

## Food safety knowledge, attitude and practices among management and science university students, Shah Alam

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### CHRONICLE

### ABSTRACT

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In industrialized countries, about 30% of the population may suffer from foodborne illnesses each year. Malaysia has proven to be a country that has very serious focus on food, but the people do not care much about their food safety. Food safety and hygiene is usually explained as the multiple conditions and ways to preserve food quality, so that foodborne diseases and contamination is prevented. University students face with high risk because of their unsafe behaviors in consuming food. There have been many studies accomplished on comprehension, behavior and implementation towards food safety among food handlers. The current research desires to determine the current knowledge, attitude and practice status among students in Management & Science University (MSU) on food safety. The study framework focuses on testing the relationship between knowledge, attitude and practices and whether or not attitude will be a mediating factor towards practices on food safety among university students in MSU. Using a quantitative and descriptive method, a structured questionnaire was distributed among 430 respondents. The result of the study was analyzed using regression test and indirect method. The result shows that the students had a good knowledge, attitude and practice status towards food safety and attitude was a partial mediating factor in the relationship between knowledge and practice.

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## 1. Introduction

Food hygiene means a certain condition or measure that is needed to ensure the safety of our food from production to consumption (Wallace et al., 2018). These procedures must be kept in our daily lives so that customers get good quality food and avoid any issues that can come out of it due to bad practice of food hygiene. Previous research has indicated that some people may not have enough knowledge and practice about ways to stop food-borne illnesses (Al-Shabib et al., 2016; Katukurunda et al., 2018a,b). Malaysia has proven to be a country that has very serious focus on their food, but the people do not care much for their food safety (Philip, 2015). Educated consumers are what is needed in this country as they can become food safety inspectors with high level of knowledge in their own right (Charlebois et al., 2016). Currently, food safety is delivered through mass media and sometimes is focused on schools to teach young children about food safety. Unfortunately, not much change can be seen through this method. There is still a never-ending threat to the general public that is constantly growing (Luo et al., 2019). A major problem that remains the same is the food safety awareness among consumers in both developed and developing countries, but developing countries are getting the brunt of the problem more because of their poor standard of living, poor personal hygiene and not getting access to proper medical treatment (Mohamad et al., 2017; Odeyemi et al., 2019). The purpose is to determine the food safety knowledge, attitude and practices among university students in Management & Science University (MSU) in Shah Alam.

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## 2. Literature Review

World Health Organization (WHO) estimates that almost 30% of the human being in industrialized nations will probably experience foodborne disease every year (WHO, 2014). Cases of food disease in Malaysia are on the rise even with various ways have been done by the Malaysian government through National Food Safety (Siau, 2015). Based on the model of KAP, which consists of knowledge, attitude and practice, a positive attitude came from a compact knowledge on food safety and nutrition and it will allow an individual to develop a sound eating behavior a sound eating behavior (Cheng et al., 2017). However, attitude has a rather complicated process to be impactful in practice due to the various factors that can affect it such as culture, regulation, tradition and education (Cheng et al., 2017). There was limited information on young adult students regarding KAP due to the ineffective study designed on a relatively large sample for the age group (Cheng et al., 2017). Therefore, in order to determine the ways to provide better education and minimize the foodborne illness is to have a deep understanding of the knowledge, attitude and practice towards food safety of young students (Cheng et al., 2017).

