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## Health hazards awareness and fast food habits among university community in Suleimanyah, Iraq

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### ABSTRACT

Most of food borne diseases occurs as a result of poor food safety knowledge of individuals who work in food processing industries and also due to people do not have enough awareness about health hazards that occur during food poisoning. In this study, an online questionnaire was prepared and sent through emails to students and lecturers at the university and a scientific institute about their knowledge of food safety and health hazard awareness. Among 233 respondents, there is a high preference toward selecting fast food as an individual's daily meal regardless of the educational background and age with a higher significant preference among male genders. Nowadays, people have access to various sort of valuable resources through internet, that is why most people have moderately good knowledge of food safety such as washing hands and practicing food safety measures. University lecturers and students are aware of health hazards caused by contaminated food and water with pathogenic bacteria, and they can manage it by various methods of treatment once they have been experiencing the food poisoning. Most of the socio-demographic population included in the study, they are fairly unsatisfied about fast food restaurant services in the city. Therefore, continuous educational practices and advices are necessary in order to educate most of the people and healthier food options must be provided in order to replace the fast food in possible.

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### Introduction

Food is one of the most essential necessities for human race to continue their life journey on the earth. Food is required by human body to generate energy, repair damaged tissues, growth, keep body warm and reproduce a new generation (Turetta et al. 2021). A number of macronutrients constitute the most important human food, which are carbohydrates, fat and proteins. Human being also requires other micronutrients that are minerals and vitamins (Martin 2001). According to Maslow's theory of human needs, the starting point of motivation theory is the physiological needs and food is an important requirement in order to

maintain homeostasis. There is no doubt that physiological needs will stay at the pre-potent of all the other needs (Maslow 1943).

According to the United Nations, the current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100. Therefore, In the current developing world, the demand for food will also be increasing based on this pace of human population increase (Bongaarts John 1996). Moreover, with the great changes in the life style specially during and after the COVID-19 pandemics (Janssen et al. 2021), the method of food preparation and eating is changed as well (Lalusu et

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al. 2022). Hence, undoubtedly, there is a pressure on the food supply chain and the food safety parameters that might be affected in various ways due to this huge global demand for food (Bradford 1999; Katz 2008).

Food can never be safe if it is investigated in details. In certain circumstances, the food is coming as contaminated by certain bacteria as in vertical transmission of food contamination. Whereas, the food can also be contaminated horizontally through cross-contamination by various toxins and microorganisms (Zimmerman et al. 2021). The science of food safety is very important to adapt in various nations in order educate the individuals about the hazards that comes from consuming contaminated food (Andrej et al. 2014). Food borne illnesses and food poisoning mostly originate from practicing a bad habitual of consuming fast foods (Zimmerman et al. 2021). Since the fast food is prepared in bulk, food safety rules and regulations such as washing hands, food preparation and storage might not be practiced properly. Moreover, urbanization and industrialization may also increase the rate of food borne diseases (Medeiros et al. 2004).

Awareness of health hazards resulting from eating contaminated food is essential for obtaining a healthy life (Turetta et al. 2021). However, health hazards from eating contaminated food are ranging from moderate distress, severe complications and even death (Lazou et al. 2012). Although a number of foods is considered as a high risk food such as meat and fish, salads, vegetables and fruits can cause potentially dangerous food poisoning (Kennedy et al. 2005).

Although studying human nutrition is a character, which is interdisciplinary in its content that involve a number of sciences such as physiology, molecular biology and biochemistry, in addition, psychology and anthropology is also involved as a science that explore the influence of attitudes, knowledge, preferences, beliefs and cultural traditions of the choice of food (Skinner 1990; Sidney W. Mintz 2002). Therefore, the aim of the current study is to explore the habitual rate of fast food selection as an individual's meal. Furthermore, the knowledge of food safety and awareness of health hazards from eating fast food has been further investigated among students and University lecturers.

## Materials & Methods

### *Sampling and study design*

In order to identify the habitual rate of fast-food selection as an individual's daily meal and his knowledge of food safety and health hazard awareness resulting from consuming fast foods, a questionnaire was designed based on literature review of the food quality and safety (Zeeshan et al. 2017). The study was conducted as a descriptive and cross-sectional work for students and University lecturers in the

city of Sulaimanyah, Iraq. The study involved 233 respondents and the data was collected using an online questionnaire created via google form. The online form sent through email to the University and institute students' lecturers and the responds were collected via the sheet.

