

**Kertas Asli/Original Articles**

**Food Safety Knowledge, Beliefs and Behaviour among Health Sciences-related Field Undergraduate Students at a Local University**

(Pengetahuan, Kepercayaan dan Tingkah Laku Keselamatan Makanan dalam Kalangan Pelajar Bidang Berkaitan Sains Kesihatan di Sebuah Universiti Tempatan)

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ABSTRACT

*Foodborne disease is among the primary illness that causes morbidity and mortality in the world. Several studies show that most students do not have adequate food safety knowledge to protect themselves against foodborne diseases. This study aimed to determine the food safety knowledge, behaviour, and beliefs among undergraduate students at a local university in Malaysia. This cross-sectional study involves 121 respondents from three health science-related faculties at the studied institution. The questionnaire was distributed via an online platform. This study used multiple-choice-format questions for Food Safety Knowledge and a Likert type scale for Food Safety Behaviour and Belief question statements. Most of the respondents were female (78%). About 16% of the respondents have experience working / volunteering in food services, and half of them are involved in food handling during their services. This study recorded a moderate score in all sections (knowledge, behaviour, beliefs) with a total percentage score of 60.3%, 60.3%, and 66.1%, respectively. A strong but not significant correlation between food safety knowledge and beliefs ( $r = 0.69$   $p > 0.05$ ) and between food safety knowledge and behaviour ( $r = 0.83$   $p > 0.05$ ) were observed. This study is useful as a basis to develop a targeted food safety education program among undergraduate students. Students with high knowledge of food safety will increase food safety beliefs and behaviour, thus preventing them from getting any foodborne illness.*

*Keywords: Food safety knowledge; food safety belief; food safety behaviour; foodborne illness; undergraduate students*

ABSTRAK

*Penyakit bawaan makanan adalah antara penyakit utama yang menyumbang kepada kadar morbiditi dan mortaliti di seluruh dunia. Kajian lalu telah melaporkan bahawa golongan pelajar tidak mempunyai tahap pengetahuan keselamatan makanan yang mencukupi bagi melindungi diri mereka daripada penyakit bawaan makanan. Kajian ini bertujuan untuk menentukan tahap pengetahuan, kepercayaan dan tingkah laku keselamatan makanan di kalangan pelajar prasiswazah di sebuah universiti tempatan di Malaysia. Kajian keratan-rentas ini melibatkan seramai 121 orang pelajar dari tiga fakulti berkaitan sains kesihatan di institusi tersebut. Borang soal-selidik telah diedarkan melalui pelantar atas talian. Soal selidik ini terdiri daripada soalan berbentuk pelbagai pilihan jawapan bagi bahagian Pengetahuan Keselamatan Makanan dan pernyataan berbentuk skala-Likert bagi bahagian Tingkahlaku dan Kepercayaan Keselamatan Makanan. Hasil kajian menunjukkan seramai 78% responden adalah pelajar wanita. Terdapat seramai 16% responden mempunyai pengalaman bekerja/menjadi sukarelawan dalam perkhidmatan makanan dan separuh daripada responden tersebut terlibat dengan pengendalian makanan sewaktu tempoh bekerja/khidmat sukarelawan tersebut. Jumlah skor keseluruhan adalah sederhana untuk semua bahagian (Pengetahuan, Kepercayaan dan Tingkahlaku) dengan skor sebanyak 60.3%, 60.3% dan 66.1% bagi setiap satunya. Terdapat hubungan korelasi yang kuat di antara pengetahuan dan kepercayaan ( $r = 0.69$   $p > 0.05$ ) serta di antara pengetahuan dengan tingkah laku keselamatan makanan ( $r = 0.83$   $p > 0.05$ ). Namun, hubungan korelasi ini adalah tidak signifikan. Kajian ini dapat dijadikan sebagai asas pembangunan program pendidikan kesedaran keselamatan makanan yang lebih tertumpu di kalangan pelajar prasiswazah. Pelajar yang mempunyai tahap pengetahuan keselamatan makanan yang tinggi akan dapat meningkatkan tahap tingkahlaku dan kepercayaan terhadap keselamatan makanan, sekaligus dapat melindungi diri daripada penyakit bawaan makanan.*

## INTRODUCTION

Foodborne diseases are a significant cause of morbidity and mortality in many countries. Foodborne illnesses have emerged as an important and growing public health and economic problem, substantially impacting people's health worldwide. Contaminated food and water intake can cause food and water-borne diseases that include cholera, typhoid, dysentery, viral hepatitis A and food poisoning (WHO 2020).

