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# Determinants of Healthcare Utilisation for Foodborne Illness Among Students in Saudi Arabia: A Cross-Sectional Study

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## ABSTRACT

**BACKGROUND:** Understanding of healthcare utilisation during foodborne illness is vital for public health practice, and healthcare planning. Present study aims to identify patterns and determinants of healthcare-seeking behaviour in response to foodborne illness among students of Saudi Arabia.

**METHODS:** A cross-sectional survey was conducted among 252 students of Saudi Electronic University located in four major cities (Riyadh, Abha, Dammam and Jeddah) of Saudi Arabia. Study participants were students who reported a foodborne illness within 1 month prior to the survey. A multivariate logistic regression models were used to analyse association of healthcare-seeking behaviour with knowledge and attitude about food poisoning of participants.

**RESULTS:** Of the 252 participants who experienced foodborne illness symptoms, 69.8% visited doctor for seeking care, while 7.5% visited pharmacy, 9.1% got treated by the family and peers and 13.4% did not do anything. Healthcare-seeking behaviour of participant showed association with knowledge of the cause of food poisoning (AOR: 1.98; 95% CI 1.04-3.78,  $P = .036$ ); and attitude of participant that food poisoning illnesses is a serious health problem and may lead to death (AOR: 2.15; 95% CI 1.33-2.71,  $P = .014$ ).

**CONCLUSIONS:** In this study, majority of the participants used healthcare for treatment during the food poisoning episode, and healthcare-seeking behaviour depended on perceived severity of the disease consequences. Knowledge on food poisoning was found to be an important determinant in utilisation of healthcare services. Health promotion and educational programmes are recommended to further increase the healthcare utilisation for foodborne illness.

**KEYWORDS:** Food poisoning, foodborne illness, health seeking behaviour, knowledge, Saudi Arabia

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## Introduction

Foodborne illness is a common public health issue throughout the world, including Saudi Arabia.<sup>1-5</sup> It is mainly caused by consumption of contaminated food with bacteria, viruses, parasites, toxins and chemicals and is also referred to as 'food poisoning'. In the year 2010, the World Health Organization<sup>6</sup> (WHO) estimated 600 million of foodborne diseases with 420 000 deaths worldwide. The WHO classified the Eastern Mediterranean Region (EMR) as the third highest region with estimated 100 million foodborne illnesses annually with the median rates of foodborne disability adjusted life years (DALYs) per 100 000 population as 362 (205-582).<sup>7</sup> Foodborne illness has substantial impact on public health through direct and indirect healthcare costs, which includes loss of productivity.<sup>8,9</sup> According to the Saudi Arabia Ministry of Health Statistical Yearbook 2020 report, the foodborne sporadic cases were 3081, among which 1258 cases were observed in age group 15 to 45 years.<sup>10</sup>

The foodborne illness is manifested with acute gastrointestinal illness, which is usually self-limited. The majority of the cases rarely visit a healthcare provider and try to manage it at

home. The perception that foodborne diseases are common and there will be no complications, results in a substantial economic burden to the healthcare system.<sup>11</sup> In China, the monthly prevalence of foodborne gastroenteritis was 4.2%, however only 56.1% of those reported illness sought a healthcare.<sup>12</sup> Studies from different countries reported an annual incidence rate of 0.33 cases/person-year to 1.11 cases/person-year for acute gastrointestinal illness and among them only 8.9% to 39% cases consulted the physician for treatment.<sup>13-15</sup>

A number of theories and models have developed to analyse the health related behaviour. One of the well-known models, Health Belief Model (HBM) is a social psychological model which presents that health seeking behaviour depends on a person's belief about the health problem along with cue to action.<sup>16</sup> According to the Theory of Reasoned Action (TRA), the health behaviour of an individual depends on person's attitude which is formed after careful consideration of available knowledge leading to the action.<sup>17</sup>

A review of health seeking behaviour stated that providing education and knowledge at the individual level are not adequate for bringing about a behaviour change.<sup>18</sup> According to



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Glanz et al<sup>19</sup> comprehension of local perceptions of health needs and their process of health decision-making are important factors in understanding health-seeking behaviour for any health condition. Brainard et al<sup>20</sup> reported that persons suffering from infectious intestinal disease consult doctor when they perceive that seeking treatment would be beneficial.