The questionnaire was composed of 15 questions. The initial 3 questions were asking about socio-demographic information of whether they are students or lecturers, their gender and age range. The rest of the questions focused on their attitudes about fast food selection as their daily meal, their knowledge about food safety and quality. The other questions were asking about their awareness of health hazards resulting from consuming fast foods more often than occasional. Some questions were about their ability to identify food poisoning and how they manage when they experience such conditions. Finally, they were asked about their satisfaction about food safety rule's adaptation in city restaurants.

### *Statistical analysis*

The data collected from the online questionnaire were analysed using Statistical Package for the Social Sciences (SPSS) software version 5.0. The data was first analysed using a descriptive statistic to identify the socio-demographic characteristics and the results were presented as median for the numerical and the data that are normally distributed and for the frequency and percent (%) of the data that are categorized. P values  $\geq 0.05$  were considered statistically significant.

## Results

### *Socio-Demographic Profile*

In order to identify the habitual rate of selecting fast food as an individual's daily meal and their knowledge of food safety and awareness of health hazards from consuming fast food, an online questionnaire was designed and sent via email to students and lecturers at the University of Sulaimani and Kurdistan Technical Institute, Suleimanyah, Iraq. With regards to their education level, among the 233 responders, the majority of the responders were students (82%) and the rest were lecturers (18%). The female responders were constituting more than half (63%) and the male responders were (37%). Furthermore, the age range of the responders (41%) were between the age range of 16-20 years old, (42%) were 21-25 years old and the rest of the responders (17%) were 26 years old and above (Table 1).

### *Habits of Selecting Fast Food as an Individual's meal plan*

A number of questions in the online questionnaire were asking about the habitual rates of selecting fast foods as an individual's meal plan. The first question was "Do you eat fast food (takeaways)", and some lecturers and students

reported yes, they do eat takeaways (36%) and (46%) respectively, and more lecturers (12%) than students (4%) responded “No”, that they do not eat takeaways, whereas, regardless their educational level, they both responded as they do sometimes eat takeaways (52%) and (50%) respectively. There was a statistically significant difference with regards to the fast food section by the different genders. More males (54%) responded “yes” to the selection of fast-food question than females (39%), as it is confirmed by less responds to the “no” and “sometimes” answer (7%, 39%) by the male responders and female (4%, 57%). Taking age range as another variable for the study, the habit of selecting fast food as preferred meal is more prominent in younger population of 16-20 and 21-25 years old by selecting more “yes” answers than “No” and “sometimes” (45%, 3%, 52%) (47%, 4%, 49%) compared to older generation of 25-above years old (38%, 12%, 50%). Furthermore, to the habitual rate of fast-food selection, another question was “How often do you eat fast food”, among those who responded “yes” and sometimes to the previous question, the frequency of the fast food selection is less among the lecturers (74%, 1-2 times) (24%, 3-5 times) (2%, 5-above times) compared to the students (60%, 1-2 times) (35%, 3-5 times) (6%, 5-above times). Similar to the previous question, the frequency of the fast-food selection is higher among male responders (56%, 1-2 times) (36%, 3-5 times) (8%, 5-above times) compared to female responders (66%, 1-2 times) (31%, 3-5 times) (3%, 5-above times). Moreover, the middle age group 21-25 years old, select fast food more often (58%, 1-2 times) (36%, 3-5 times) (6%, 5-above times), than 16-20 years old (61%, 1-2 times) (34%, 3-5 times) (5%, 5-above times) and most definitely than the 25-above years old (75%, 1-2 times) (22%, 3-5 times) (3%, 5-above times) (Table 2).