Malaysia's climate, which is hot and humid, provides a suitable temperature and condition for most bacteria's growth, contributing to one of the countries with high cases of foodborne diseases (Abdul-Mutalib et al. 2015). There is a possibility of foodborne cases being underestimated in Malaysia because most incidences were not reported by patients who did not seek medical treatments (Salleh et al. 2017). Animal origin food, particularly beef, poultry, pork, milk, fish, and eggs, is the most frequent food products involved in foodborne disease outbreak (Abdullahi 2016; Pal et al. 2020a; Pal et al. 2020b).

Young adults aged 18 to 29 are vulnerable to mishandling of food than adults of other ages (Courtney et al. 2016). The food safety knowledge among this age population has been investigated in college and university students. Most studies have found that college students do not have adequate awareness, understanding of food safety and are frequently involved in inappropriate food safety practices that can pose a high risk of foodborne diseases (Luo 2019; Majowicz 2015). Direct comparisons can be seen between different study years, populations, and knowledge from these published studies. They are an important target group as they tend to engage in risky eating behaviours and food handling practices that make them vulnerable to foodborne illness (Al-Shabib et al. 2017).

The study by Ali et al. (2018) had reported that factors that lead to the lack of comprehensive knowledge among university students include a low level of public awareness since less attention was given to safe eating behaviour and safe food preparation methods. Therefore, this study aimed to determine the food safety knowledge, behaviour, and beliefs among undergraduate students at a local university in Malaysia.

## MATERIALS AND METHODS

### RESEARCH DESIGN

This study is a cross-sectional study conducted at three health sciences related faculties at a local university in Malaysia. The inclusion criteria were undergraduate

students from the studied institution's selected faculties and are willing to participate. The exclusion criteria are undergraduate students from non-selected faculties, postgraduate students, and staff. Ethical approval from the Universiti Kebangsaan Malaysia's Research Ethics Committee was obtained before this study's commencement [Ref. No: UKM.PPI.800-1/1/5/JEP-2019-502].

### INSTRUMENTATION

The questionnaire used was based on a slight modification of Courtney et al. (2016). The questionnaire was distributed through the online platform via 'Google Form'. The respondents were especially reminded that truthful information was required for the study's success and that the information would be kept confidential. Respondents were informed about the purpose of the study and the importance of the reliability of their answers. Identity numbers were randomly assigned to each questionnaire to guarantee the anonymity of responses and easy identification of questionnaires by individuals.

The questionnaire consisted of a total of 80 items and was divided into four sections: (1) demographic profile, (2) food safety knowledge, (3) food safety behaviour and (4) food safety belief. Multiple-choice-format questions were used for food safety knowledge, whereas the Likert-type scale was used for food safety behaviour and belief question statements (agree, disagree, or neither agree nor disagree). Each section included a set of negative and positive questions. For each correct answer, one mark was given and zero marks for the wrong or not sure answer. The total score for the food safety knowledge section was calculated and categorised into low (0 to 6), medium (7 to 12) and high (12 to 17), the total score for the food safety belief section was calculated and categorised into low (0 to 14), medium (15 to 28) and high (29 to 41). The total score for the food safety belief section was calculated and categorised into low (0 to 6), medium (7 to 12) and high (12 to 17).

### DATA ANALYSIS

All data were analysed in SPSS software (Statistical Package for the Social Sciences, version 25.0). Total responses and percentages in each section (demographic profile, food safety knowledge, food safety belief and food safety behaviour) were calculated and presented tabularly. Spearman's rho test was conducted to determine the correlation between students' food safety knowledge, beliefs, and behaviour. A p-value of less than 0.05 was defined as statistically significant unless otherwise stated.