### 2.1 Knowledge

Food safety has been an increasingly important public health issue for years (Bloomfield et al., 2016). 420,000 people die every year and that is almost 1 in every 10 people in the world to suffer a sickness after consuming contaminated or unsafe food as per to the World Health Organization (WHO, 2016). Foodborne illness has a tendency to increase in two categories of income which is middle and low- income nations because of the surge in consuming unsafe foods specifically fresh produce product, fish product and farm animals (Uyttendaele et al., 2015). Consumption of unhealthy food is becoming more severe and there are increasing cases on the matter and it does not only imply to the general public, but there is concern, issue arises among school children despite many efforts that have been done by the authorities (Norazmir et al., 2012). Probably, the importance of knowledge on food safety is still not well-known to many (Norazmir et al., 2012). Every single person is at risk of experiencing foodborne disease, but the only difference is in terms of the risk level (Norazmir et al., 2012). The people with low level of knowledge about food safety are likely to suffer with any food illnesses ever existed (Norazmir et al., 2012). Food safety systems that are highly developed like in Europe “farm-to-fork” and in the United States of America “farm-to-table”, at least dependable group of people still can cause significant rate of disease and even death in a population from foodborne disease (Norazmir et al., 2012; Boyce et al., 2008). The second packaged food left the manufactured establishment and being distributed, consumers have to rely on their own levels of knowledge and the most trustworthy on the packaging to avoid from eating the unsafe food product even if the food service personnel do practice a proper food safety (Boyce et al., 2008). It was reported in various studies that consumers aged 18-29 years have a poor food handling practices even with an education above high school level compared with others (Ali et al., 2019). It is important to evaluate the student’s level of knowledge, which will determine their perception and subsequently transform into their behavior. Majority of food handlers do not have a proper background education on regulations of food safety and hygiene but still have been brought into the industry as food handlers (Ali et al., 2019). Cheng et al. (2017) stated that in recent studies done in Beijing, approximately 75% of the student population eat food served by an individual who was unlicensed once a week, which is normally very delicious but may have a safety problem. Developing a proper attitude, sound knowledge and skills to understand current food issues is without a doubt by providing education towards food safety for the young generations (Cheng et al., 2017). Lazou et al. (2012) found that university students have an imperfect knowledge and usually partake in practices of food handling that is hazardous even students who come from courses related to food safety (Halim et al., 2016). An observation made by Odeyemi et al. (2019) found that effective food safety training on a regular basis must be compulsory and ongoing as it can eliminate the possibility of misleading towards food safety issues (Halim et al., 2016). Closing the gap discovered from other studies that involves on food safety matter is the responsibility of the young adult as the new generation of food handlers to decrease the extensiveness of foodborne illness (Halim et al., 2016). Minimizing the rate of foodborne illness breakout is by having a clear understanding of the relationship of overcoming the beliefs on knowledge and practices towards food safety (WHO, 2014). Despite the statistics on the increase rate in foodborne illness, consumers convinced that they do possess sufficient comprehension towards sanitary practices of food handling (Ovca et al., 2014). Food personnel were reported to be one of the most causes of foodborne disease due to lack of personal hygiene (Regan, et al., 2016). The increase in foodborne disease caused by few factors such as the inadequate training on food safety, proper education for food personnel, the change of habits in preparing food, heightening in establishments of food service and the rise of eating outside (Cruz, 2019). There is a lack of studies that was executed to examine the knowledge and practices of food safety among food personnel or tertiary level students in countries that is already evolving (Van Lieshout & Dawson, 2016). Comparing the knowledge of consumers between the year 1993, 1998 and 2001, it was discovered that as the time passed by, knowledge on food safety will surely arise (Lazpoulos Friedman & Van Camp, 2016). Knowledge of food safety is very important among students because they are also consumers (Turnbull-Fortune & Badrie, 2014). However, good knowledge is not a guarantee for exemplary implementation. Other studies found inconsistency in consumers’ concern towards food safety in terms of knowledge and practices of the household (Gurudasani & Sheth, 2009). Evaluating information without good practices is a fragmented picture of customer mindfulness towards food safety as getting high detailed qualities does not show that the learning is being used at the ideal time. Using one's learning to shield one's self as well as other people from sanitation risks could easily compare to great information scores. Great learning with deficient implementation contemplates the absence of inclusion and significance that the matter of hygiene has on the customers. Behavioral changes do not necessarily occur with sufficient amount of knowledge, along with various programs for hygiene education that failed to serve its purpose to create changes (Greyson, 2016).