### **Knowledge of Food Safety**

Selecting fast food as a meal plan is an issue. Furthermore, the major issue to coming from having a very little or no knowledge of food safety. One of the food safety questions asked was “Do you wash your hands before eating?”. Taking the education level of the responders into consideration, responders with higher education level, lecturers, reported that they wash their hands before eating their meal (69%, Yes) (7%, No) (24%, may be) compared to the students (57%, Yes) (13%, No) (30%, may be). Both genders showed similar habits of washing their hands before starting their meal, male (56%, Yes) (17%, No) (27%, may be) and female (61%, Yes) (9%, No) (30%, may be). Further to the age of the responders, the food safety knowledge is higher among the older responders 25-above years old as there was a highly statistical significant difference in their preference to wash their hands before eating (80%, Yes) (5%, No) (15%, may be) compared to 16-20 years old (50%, Yes) (13%, No) (37%, may be) and 21-25 years old (59%, Yes) (14%, No) (27%, may be). A further question was “Have you got any health problems with consuming fast food?”,

lecturers reported more (43%, Yes) (57%, No) suffering from health issues from eating fast food compared to students (% , Yes) (57%, No). both genders reported exactly the same level of whether they have suffered from health issues resulted from eating fast food (34%, Yes) (66%, No), and the older population of 25-above years old reported more suffering (42%, Yes) (58%, No) compared to 16-20 years old (27%, Yes) (73%, No) and 21-25 years old (37%, Yes) (63%, No) (Table 2).

### **Health Hazard Awareness**

Another aim of the study was to estimate the people’s awareness of health hazards that they may be aware of from eating fast foods. When the participants asked “Are you aware that food poisoning can occur due to contamination with some types of pathogenic bacteria?”, the lecturers responded (71%, Yes) (29%, No), and the students also responded similarly as (63%, Yes) (37%, No). Taking gender into consideration, both genders reported similarly as males (63%, Yes) (37%, No) and females (66%, Yes) (34%, No). within the age ranges, the mature population, 25-above years old, showed higher awareness of getting food poisoning after eating fast food by reporting (75%, Yes) (25%, No) when compared with 16-20 years old by (62%, Yes) (38%, No) and 21-25 years old (63%, Yes) (37%, No). Furthermore in food poisoning issue, the participants were asked whether they are aware of what possibly is the reason for food poisoning “Food poisoning is related to”, lecturers believe that it is probably due to improper cooking and lack of hygienic rules in the restaurants rather than improper washing and storage of foods (14%, improper storage) (24%, Improper cooking) (5%, improper washing) (57%, lack of hygienic rules), whereas the students think that the food poisoning is due to improper washing of the foods and lack of hygienic rules in the restaurants (20%, Improper storage) (16%, Improper cooking) (17%, Improper washing) (47%, lack of hygienic rules). The participants with different age have different believe for the reasons related to food poisoning, age range 16-20 years old is thinking that all the reasons, in particular lack of hygienic rules, are related to food poisoning (20%, Improper storage) (20%, Improper cooking) (16%, improper washing) (44%, lack of hygienic rules), 21-25 years old think lack of hygienic rules in the restaurants is mostly account for the food poisoning (20%, Improper storage) (10%, Improper cooking) (17%, Improper washing) (52%, lack of hygienic rules), and respondents with age range of 25-above years old think that improper cooking and lack of hygienic rules are mostly responsible for food poisoning (15%, Improper storage) (27%, Improper cooking) (8%, Improper washing) (50%, lack of hygienic rules) (Table 3).

Another health hazard awareness question was “Food contaminated with bacteria called contaminated food, how do you differentiate them?”. Regardless of their educational level, both lecturers and students believe that a combination

**Table 1.** Socio-demographic characteristics of the respondents.

Education level	Percent (n.)
Lecturer	18% (42/233)
Students	82% (191/233)
<b>Age</b>	
16-20	41% (95/233)
21-25	42% (98/233)
26-above	17% (40/233)
<b>Gender</b>	
Male	37% (86/233)
Female	63% (147/233)

of seeing the food by naked eye, smell and taste of the food is required in order to identify food contaminated with a pathogen since lecturers responded (0%, Naked eye) (7%, Smell) (17%, Taste) (76%, All of above) and the students responded (5%, Naked eye) (8%, Smell) (8%, Taste) (77%, All of above). Both males and females also believe that the above combination is required as males responded (4%, Naked eye) (10%, Smell) (10%, Taste) (76%, All of above) and females responded (6%, Naked eye) (7%, Smell) (9%, Taste) (78%, All of above). Similarly, all the respondents from various age group thinks that combining a number of factors is leads to the identification of foods poisoned with bacteria, 16-20 years old (5%, Naked eye) (8%, Smell) (8%, Taste) (79%, All of above), 21-25 years old (7%, Naked eye) (9%, Smell) (9%, Taste) (75%, All of above) and 25-above years old (0%, Naked eye) (8%, Smell) (15%, Taste) (78%, All of above). (Table 3).