## RESULTS

The current study evaluated undergraduate students from health sciences-related fields from a local university in Malaysia regarding their knowledge, beliefs, and food safety behaviour. A total of 121 students have participated in this study. The general demographic information of the respondents is shown in Table 1. Overall, most of the respondents were female (78%) and from the Faculty of Health Sciences (57%). The age range of participants is between 19 years old and 23 years old and above. About

16% of them have experience working or volunteering in services such as restaurants, delivery, hospital and daycare, with only half of them have been involved in handling food during the services. The majority of the respondents lived at home (57%), followed by living at college (26%) and living off college (17%). Almost all respondents (97%) know how to cook, with most of them (57%) reported that they could prepare simple meals with a recipe's aid. Only 30% of the respondents have taken a food safety course, with 20% of them took the course through their education system.

Table 1. Demographic information of respondents (n=121).

Demographic Information	Number	Percent (%)
Age (in years)		
≤18	-	-
19	2	2
20	21	17
21	19	16
22	41	34
≥23	38	31
Gender		
Male	27	22
Female	94	78
Faculty		
Faculty of Health Sciences (FSK)	69	57
Faculty of Pharmacy (FFAR)	35	29
Faculty of Dentistry (FGG)	17	14
Works or volunteer in a		
Restaurant, deli, or other food services	7	6
A hospital	5	4
A daycare or other place that interact with children	6	5
A retirement home, nursing home or long-term facility	-	-
Not applicable	103	85
Is a current food handler		
Yes	9	7
No	9	7
Not applicable	103	85
Has ever taken a previous food safety course		
Yes	36	30
No	85	70
The food course taken		
Education system	24	20
Personal effort	12	10
Self-described cooking ability		
I don't know how to cook	4	3
I can only cook food when the instructions are on the box	7	6
I can do the basics from scratch (like boil an egg or make a grilled cheese sandwich) but nothing more complicated	18	15

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I can prepare simple meals if I have a recipe to follow	69	57
I can cook almost anything	23	19
Current living arrangement		
College	32	26
Outside college	20	17
Home	69	57
Frequency of cooking from basic ingredients		
At least once a day	45	37
A few times a week	29	24
A few times a month	25	21
A few times a year	18	15
Never	4	3

Overall, the students involved in this study (60.3%) showed a moderate score (Figure 1A) for food safety knowledge, with an average of 8 correct answers out of 13 questions. However, only 2.5% of the respondents obtained good scores, and about 37.2% reported poor food safety knowledge. The distribution of correct answers and most frequently incorrect answers chosen by the respondents for the food safety knowledge section are summarised in Table 2. Most of the respondents are well-versed in the definition of microorganisms, as shown by the highest correct answers obtained (89%) compared to other questions. This was followed by knowledge on the method to reheat leftovers and the effects of cold treatments on

foodborne pathogenic bacteria, where 73% of respondents answered both questions correctly. A total of 80% respondents believe that most food safety problems are most likely to occur in restaurants, but 8% answered “do not know” for this question. Only 67% of the respondents know the correct way to wash their hands hygienically. Results also showed that there were less than 20% correct answers for these following questions: “safe actions to be taken on prolonged thawed meat/seafood products”, “the proper method to determine whether the burger patties are cooked enough”, and the “duration of leftovers that can be kept in the refrigerators”.