## 2.2 Attitude

Even though many students are taught of dangerous microorganism that lurks everywhere around us, each person has the freedom to choose whatever they wish to buy. When it comes to packaged food, even if one abides by the proper sanitary practices, they have no control over the food after it has left their production location. Consumers must understand that they have freedom of choice when it comes to these package foods. If the packaging is compromised one should be able to know whether the product is still safe for consumption (Boyce et al., 2008). Another factor that may affect how students choose to buy their food is how their parents taught or showed them when they were young. A parent's actions may reflect their choices and may indirectly influence their children. The children may see these actions being done when they were young and see them as examples. A parent's ability to parent their child make better choices and can be seen in how they teach their children self-control and have responsible attitude through constant monitoring (Teh et al., 2016). Based on the research of Teh et al. (2016), even with a considerably large amount of knowledge on food safety, it will not mean much whether the person's attitude is neglectful and because of this, it will not help people adopt proper practices in food handling. Therefore, positive attitude should lead to proper attitude regarding these topics. On the other hand, misinterpretation and bad attitude can also be led by superficial knowledge which may result in increasing detrimental practices (Md Mizanur, 2012). Rosnani et al. (2014) showed that there was quite a notable difference in attitude between trained and untrained food handlers, education levels, ethnicity for the Malaysians and among non-Malaysians. This will give other researchers an opportunity to further inspect each demographic difference and how it affects their attitude. Da Cunha et al. (2014) stated that proper attitude can be a conciliate element in effecting the relationship of food handling knowledge and practices. Prior researches explanation regarding attitudes on food safety is similar to each other, but many of these researches are focusing on food handler as they are the closest to food production. Our research will do its best to close up the research gap of whether attitude affects their food preparations and their views on food sold at roadside stalls.

## 2.3 Practice

Based on a study that was done in China, the college students there were very cautious with the state of their food safety and the food safety issues. Their knowledge on this matter is the average, which gives a cause for concern because more than half of them ends up purchasing unsafe food that could ultimately cost their health (Luo et al., 2018). In the field of food safety, it does not only relate to the people's health but also the stability of social standings and the undertaking of various developments (Teh et al., 2016). Teh et al. (2016) also stated that not enough food hygiene knowledge is a factor that lead to the existence of diarrhoea among university students. This can be a high possibility when students consume food that they prepare themselves at home. Ness (2017) said that female students do not have enough knowledge on preventive measures to foodborne illnesses and there is other research that shows the result of university students having compliance issues to proper food handling practices. There is a very limited amount of information regarding the practices of food safety amongst university students in Malaysia. The practice is highly determined by a person's knowledge and attitude. Ness (2017) explains that when a person has low food safety scores, it can indicate that the person has low awareness toward the essential part of proper implementation of food safety. A secondary excuse can be the lack of knowledge given to them during their time in secondary school, which shows how the current education system is not doing enough to teach the students regarding food safety knowledge, attitude and practices. Another research found that there is no connection between demographic characteristics and course of study in practicing an upright food safety aspect (Foong et al., 2018). According to Lelieveld et al. (2016) there is a need to be a custom targeted risk communication and learning plan that will effectively influence the consumer's actions. However, there may not be any differences in encouraging behavior or practices if practice is only based on scientific communication. Based on the studies of Al-Shabib et al. (2016), there is rough handling of food when one lacks the knowledge of proper food handling practices.