Furthermore, a question was asked about how the participants can tell whether they have been poisoned with contaminated food "Which of the following you believe is/are the sign of food poisoning?", majority of the lecturers believe that stomach pain is the most critical sign of food poisoning (2%, Headache) (24%, Diarrhoea) (45%, Stomach pain) (19%, Vomiting) (5%, Fever) (5%, Loss of appetite), similar to the students which responded as (6%, Headache) (26%, Diarrhoea) (44%, Stomach pain) (16%, Vomiting) (5%, Fever) (4%, Loss of appetite). Male gender believes that stomach pain and diarrhea are important signs for experiencing food poisoning as reported (5%, Headache) (31%, Diarrhoea) (42%, Stomach pain) (12%, Vomiting) (6%, Fever) (5%, Loss of appetite) whereas female think that stomach pain, diarrhoea and vomiting signs are of food poisoning as reported (6%, Headache) (22%, Diarrhoea) (46%, Stomach pain) (19%, Vomiting) (4%, Fever) (3%, Loss of appetite). Participants at various age range responded similarly in terms of the signs and symptoms of food poisoning as, 16-20 years old (7%, Headache) (21%, Diarrhoea) (46%, Stomach pain) (21%, Vomiting) (2%, Fever) (2%, Loss of appetite), 21-25 years old (5%, Headache) (29%, Diarrhoea) (43%, Stomach pain) (12%, Vomiting) (6%, Fever) (5%, Loss of appetite) and 25-above years old (2%, Headache) (27%, Diarrhoea)

(43%, Stomach pain) (15%, Vomiting) (8%, Fever) (5%, Loss of appetite). (Table 4)

In order to further identify the knowledge and awareness, the participants were asked about the possible ways of transmission of microbes (bacteria in particular) that are related food borne diseases "Food borne disease (food borne bacteria) can be transmitted by", lecturers showed a significant difference in claiming that contaminated food and water are the main reason for food borne microbe transmission (29%, Food) (17%, Water) (2%, flies) (52%, All) while students claiming that contaminated food is the critical reason for food borne disease transmission (27%, Food) (4%, Water) (5%, flies) (63%, All). In terms of gender, both males and females believe that all the below routes are possible for the transmission of food borne microbes as males and females reported (31%, Food) (8%, Water) (4%, flies) (57%, All) and (26%, Food) (5%, Water) (5%, flies) (64%, All) respectively. Apart from the contaminated food, respondents with the age range of 25 years old and over believe that contaminated water is also a pivotal reason for the food borne disease transmission (25%, Food) (20%, Water) (0%, flies) (55%, All), whereas respondents with age range of 16-20 and 21-25 believe that the food itself must be contaminated then the food borne microbes get transmitted as they reported (27%, Food) (3%, Water) (6%, flies) (64%, All) and (30%, Food) (4%, Water) (5%, flies) (61%, All) respectively. It is very important to increase peoples' awareness about what they should actually do when they experience food poisoning case. Therefore, a question is placed in the questionnaire as "What are you doing when you have severe food poisoning signs and symptoms?". Lecturers reported that they can prescribe medications by themselves from their knowledge in addition they prefer to go to hospital (14%, Take rest) (24%, Self-Medication) (17%, Consult pharmacist) (45%, going to Hospital), whereas, the students prefer to consult a pharmacist in a nearby pharmacy in addition to their attitude toward going to hospital (15%, Take rest) (14%, Self-Medication) (21%, Consult pharmacist) (50%, going to Hospital). Male participants in the survey prefer all the