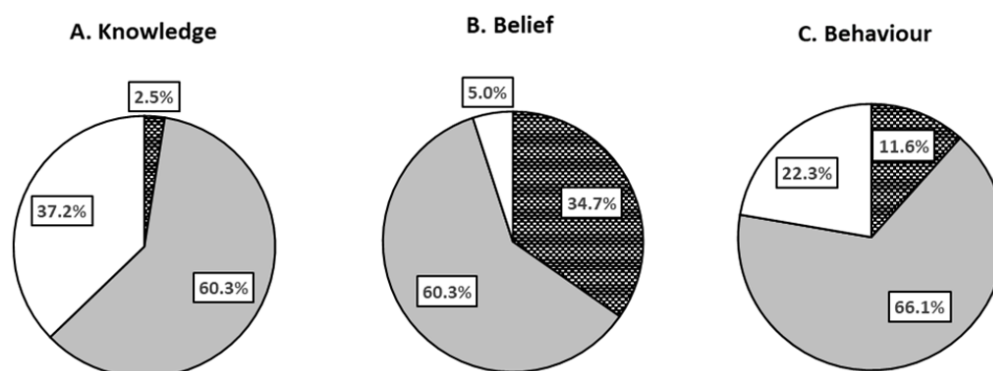


Figure 1. Percentage of respondents' score on Food Safety (A) Knowledge, (B) Belief and (C) Behaviour

Table 2. Distribution of respondent's correct answers and most frequently selected incorrect answers to food safety knowledge questions ( $n = 121$ )

Questions	Percent of Students Selecting a Given Answer			
	Correct Answer	%	Most Frequent Incorrect Answer	%
Which procedure for cleaning kitchen counters is best?	Wash with a detergent, rinse, then wipe with a sanitising solution	22	Brush off any dirt or food pieces, then wipe with sanitising solution	51

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Which is the most hygienic way to wash your hands?	Run water, moisten hands, apply soap, rub hands together for 20 seconds, rinse hands, dry hands	67	Apply soap, rub hands together for 20 seconds, rinse hands under water, dry hands, apply sanitiser	24
Imagine that your electricity went off and the meat, chicken, and/or seafood in your freezer thawed and felt warm. What should you do?	Throw them away	10	See how they smell or look before deciding what to do	74
Which of the following is considered the most important way to prevent food poisoning?	Keep foods refrigerated until it's time to cook or serve them	54	Rarely or never serve leftovers	30
If a family member is going to be several hours late for a hot meal, how should you store the meal to keep it safe until this person is ready to eat it?	Store it in the refrigerator and reheat it when the person is ready to eat it	49	Store it in a warm oven until the person is ready to eat it	26
All foods (except whole poultry) are considered safe when cooked to an internal temperature of	165 °F (74 °C)	38	140 °F (60 °C)	36
Which method is the best way of determining whether burger patties are cooked enough?	Measure the temperature with a food thermometer	14	Cut one to check the color of the meat inside	53
To prevent food poisoning, how long should leftover foods be heated?	Until they are boiling hot	73	Just until they are hot, but not too hot to eat right away	20
Chilling or freezing eliminates harmful germs in food.	False	73	True	27
Where do you think food safety problems are most likely to occur? (You can choose more than one option)	Farms	41	-	-
	Food processing plants	41	-	-
	Warehouses	41	-	-
	Supermarkets	51	-	-
	Restaurants	80	-	-
	Homes	44	-	-
	-	-	Don't know	8
How long should leftovers be stored in the refrigerator?	3 to 4 days	18	Base on look, smell, and taste of food	42
What are microorganisms?	Small living things that are too small to be seen with our eyes	89	Poisons that can contaminate our food and water	11

Only 46 students (38%) answered that all foods (except whole poultry) are considered safe when cooked to an internal temperature of 74°C. About 36% of students also answered incorrectly for the statement that food needs to be cooked to an internal temperature of 66°C. It is also interesting to note that 51% of the respondents chose the answer to the question of the best procedure for cleaning the kitchen counters as by brushing off any dirt or food pieces instead of washing of dirt from the surface with detergent and rinsing it off before wiping it off with a sanitising solution.

