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RESEARCH ARTICLE

Foodborne disease and food safety among college students in a pandemic situation

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Abstract

Background: During the COVID-19 pandemic, there were 6,205 cases of food poisoning recorded by the Public Health Emergency Operation Centre (PHEOC) Indonesia. **Objective:** The objectives of this study were to assess the profile, knowledge, attitude, and practice of food safety among college students in a pandemic situation. **Method:** This research is a cross-sectional study conducted online at Universitas Jember, Indonesia, in October 2020. The sample used was (n=187, college students whose profiles, knowledge, attitude and practice were analysed with a chi-square test and Spearman rank ($\alpha = 0.05$). **Result:** The respondents were female (86.1%) and living in a dormitory (90.9%). The knowledge was medium, the attitude was neutral, and the practice was average. There was a significant correlation between profile and knowledge, attitude, and practice ($p < 0.05$); knowledge and attitude; knowledge and practice; attitude and practice in food safety among college students. ($p < 0.05$; $\alpha = 0.05$). **Conclusion:** The college curriculum should be improved in knowledge, attitude and practice to prevent foodborne disease, especially in the pandemic situation.

Introduction

Indonesia is one of the countries that still has a problem controlling the transmission of foodborne diseases. There is more than 200 disease that can be transmitted through food. The Public Health Emergency Operation Center (PHEOC) Indonesia recorded 163 incidents and 7132 cases of food poisoning outbreaks with a case fatality Rate (CFR) of 0.1% in 2017. There were 6,205 cases of food poisoning in 2019 during the Indonesia pandemic, which occurred in the 20-24 years old (Departemen Kesehatan Republik Indonesia, 2019).

The manifestation of foodborne disease is very complex. Foodborne diseases encompass various illnesses, from diarrhoea to cancers (World Health Organisation, 2020). The gastrointestinal problems are most common in foodborne diseases, but some cases

worsen when they also produce immunological symptoms, neurological, hepatotoxic, nephrotoxic, and cancers.

Many microorganisms can contaminate the food, which causes foodborne infection. Some bacteria like salmonella, *Escherichia coli*, campylobacter, and listeria, and some viruses, poliovirus and hepatitis A virus, can cause health problems. Some fungi can produce toxins that contaminate the food, enter our bodies, and cause foodborne disease symptoms. Many chemical substances also cause foodborne intoxication. There are many stages of contaminated food. The food production chain, such as how the crops grow, the harvesting process, food handling procedures, cooking processes, and food distribution, can be the entrance to contamination.

The implementation of food hygiene and sanitation was crucial. Some factors contributing to the foodborne disease are unsanitary food handling procedures and lack of hygiene in food preparation areas (Soon *et al.*, 2020). An international survey among consumers (Odeyemiet *al.*, 2019) showed that food safety knowledge in the world, especially in developing countries like Africa, is still lower. In Indonesia, there was a lack of implementation in hygiene and food sanitation (Dakwani, 2019; Pratiidina *et al.*, 2017).

Some dangerous substances still found in Indonesia's food like formalin, borax (Ristianingrum, Moelyaningrum., & Pujiati, 2018), (Imansari DS, AD Moelyaningrum, & PT Ningrum, 2018), (Moelyaningrum, 2019), (Dayanti, Moelyaningrum., & Ellyke, 2020). The respondents didn't realise that some foods consumed are likely to cause certain diseases. They should have good knowledge to choose safe food. sometimes, food labelling can indicate whether the food is good quality.

College students were expected to have good knowledge, attitude, and practice about food safety. They have the ability to influence people to control the food-transmitted disease. College students can be role models to people on how to choose food safety.

The pandemic makes people increase their vigilance, including food safety in the pandemic situation. The high incidence of foodborne disease, the unsanitary food lack of hygiene, many foods that were found to contain some dangerous substances, and the situation of the pandemic make the researcher want to analyse further how knowledge, attitude, and practice of food safety among college students in Jember district are through the pandemic situation. This research aims to analyse the profile, knowledge, attitude, and practice of food safety among college students through the pandemic.

Methods

This research is a cross-sectional study conducted at Universitas Jember, Indonesia, in October 2020. The ethics certificate number 974/UN25.8/ KEPK/DL/2020. The respondents were college students majoring in Public Health who studied for over two years at Jember University. The sample was (n) 187 college students. The respondents declare agreement for informed consent before they fill out the questionnaire. The questionnaire has been tested for validity and reliability.

The characteristic of respondents was gender and living with. The knowledge was analysed in nine

questions for knowledge that was categorised as poor, medium, and high. There were ten questions for the attitude that were categorised as negative, neutral, and positive, and there were 11 questions for practice, which were categorised as less, average, and good. The data were analysed with SPSS with chi-square and coefficient rho Spearman rank test ($\alpha=0.05$).

Results

Sample profile

There are 187 responses with 86.1% female and 13.9% male. Most college students in Public Health were female. There were many cases of food poisoning during the pandemic, Although male was reported to get higher case than female of food poisoning in Indonesia during the pandemic (Departemen Kesehatan Republik Indonesia, 2019).

Most students (90.9%) weren't living with their parents. They live in a dormitory, boarding house, etc. The chi-square test showed that there was a significant correlation between gender and knowledge ($p = 0.00$), attitude ($p = 0.00$) and practice ($p = 0.00$); ($\alpha=0.05$).

Living in a dormitory probably has a higher risk of food poisoning because of the high amount of food purchased outside. Buying the food outside sometimes couldn't guarantee how food is prepared, like the food material and ingredients, the washing process of cutlery, vector control, etc.