**Table 2.** Habitual rate of fast food section among the respondents. Data shown as percentage (n). \* P values <0.05

Parameters	Do you eat Fast foods (takeaways)				How often do you eat fast foods (takeaways) in a week?				Do you wash your hands before eating?				Have you got any health problem with consuming fast foods?		
	Yes	No	Sometimes	P-v	1-2 times	3-5 times	5-above times	P-v	Yes	No	Maybe	P-v	Yes	No	P-v
	<b>Education level</b>														
Lecturer	36%(15)	12%(5)	52%(22)	0.06	74%(31)	24%(10)	2%(1)	0.21	69%(29)	7%(3)	24%(10)	0.31	43%(18)	57%(24)	0.17
Student	46%(89)	4%(7)	50%(90)		60%(114)	35%(66)	6%(11)		57%(109)	13%(25)	30%(57)		32%(61)	68%(130)	
	<b>Gender</b>														
Male	54%(46)	7%(6)	39%(34)	0.04*	56%(48)	36%(31)	8%(7)	0.15	56%(48)	17%(15)	27%(23)	0.15	34%(29)	66%(57)	0.96
Female	39%(58)	4%(6)	57%(83)		66%(97)	31%(45)	3%(5)		61%(90)	9%(13)	30%(44)		34%(50)	66%(97)	
	<b>Age range</b>														
16-20	45%(43)	3%(3)	52%(49)	0.31	61%(58)	34%(32)	5%(5)	0.42	50%(48)	13%(12)	37%(35)	0.02*	27%(26)	73%(69)	0.17
21-25	47%(46)	4%(4)	49%(48)		58%(57)	36%(35)	6%(6)		59%(58)	14%(14)	27%(27)		37%(36)	63%(62)	
25-above	38%(15)	12%(5)	50%(20)		75%(30)	22%(9)	3%(1)		80%(32)	5%(2)	15%(6)		42%(17)	58%(23)	

**Table 3.** Food safety knowledge among participants. Data shown as percentage (n). \* P values <0.05

Parameters	Are you aware of food poisoning can occur due to some type of bacteria?			Food poisoning is related to				Food contaminated with bacteria called contaminated food, how do you differentiate?					
	Yes	No	P-v	Improper storage	Improper cooking	Improper washing	Lack of hygiene	P-v	Naked eye	Smell	Taste	All of above	P-v
	<b>Education level</b>												
Lecturer	71%(30)	29%(12)	0.32	14%(6)	24%(10)	5%(2)	57%(24)	0.09	0%(0)	7%(3)	17%(7)	76%(32)	0.07
Student	63%(121)	37%(70)		20%(39)	16%(30)	17%(33)	47%(89)		%5(12)	%8(16)	%8(16)	%77(147)	
	<b>Gender</b>												
Male	63%(54)	37%(32)	0.62	22%(19)	17%(15)	17%(15)	43%(37)	0.58	4%(3)	10%(9)	10%(9)	76%(65)	0.63
Female	66%(97)	34%(50)		18%(26)	17%(25)	14%(20)	52%(76)		6%(9)	7%(10)	9%(14)	78%(114)	
	<b>Age range</b>												
16-20	62%(59)	38%(36)	0.32	20%(19)	20%(19)	16%(15)	44%(42)	0.19	5%(5)	8%(7)	8%(8)	79%(75)	0.38
21-25	63%(62)	37%(36)		20%(20)	10%(10)	17%(17)	52%(51)		7%(7)	9%(9)	9%(9)	75%(73)	
25-above	75%(30)	25%(10)		15%(6)	27%(11)	8%(3)	50%(20)		0%(0)	8%(3)	15%(6)	78%(31)	

**Table 4.** Health Hazard Awareness of participants. Data shown as percentage (n). \* P values <0.05

Parameters	Which of the followings you believe is/are the sign of food poisoning?							Food borne disease (food borne bacteria) can be transmitted by;				What are you doing when you have severe food poisoning signs and symptoms?					
	Headache	Diarrhea	Stomach pain	Vomiting	Fever	Loss Appetite	P-v	Food	Water	Flies	All	P-v	Take Rest	Medication By self	Consult pharmacist	Go to Hospital	P-v
	<b>Education level</b>																
Lecturer	2%(1)	24%(10)	45%(19)	19%(8)	5%(2)	5%(2)	0.90	29%(12)	17%(7)	2%(1)	52%(22)	<b>0.04*</b>	14%(6)	24%(10)	17%(7)	45%(19)	0.41
Student	6%(12)	26%(49)	44%(84)	16%(30)	5%(9)	4%(7)		27%(52)	4%(8)	5%(10)	63%(121)		15%(28)	14%(26)	21%(41)	50%(96)	
	<b>Gender</b>																
Male	5%(4)	31%(27)	42%(36)	12%(10)	6%(5)	5%(4)	0.44	31%(27)	8%(7)	4%(3)	57%(49)	0.52	19%(16)	22%(19)	21%(18)	38%(33)	<b>0.03*</b>
Female	6%(9)	22%(32)	46%(67)	19%(28)	4%(6)	3%(5)		26%(37)	5%(8)	5%(8)	64%(94)		12%(18)	12%(17)	20%(30)	56%(82)	
	<b>Age range</b>																
16-20	7%(7)	21%(20)	46%(44)	21%(20)	2%(2)	2%(2)	0.52	27%(25)	3%(3)	6%(6)	64%(61)	<b>0.01*</b>	14%(13)	10%(9)	26%(25)	50%(48)	0.28
21-25	5%(5)	29%(28)	43%(42)	12%(12)	6%(6)	5%(5)		30%(29)	4%(4)	5%(5)	61%(60)		15%(14)	18%(18)	18%(18)	49%(48)	
25-above	2%(1)	27%(11)	43%(17)	15%(6)	8%(3)	5%(2)		25%(10)	20%(8)	0%(0)	55%(22)		17%(7)	22%(9)	12%(5)	49%(19)	

