.3)		
High	33(37.1)	56 (62.9)		
Small industry certificate			2.491	0.110
With certificate	34(37.4)	57(62.6)		
No certificate	20(45.5)	24(54.5)		
Working experience			2.303	0.316
<5 years	39(42.9)	52(57.1)		
>5 years	23(52.3)	21(47.7)		
Training experience			4.436	0.035*
Yes	26(36.6)	45(63.4)		
No	35(54.7)	29(45.3)		
Knowledge			7.837	0.005*
Good	19(33.3)	38(66.7)		
Poor	45(57.7)	33(42.3)		
Attitudes				
Positive	24(32.4)	50(66.6)	14.730	0.000*
Negative	40(65.6)	21(34.4)		

*$p<0.05$

positive ($p<0.05$), while other characteristics (gender, age, working experience, certification status) and food handling KAP were not significant. These findings indicate that food safety knowledge and training of the food employees could influence their attitude and practices in food safely. However, these results are in contrast with other studies which found that although food service employees had good knowledge of food safety, they rarely applied this knowledge when handling foods (Rowell *et al.*, 2013).

Several limitations were noted in this study. We relied on the use of a self-administered questionnaire that depended on the honesty of the food employees in answering the questions. As the study only focused on selected small food companies, these results should not be generalised to the entire Ambon city. More studies on a larger sample size should be conducted involving collaboration of the Ministry of Health and National Food and Drug Control Agency.

CONCLUSION

The study reported findings on the knowledge, attitude and practices regarding food safety among food employees working in small companies. Food safety training and guidelines should be provided to improve the food safety practices of food service employees in Ambon City.

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Authors' contributions

SAK, RSP, and JS performed in conception and design, acquisition of data analysis and interpretation of data. SAK and JS were drafting the article or revising it critically. Three authors were approved the final version to be published.

Conflict of interest

The authors declare no conflict of interest.

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