Knowledge

The analysis of the knowledge question was about the definition of food, what are the important things in food, the definition of hygiene, sanitation, food standardisation, food distribution permit, food labelling, and food additives.

The research showed that the majority of respondents (68.4%) had medium knowledge (score $33.4\% < x < 66.6\%$), 49 respondents (26.2%) had poor knowledge (total score $\leq 33.3\%$) and ten respondents (10.3%) was high knowledge (score $> 66.6\%$) (see table 1). The Interquartile score of knowledge range (1 ± 8 , mean 4.37; SD 1.37).

The respondents of this research were public health students who had studied for over two years. However, this research showed that most respondents had medium knowledge and only 10 respondents (5.3%) had high knowledge. It means that although the respondents studied food hygiene and sanitation for over two years, that does not ensure they have a high food safety knowledge.

Table 1: Gender, profile and correlation between knowledge, attitude and practice of the respondents

Variable	Frequency	%	Knowledge	Attitude	Practice
Gender					
Male	26	13,9	Sig ($p = 0.00$; $\alpha = 0.05$)	($p = 0.00$; $\alpha = 0.05$)	($p = 0.00$; $\alpha = 0.05$)
Female	161	86.1			
Total	187	100			
Living status					
Stay with parent	17	9,1%	($p = 0.00$; $\alpha = 0.05$).	($p = 0,00$; $\alpha = 0.05$).	($p = 0.00$; $\alpha = 0.05$)
Dormitory/boarding house	169	90.9%			
Total	187	100			
Knowledge					
High	10	5.3			
Medium	128	68.4		($p = 0.00$; $\alpha = 0.05$).	($p = 0.00$; $\alpha = 0.05$)
Poor	49	26.2			
Total	187	100			
Attitude					
Negative	46	24.6			
Neutral	107	57.2			($p = 0.00$; $\alpha = 0.05$)
Positive	34	18.2			
Total	187	100			
Practice					
Good	8	4.3			
Average	122	65.2			
Less	57	30.5			
Total	187	100			

The research of Luo and the authors that compares the knowledge of food safety of nursing students, education, and medical college students showed that nursing students scored the lowest, and medical students scored the highest ((Luo *et al.*, 2019).

According to the research (Banawas, 2019) on Majamah University, students said that the respondents have a lack of knowledge on food safety. The higher academic qualification does not possess more safety knowledge than the lower academic qualification (Suryani *et al.*, 2019; Teffo & Tabit, 2020).

Attitude

The categories of attitude were negative (total score $\leq 40\%$), neutral (total score $40\% < x < 75\%$) and positive (total score $> 75\%$). The Interquartile score of attitude (1 ± 20 , mean 11.9; SD 4.181). Most of the respondents (57.2 %) have a neutral attitude, 46 respondents (24.6%) have negative and 34 respondents (18,2%) have a positive attitude. There were still respondents who had a negative attitude, although the

respondents were public health students. The major of the study didn't always contribute to the attitude the food safety. (Luo *et al.*, 2019) found that on food safety attitudes, the education students scored the highest, and the medical students scored the lowest. However, On food safety practices, the education students scored the highest, and the nursing students scored the lowest.

Practice

The practice of food safety among students showed that only 8 respondents (4.3%) have good practice in food safety (total score $> 85\%$), 122 respondents (65.2%) practice on average, and 57 respondents (30.5%) do less (total score $\leq 45\% \leq 85\%$). This research showed that the respondents' major practice on food safety showed in enough categories. This means that the years of study didn't correlate with good practice in food safety (Stratev *et al.*, 2017).

Discussion

This research showed that profile respondents in gender were sig correlation between knowledge ($p=0.00$), attitude ($p=0.00$) and practice ($p=0.00$); ($\alpha=0,005$). Research showed that females are more careful than males in food safety, and there was a significant relationship between gender among males and females in their attitude toward consuming risky food (Alqurashi, Priyadarshini, & Jaiswal, 2019). In the other research, (Hussein & Dimassib, 2014) said that female students from Lebanese universities have a higher score on both knowledge and practice of food safety than male students. But the other hand, the research from (Courtney, Majowicz, & Dubin, 2016) studied on Canadian students at universities showed that males' food safety knowledge is higher than that of females. Good knowledge will contribute to the attitude and practice. There were 90,9% of respondents were living in a dormitory or boarding house without their parents. They prepared all the daily food by themselves. The respondents have the self-authority to choose their food every time. The respondents living with were sig correlation with the knowledge ($p=0,00$); attitude ($p=0,00$) and practice ($p=0,00$); ($\alpha=0,005$).

Knowledge is the basic thing for someone in implementing food safety behaviour. The result of the research showed that there was a significant correlation between knowledge and attitude ($p=0,00$); ($\alpha=0,005$), knowledge and practice ($p=0,00$); ($\alpha=0,005$) toward food safety (Ncube et al., 2020) in their research found that there is a significant correlation between food safety knowledge and attitude. The other research (Yusof, 2018.) showed that there was a significant association between knowledge and attitude and knowledge and practice toward food safety (Zyoud et al., 2019) also showed the same result that there was a correlation between knowledge and attitude, knowledge and practice, and also attitude and practice on food safety.

Conclusion

There was a significant correlation between knowledge, attitude, and practice about foodborne disease among public health students during the pandemic situation. The knowledge, attitude, and practice of food safety among college students must be improved. The college should integrate food safety into the curriculum, so the college students can contribute to breaking foodborne diseases in the community.

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