options (19%, Take rest) (22%, Self-Medication) (21%, Consult pharmacist) (38%, going to Hospital), while females prefer to only consult a pharmacist and go directly to hospital (12%, Take rest) (12%, Self-Medication) (20%, Consult pharmacist) (56%, going to Hospital). Younger generation 16-20 years old prefer to consult a pharmacist or go directly to hospital in case of experiencing food poisoning (14%, Take rest) (10%, Self-Medication) (26%, Consult pharmacist) (50%, going to Hospital), whereas the other generations of 21-25 and 25-above years old believes in all the options (15%, Take rest) (18%, Self-Medication) (18%, Consult pharmacist) (49%, going to Hospital) and (17%, Take rest) (22%, Self-Medication) (12%, Consult pharmacist) (49%, going to Hospital) respectively.

### ***Customer's Satisfaction of Fast Food Restaurants***

The participants were asked about their overall satisfaction about the restaurant services in the city and how they evaluate them. A number of related of questions asked "Overall, are you satisfied with fast food services in our city, for example customer service, staff wearing gloves, changing gloves between different food, fast food restaurant environment?". Regardless of their educational level, both lecturers and students were fairly neutral in their satisfaction about fast food restaurant services (15%, Strongly unsatisfied) (32%, Fairly unsatisfied) (41%, Neutral) (10%, Fairly satisfied) (2%, Satisfied) and (11%, Strongly unsatisfied) (24%, Fairly unsatisfied) (45%, Neutral) (10%, Fairly satisfied) (10%, Satisfied). Male and female genders also showed a very similar satisfaction toward the restaurant services in the city as they reported (15%, Strongly unsatisfied) (26%, Fairly unsatisfied) (42%, Neutral) (12%, Fairly satisfied) (5%, Satisfied) and (10%, Strongly unsatisfied) (25%, Fairly unsatisfied) (45%, Neutral) (9%, Fairly satisfied) (11%, Satisfied) respectively. While within the age groups, more mature generation, 25-above years old, was fairly unsatisfied and to some extent they were neutral about the fast food services in the city (15%, Strongly unsatisfied) (37%, Fairly unsatisfied) (37%, Neutral) (8%, Fairly satisfied) (3%, Satisfied) and the younger age groups, 16-20 years (10%, Strongly unsatisfied) (20%, Fairly unsatisfied) (46%, Neutral) (12%, Fairly satisfied) (12%, Satisfied) and 21-25 years old (12%, Strongly unsatisfied) (24%, Fairly unsatisfied) (46%, Neutral) (10%, Fairly satisfied) (9%, Satisfied) were mostly neutral about the services. (Table 5) (Table 6)

### **Discussion**

Nowadays, changes in the life style and the demand for various life essentials changed the way people prepare and eat food because of their time management. Going outside for a meal used to be an activity that is driven by an occasion, but nowadays it can be counted as an everyday activity. University lecturers work fulltime and extra hours

to fulfil their life demands and students are studying in the university and work in the afternoon or night time to live the life style they want. The time allocation to prepare and eat food is very restricted and all these changes require a food that is easily and quickly accessible. The result from our study shows that students, adolescence in general, mostly prefer fast foods compared to more mature lecturers. The results are consistent with a study done in India on Manipal University students (Prabhu M 2015) in order to identify the fast food consumption behaviour among 25,000 students. Other studies looked at the gender preference of fast food selection as their daily meal. In our study, male students mostly prefer fast food meal, whereas, a research study on Saudi girl students in Riyadh showed opposite of girls preference for the fast food selection (AlFaris et al. 2015). Many factors associate with the habitual rate of fast food selection (Scully et al. 2020). With the advancement in age and maturity, understanding what food is healthy and what is not will be gained, which is what we found in our study and others as well (Majabadi et al. 2016; Mohamed et al. 2020).