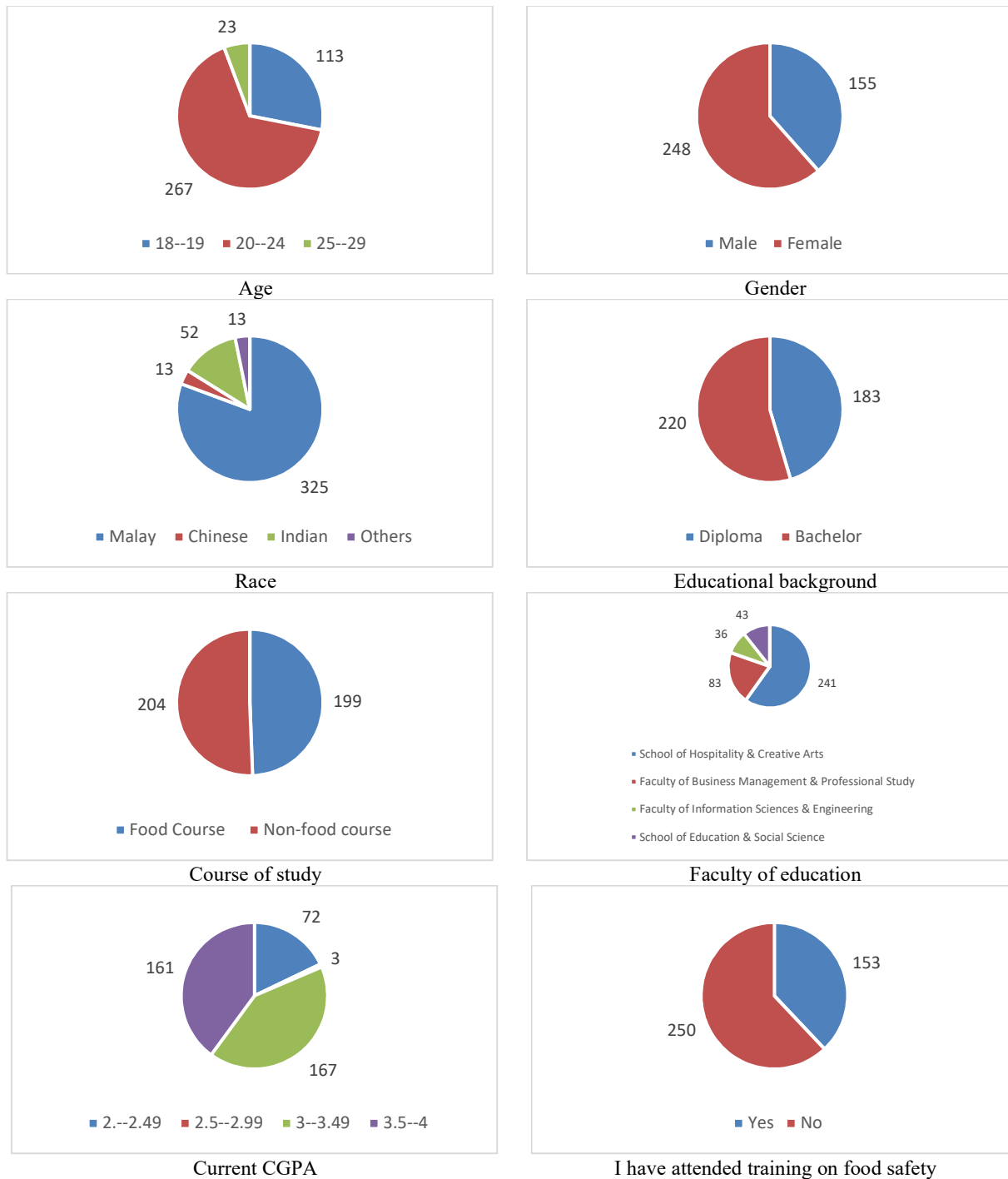
## 3. Methodology

The quantitative study was executed in three weeks on the campus of Management & Science University (MSU) as the population target was the students. The study distributed 430 surveys adapted and improvised from a previous study (Odeyemi et al. 2018). The structured questionnaire involves four sections. The first section included the demographic profiles of the respondents, the second section was knowledge about food safety, the third section was the attitude on food safety and the last dimension was the practice of food safety. The responses were thoroughly checked and for statistical analysis, incomplete response was not included. Descriptive statistics, regression analysis and indirect method were used in analyzing the data received by using SPSS20.

## 4. Findings

### 3.1 Demographic Profile

As can be seen in Fig. 1, the age group of 20-24 years dominated the respondent composition which accounts for more than half (66.3%) of total respondents. In addition, most of the respondents for the surveys were females with a frequency of 248 respondents.