Most respondents (60.3%) showed a moderate score for food safety beliefs, but only 5% of the respondents scored poorly in this section (Figure 1B). The distribution of respondent's answers towards food safety belief-based statements was shown in Table 3. More than 93% of respondents reported that they are interested and would like to learn how to prevent/avoid getting food poisoning and keeping their food safe. About 61% of students are confident that they can cook safe and healthy meals for themselves and their families, and 93% of respondents

believe that being able to cook safe and healthy meals is an important life skill that one should have. A total of 87% of students also are interested in learning how to read nutrition labels on food products and how to choose nutritious food to eat. More than 76% of respondents are worried about getting food poisoning based on their answers towards the food safety belief-based statements, but only 46% believe that food poisoning is currently a significant threat to their health. A lower percentage of concern on food allergies were also observed among the respondents (53%), with only 36% of respondents believe that food allergies are currently a significant threat to their health. Although 94% of the respondents agree that everyone can get sick with food poisoning, the percentage of respondents that believe they are at risk of getting food poisoning is almost similar between those who agree and those who felt neutral on these statements. It can also be observed that convenience is a more critical factor in choosing their food than the food cost among the respondents (63%).

Table 3. Distribution of respondent's answer towards food safety belief-based statements (n = 121).

Statements	Disagree n (%)	Neutral n (%)	Agree n (%)
I am interested in finding out how to avoid food poisoning.	-	6 (5)	115 (95)
I like learning about how to keep my foods safe to eat.	2 (2)	3 (2)	116 (96)
I would like to learn about how to prevent food poisoning.	1 (1)	7 (6)	113 (93)
I am interested in finding out how to read nutrition labels.	1 (1)	15 (12)	105 (87)
I like learning about how to choose nutritious foods to eat.	3 (2)	13 (11)	105 (87)
I believe that I could get food poisoning.	10 (8)	54 (45)	57 (47)
I have a chance of getting food poisoning.	11 (9)	51 (42)	59 (49)
Food poisoning is not currently a big threat to my health.	56 (46)	40 (33)	25 (21)
Getting food poisoning is not a problem I worry about.	94 (78)	18 (15)	9 (7)
I am concerned about getting food poisoning.	10 (8)	19 (16)	92 (76)
Anyone can get sick with food poisoning.	4 (3)	4 (3)	113 (94)
Food allergies are not currently a big threat to my health.	44 (36)	28 (23)	49 (41)
I am concerned about food allergies.	25 (21)	32 (26)	64 (53)
I am confident that I can cook safe, healthy meals for myself and my family.	8 (7)	39 (32)	74 (61)
Being able to cook safe, healthy meals is an important life skill	3 (3)	5 (4)	113 (93)
I am not worried about how much food costs.	48 (40)	45 (37)	28 (23)
Choosing the cheapest food option is most important to me.	40 (33)	55 (45)	26 (22)
Choosing the most convenient food option is most important to me.	14 (11)	31 (26)	76 (63)

Most respondents (66.1%) scored moderately for the food safety behaviour section, while only 11.6% of respondents obtained good total scores (Figure 1C). The distribution of respondent's answers towards food safety behaviour-based statements was shown in Table 4. A total of 80% respondents wash their hands with soap and running water before handling any food, with 75% reported that they would wash their hands after handling raw meat, and 74% will cover their cuts/sores on their hands before preparing any food. Only 32% of respondents reported that they clean their kitchen counters with hot soapy water after preparing

their food, while only 17% uses ice packs when packing for their lunch for day trips. About 44% of respondents refrigerate their food within 2 hours of preparing and eating, and most of them (86%) reported that they kept their raw meat separated from ready-to-eat foods. Most respondents did not use the thermometer to check their cooked meat's temperature (75%) or when reheating their leftovers (78%). A total of 48% respondents read the nutrition labels, and 60% read the ingredient labels when choosing food products. Microwave usage among the respondents is more or less similar between the three categories (31-37%).

Table 4. Distribution of respondent's answer towards food safety behaviour-based statements (n = 121).