Knowledge of food safety is critical for a healthy life style and in particular in the era of viral disease outbreaks. If someone is obliged to eat fast food because of their life style, it is critical to be aware of the food safety rules and regulations in order to keep their self-safe. Hand washing is one of the most important safety measures in order to prevent infections and food borne disease (Taylor et al. 2010; Sallami 2016). Although the results were not 100%, regardless of their educational level and gender, all the participants in the study prefer to wash their hands before eating their daily meal. Interestingly, there was a positive significant correlation between the habit of washing hands and age, in which people with higher age range are washing their hands more often than younger age groups.

Fast foods are favored by many people and they are fairly inexpensive. Peoples' awareness of the health hazards from eating fast foods must be raised by different means (Mohammadbeigi et al. 2018). Fast food is ideally served in large portions and they are very rich in salts, sugar and energy, but they are very poor fibers and micronutrients (Singh et al. 2021). Apart from its low nutritional quality, food contaminated with pathogens lead to life taking consequences (Wills et al. 2015; Fuhrman 2018). One of the aims of the current study was to assess the University's students and lecturers' level about the health hazard awareness. Majority of the participants in the study, whether they are students or lecturers with various gender and age groups are aware of the health hazards that occur due to contaminated foods. Similar to other studies (Vidyashri et al. 2021; Mshelia et al. 2022), they believe that lack of hygienic rules in the restaurants and food processing factories are the main reason for food cross contamination with bacteria, which eventually results in food poisoning.

Prevention of food poisoning occurrence is pivotal for a healthy life, but knowing what to do when someone already has been poisoned with contaminated food is critical and could save life. The participants in the online questionnaire have different beliefs toward managing the food poisoning. Lecturers and males in the study prefer self-prescribing medication based on their knowledge in addition to going directly to hospital. Whereas, students and females mostly prefer direct admission to hospital. Furthermore, customer satisfaction is also important to improve the quality and services in the fast food restaurants. The students and lecturers whether they are of male or female gender were fairly neutral about their satisfaction with the fast food restaurant services in the city. Though responders with higher maturity with regards to age were quite unsatisfied with the services, which is almost consistent with other studies done in Pakistan and Malaysia (Khan et al. 2013; Shamsudin et al. 2020)

The limitation of the study is the questionnaire's confinement only to students and lecturers at the university level. That is why, a broader socio-demographic population is needed to include in a study in order to fully identify the habitual rate of fast food selection and the knowledge of food safety and health hazard awareness in the city.

### Conclusion

On the basis of this study, it can be concluded that there is a high tendency toward selecting fast food as an individual's daily meal no matter whether the individual is highly educated or still just a student. In addition, there is a significant preference among male genders than females. Knowledge of food safety is moderately good with regards to washing hands and knowing the principles. University lecturers and students are aware of health hazards that cause by contaminated food and water with pathogenic bacteria, and they can manage it once they been experiencing the food poisoning. Among the socio-demographic population included in the study, they are fairly unsatisfied about fast food restaurant services in the city. Therefore, the most pivotal recommendation is that the level of food safety knowledge and health hazard awareness must be raised significantly among students at the universities and even in school through various methods of education. Nowadays, social media is playing an important role in self education and government authorities should take the advantage of this method to raise and increase the societies awareness.

### Authors contribution

HAA proposed the idea of the study and HAA, ADN, RMS, DAA and SAA together developed and wrote the questionnaire. The online questionnaire sent through email to participants, then the data analyzed and the manuscript wrote by HAA. All authors revised the manuscript and added their contribution to the study.

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### Compliance with ethical statements

#### Conflict of interest

The Author declares no conflict of interest.

#### Informed consent

All participants responded to the online questionnaire were guaranteed with their name and email address confidentiality.

#### Ethical approval

The online questionnaire sent out in this study was approved by the Scientific research committee of Kurdistan Technical Institute, Suleimanyah, Iraq.

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