**Fig. 1.** Personal characteristics of the participants

This accounts for more than half of the total numbers of the respondents with (61.5%) compared with male respondents which only comprises of 155 respondents with (38.5%). With regards to the race of the respondents, the questionnaire was dominated by Malay respondents with a total of (80.6%). In terms of education level, the highest response came from the bachelor level of study which makes up half of the respondents (54.6%) and trailed behind is the diploma level of study that accounted around (45.4%) from total respondents. The highest number of participants came from students who score their CGPA between 3.00 to 3.49 dominating about (41.4%) and trailing behind is the participants who achieved their CGPA more than 3.50 which accounted about 40 percent or 161 respondents. More than half of the respondents which make up (62%) of total respondents have not attended training on food safety and 153 respondents accounted (38.0%) attended the food safety training. The number of participants according to the course enrolled is classified into two groups; Food Course and Non-Food Course. As this is a comparative study, the separation of the group is necessary in order to see the analysis clearly. The largest

group of participants came from non-food course accounted for 204 respondents from 23 different courses and faculty which make up half of the total respondents (50.6%) and the second one came from a food course group that make up (49.4%) with 199 respondents from four different courses under the School of Hospitality & Creative Arts (SHCA)

### 3.2 Questionnaire Analysis

**Table 1**  
Summary of descriptive statistics of variables

	N	Mean	Standard deviation	Range
Knowledge	403	91.96	17.13	1-100
Attitude	403	5.17	0.71	1-6
Practice	403	5.11	0.77	1-6

In this section, descriptive analysis of knowledge, attitude and practice are analyzed. There were total of 20 questions for each variable; knowledge, attitude and practice. Mean score referred to the determination of the degree of agreement of the variable. In this study, knowledge, attitude and practice were measured using 6-point Likert scale where the respondents were asked to choose from six options to answer; Strongly Disagree, Disagree, Somewhat Disagree, Somewhat Agree, Agree and Strongly Agree. From the table, it can be concluded that the respondents had a good level of knowledge with a percentage of 91.96% (SD, 17.13) towards food safety. The response of participants to the attitude questionnaire was considered fairly high with an overall mean of 5.17% (SD, 0.71) and the total respondents carrying out good practices of food safety was also fairly high with a mean of 5.11% (SD, 0.77).

### 3.3 Correlation Analysis

**Table 2**  
Correlation of food safety knowledge, attitude and practice level

Level	Pearson Correlation	P
Knowledge – Practice	.520**	.000
Knowledge – Attitude	.518**	.000
Attitude - Practice	.826**	.000

Based on the results of Table 3, there is a positive relationship between knowledge and practice, knowledge and attitude and attitude with practice. In addition, the correlation of each level is at significant of .000 towards food safety. The value between knowledge and practice was 0.520, knowledge and attitude was 0.518 and attitude to practice was at the highest value of 0.826. The results show that a strong correlation level between knowledge, attitude and practices existed and there was a relationship between them. Therefore, hypothesis H<sub>3</sub> was found to be supported since the analysis shows a significant level between the variables. The subsequent test using a single linear regression test is used to analyze further on the relationship between each variable and will be presented in the next section.

### 3.4 Regression Analysis

**Table 3**  
Regression analysis of food safety knowledge, attitude and practices

Dependent Variable – Independent Variable	R <sup>2</sup>	Standardized Beta Coefficient	Significance	Tolerance	VIF
Attitude – Knowledge	0.268	0.518	0.000**	1.000	1.000
Practice – Attitude	0.682	0.826	0.000**	1.000	1.000
Practice – Knowledge	0.271	0.520	0.000**	1.000	1.000
Practice	0.693				
-Knowledge		0.126	0.000**	0.732	1.367
-Attitude		0.760	0.000**	0.732	1.367