Statements	Disagree n (%)	Neutral n (%)	Agree n (%)
I plan, or help plan, the meals in my household.	22 (18)	23 (19)	76 (63)
Before preparing or handling food, I wash my hands with soap and running water.	5 (4)	19 (16)	97 (80)
If I have a cut or sore on my hand, I cover it before preparing food.	10 (8)	22 (18)	89 (74)
I wash my hands with soap and warm running water after working with raw meat or poultry.	11 (9)	19 (16)	91 (75)
I clean countertops with hot soapy water after preparing food.	32 (27)	50 (41)	39 (32)
I refrigerate hot food within two hours of preparing and eating.	53 (44)	36 (30)	32 (26)
I keep raw meat and poultry away from ready-to-eat foods like raw vegetables.	7 (6)	10 (8)	104 (86)
I use a thermometer to check if meat or chicken has been cooked enough.	91 (75)	22 (18)	8 (7)
I use a thermometer to check if leftovers have been reheated enough.	94 (78)	19 (16)	8 (7)
I read nutrition labels to make decisions about the foods I choose.	26 (21)	37 (31)	58 (48)
I read ingredient lists to make decisions about the foods I choose.	12 (10)	36 (30)	73 (60)
I use an ice pack when I take my lunch with me for day trips (like a trip to the beach).	69 (57)	32 (26)	20 (17)
When I cook or reheat meals, I use a microwave.	45 (37)	38 (31)	38 (31)
I eat food that has passed the "Best Before" date.	57 (47)	29 (24)	35 (29)

Spearman's Rho analysis showed a strong correlation between food safety knowledge and beliefs ( $r = 0.69$ ) and between food safety knowledge and behaviour ( $r = 0.83$ ). However, both correlations were not significant ( $p > 0.05$ ). Meanwhile, there was only a weak correlation between food safety belief and behaviour ( $r = 0.162$ ;  $p > 0.05$ ).

## DISCUSSIONS

Foodborne diseases are a global public health concern that needs to be focused on every nation. The increasing of foodborne illness cases each year causes the nation's socioeconomic adverse impacts to increase (Wu et al. 2018). One of the main factors of the increasing foodborne illness is the lack of awareness of food safety and hygiene among the public. Young adults such as undergraduate students who may not have much experience in handling and preparing their food and the high tendency of this age group to engage in risky food handling behaviours will increase their risk of getting foodborne diseases.

This study showed that most participating undergraduate students only scored moderately for food safety knowledge, beliefs, and behaviour which is in line with other global studies (Smigic et al. 2021; Al-Shabib et al. 2017). Most respondents in our study know about microorganisms that cause foodborne illness and showed an interest in increasing their food safety knowledge, including learning about ways to prevent food poisoning and choosing healthy and nutritious food. They also showed concerns about getting food poisoning, which indicates that they are aware of the potential risk of food poisoning in their daily lives and understand the importance of food nutrition labels in choosing healthy and safe food. As most of them agree that cooking safe, healthy meals is an important life skill; this further emphasises their belief that obtaining food safety knowledge will help them cook safe, healthy meals for themselves and their families, thus avoiding foodborne illness. Food safety education for students would impart knowledge and motivate them to adhere to food safety behaviours. The university is ideal for teaching critical food safety ideas to young adults, as they will be the future caregivers for their families and future employees in the food industry (Smigic et al. 2021). Furthermore, university graduates, particularly those with a medical or health sciences background, should serve as food safety ambassadors to promote food safety culture in the community.

Although most respondents practice good hand hygiene before and during preparing food, not all of them knew the correct way to wash their hands hygienically. Handwashing is the essential behaviour that can be done to prevent food poisoning when preparing food. Washing hands correctly and frequently with soap and water is an easy way to prevent

germs from spreading around the kitchen and other foods. The addition of hand sanitisers will also increase the efficacy of microbial reduction (Foddai et al. 2016). Respondents were also observed to have low knowledge and practices in the proper way to clean the kitchen countertop after preparing their food. Most respondents reported that brushing the dirt off the kitchen countertop is adequate, and washing the surface with hot soapy water is unnecessary. The practice of using hands or tools such as towels and wet cloth to brush off dirt is unhygienic as it contributes to the transmission of microorganisms to other kitchen surfaces (Lai et al. 2021, Evans & Redmond 2019, Taché & Carpentier 2014). Brushing off any dirt or food pieces only remove the physical contamination, but microbial residual will stay at the place. Using detergent and then rinsing with clean water could remove the physical, chemical, and microbial contamination (Møretro et al. 2020). Other studies also stated that a better microbial reduction could be achieved through cleaning with detergent soap followed by sanitising agents rather than using detergent soap alone (Man & Heacock 2018; Matthewson & Heacock 2017).