Table 3 shows the findings of regression analysis of knowledge, attitudes and practices of food safety among MSU Shah Alam university students. R<sup>2</sup> is a statistical measure of data proximity to the fitted regression line. Other names for multiple regression are the determination coefficient and multiple determination coefficient. The value of R-Square has been always between 0% and 100%, where 0% is displayed that the model does not explain the variability of the response data by its mean, whereas 100% indicates that the model describes all the variability of the response data by its mean. As shown in Table 3, significant influence exists between knowledge and attitude, the entire R<sup>2</sup> was 0.268, indicating that knowledge of food safety could be interpreted into 26.8% of the attitude. Between the attitude and food safety practices, the value of R<sup>2</sup> was 0.682, which could be interpreted as 62.8% of the practices. There was also a significant difference in the relationship between knowledge and practices with the R<sup>2</sup> value of 0.271 indicating that knowledge of food safety could be interpreted into 27.1% of practices. When the predictor correlation decreases significantly by adding the mediator, a partial mediation occurs. In this case, with

the presence of attitude as the mediator, the standardized beta coefficient of knowledge obviously decreases to a value of 0.126. However, 69.3 per cent of food safety practices can explain the knowledge and attitude of food safety. According to the Preacher and Hayes (2008) procedure, when the predictor correlation is reduced to zero (i.e. When it becomes statistically non-significant), there is a complete mediation. Thus, knowledge of food safety is proven to be a partially mediated effect of results-based practices.

### 3.5 Mediating Analysis

**Table 4**  
Results of Mediation Testing of Knowledge on Practices Mediated by Attitude

	Hypothesis Tested	B-value, t-value	Result
A Path	Knowledge → Attitude	0.0214 , 12.1280	Significant
B Path	Attitude → Practice	0.8333 , 23.4840	Significant
C Path	Knowledge → Practice	0.0235 , 12.1983	Significant
C' Path	Knowledge + Attitude → Practice	0.0057 , 3.9066	Significant
H <sub>4</sub>	Attitude would mediate the relationship between knowledge and practices of university students in terms of food safety	Since C' path is significant, only partial mediation occurs	Partially Supported

First, it was found that knowledge was positively associated with the attitude towards food safety ( $\beta=0.0214$ ,  $t(403) = 12.1280$ ,  $p = .001$ ). Second, it was found that attitude was also positively associated with the practice ( $\beta=0.8333$ ,  $t(403) = 23.4840$ ,  $p = .001$ ). Lastly, the knowledge was positively associated with practically showing its significant result ( $\beta=0.0235$ ,  $t(403) = 12.1983$ ,  $p = .001$ ). Because both the a-path, b-path and c-path was significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence estimates (MacKinnon et al., 2004; Preacher & Hayes, 2004). In the present study, the 95 percent confidence interval of the indirect effect was obtained, with 5000 bootstrap samples (Preacher & Hayes, 2008). The results of the mediation analysis confirmed the mediating role of attitude in the relationship between knowledge and practice to be partially mediated ( $\beta=0.0057$ ,  $t(403) = 3.9066$ ,  $p = .001$ ). This is because the result indicated that the C' path was also significant which supposedly to be not significant.

## 4. Conclusion

Apparently, most of the students had sufficient knowledge in food safety and good attitude and practices as well. However, since these elements are evaluated based on the questions through a survey, they might not actually apply the perceived knowledge in their daily lives. It is important to have the right implementation towards food safety if we wish to produce young generations that take care of their food consumption's conditions and handling in regards to create a healthy individual or even community. The study has illustrated the students of Management & Science University of their perceived knowledge, attitude and practices towards food safety. From the study, we can see that the relationship between knowledge, attitude and practices existed and influenced on each other. Furthermore, the results of the study also have shown that the students had a good knowledge of food safety, however the knowledge could be partially mediated by the attitude when it comes to practicing. Other than that, it was also to be known that the students with food related courses will behave accordingly to what they have learnt on food safety unlike those students who did not formally learn about food safety. Hence, this will ensure the safety of the food consumption and reduce the foodborne illness that will always occur if there are no proper food safety practices. In the nutshell, it is important for students to understand the importance of food safety as a way to prevent unwanted incidence regarding foodborne illness, because as much as we knew the food that was being sold on the street are not perfectly hygienic and can contribute to such illness and any one can also get sick practicing such diet.

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