Respondents were also noted to be confused with the correct temperature to cook their food. This could indicate that the students are confused about the safe internal temperature for consuming food with the correct temperature for holding hot food. The students may assume that the food is safe to consume if the internal temperature is  $66^{\circ}\text{C}$  as it is not in the range of the danger zone ( $5^{\circ}\text{C}$  to  $60^{\circ}\text{C}$ ). The outbreak of foodborne disease is commonly due to the lack of food hygiene knowledge in preparing home food, such as improper cooking, cross-contamination, contaminated ingredients and improper storage (Ruby et al. 2019; Sanlier 2012). This shown the importance of proper cooking temperature to avoid any foodborne illness among students. Dudeja & Singh (2017) stated that all foods must reach an internal temperature of  $75^{\circ}\text{C}$  to ensure it was fully cooked. The growth of the bacteria can be minimised by controlling the temperature correctly. Raw poultry and meat are categorised as high-risk food that can cause food poisoning, which, when consumed raw or undercooked meat, can cause *Escherichia coli* infection (Dudeja & Singh 2017; Zulfakar et al. 2017).

Lack of knowledge on the correct temperature for cooking was also shown by the students' lack of thermometer usage to ensure whether their food has been cooked or reheated enough. Even though using a thermometer is the most reliable method to measure food temperature, it was commonly not used as most people tend to rely on indicators such as colour, taste, and firmness to determine if food is cooked (Ruby et al. 2019). This practice is unsafe as a chicken breast could turn white (cooked), but the internal temperature may still be less than  $74^{\circ}\text{C}$ ; the risk of viable pathogens on the food is still high. Barriers to the use of

thermometers can be contributed by many factors such as the belief that a thermometer is not necessary as the respondent has their own preference for alternative technique, or they have food professionals as a role model and often neglect the need to use thermometers to check the temperature of the food that is being prepared (Feng & Bruhn 2019). However, in this study, the data obtained is insufficient to determine the barrier to using a thermometer; thus, further study needs to be conducted to ensure failure to use a thermometer.

Although it was not significant in this study, the correlations between food safety knowledge with beliefs and behaviour were strong. Based on the Health Belief Model, knowledge influences beliefs about illness susceptibility and severity, the benefits and barriers to performing preventive health practises, and self-efficacy (Champion & Skinner 2008). Knowledge influences perceptions and beliefs, resulting from exposure to information and personal effort in collecting the information (Park et al. 2019). Food safety knowledge can be obtained through formal education, informal education, observations and experience, which result in influencing food safety belief. Individuals who perceive better knowledge tend to improve their practice and food safety beliefs to prevent them from getting foodborne illnesses. Many studies have shown that higher knowledge will positively impact attitude and beliefs towards food safety; thus, it may also lead to a positive food safety behaviour (Mihalache et al. 2021; Kwol et al. 2020; Sanlier & Baser 2019).

This study heavily relies on self-reported food safety beliefs and behaviours, so it may not reflect the students' actual beliefs and behaviours. However, the information obtained is helpful in developing targeted food safety education for students by focusing on the items that were found to be lacking in this study, thereby assisting them in improving their food safety knowledge. Educating students, especially those who stay at college, about proper handling of leftovers, storage times with proper reheating may help address the importance of food safety with food security in this undergraduate population, which may help reduce the risk of having foodborne illness among undergraduate students.

## CONCLUSION

The majority of the respondents obtained a moderate score for knowledge, beliefs and behaviour towards food safety. Although it was not statistically significant, a strong correlation between knowledge and belief as well as between knowledge and behaviour on food safety was observed in this study. The correlation found between food safety beliefs and behaviour was negligible. Continuous effort and

education are also necessary to increase awareness among students regarding food safety. Many campaigns, advertisements, short videos, and articles regarding food safety are needed on every platform, whether offline or online. These various kinds of effort could educate the students and the whole community to enhance and improve their knowledge and awareness of food safety.

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