It is important to understand healthcare-seeking behaviour specific to the foodborne illness, so that appropriate public health measures can be planned to improve the healthcare utilisation. Moreover, the youth are often engaged in risky eating behaviours like eating outside home, which put them at increased risk for foodborne illness.<sup>21,22</sup> Few studies have assessed factors influencing healthcare-seeking from a doctor among general population with foodborne illness in other countries,<sup>12-15</sup> no studies have assessed healthcare-seeking behaviour in Saudi Arabia for foodborne illnesses. Therefore to fill the gap in the literature, the present study was designed, which aims to identify patterns and determinants of healthcare-seeking behaviour in response to foodborne illness among students of Saudi Arabia.

## Methods

### *Study design and population*

A cross-sectional survey was conducted among registered students in Saudi Electronic University (SEU) located in four major cities (Abha, Dammam, Jeddah and Riyadh) of Saudi Arabia. All the students (n = 252) who reported food poisoning symptoms 1 month prior to the survey done in an earlier study<sup>23</sup> were included as participants in this study.

### *Questionnaire details*

The demographic characteristics and knowledge about food poisoning of the participants' included in the study were retrieved from the earlier study.<sup>20</sup> The questions related to knowledge, attitude and healthcare-seeking behaviour were developed by the experts in the field after a brainstorming session. The questions used to collect the data on attitude towards foodborne illness were '*Do you believe food poisoning illnesses is a serious health problem and may lead to death*' and '*Do you believe medication without prescription for food poisoning may negatively affect the health of the individual*'. The question '*What did you do when you experienced a foodborne illness*' was used to know the participants health-seeking behaviour during their food poisoning episode. The questionnaire used in the survey is uploaded as a Supplementary File.

### *Data collection*

A web-based questionnaire was administered to the study participants to collect data from them regarding attitude and healthcare-seeking behaviour during their experience with food poisoning symptoms.

### *Data analysis*

A database was constructed using EpiInfo software, and statistical analyses were performed using STATA Software V.13.0. All demographic data are expressed as frequency and percentage. Unadjusted and adjusted logistic regression was used to explore the association between healthcare-seeking behaviour and knowledge as well as attitude of the participants towards food poisoning. The participants visit to a doctor during episode of food poisoning was considered as healthcare-seeking behaviour (dependent variable) in the multivariable logistic regression model and was adjusted for age, gender, level of education, field of study and place of residence. *P*-value < .05 was considered significant in the 2-tailed tests.

### *Ethical consideration*

The study protocol was reviewed and approved by the Institutional Research Committee of the Saudi Electronic University. All participants provided informed consent before starting the survey.

## Results

### *Demographic characteristics of study participants*

The demographic characteristics of the study participants are shown in Table 1. Nearly half (48.4%) participants were female and approximately 50% participants were in the age group 20 to 30 years. Majority of the participants (76.5%) were studying in the bachelor level of education. Most of the participants were enrolled in health sciences (57.5%) specialisation followed by languages and theoretical studies (14.2%) and administration and business (13.1%). Maximum (30.9%) participants were from Riyadh.

### *Healthcare utilisation behaviour of the study participants*

Of the 252 study participants who experienced foodborne illness, 176 (69.8%) visited to a physician to seek care, 7.5% visited pharmacy, 9.1% were treated by family or peers, while 13.4% respondents did not seek care. No significant association was found demographic factors and participants health-seeking behaviour towards foodborne illness (Table 2). Association of participants' knowledge and attitude towards foodborne illness with their healthcare-seeking behaviour is shown in Table 3. Of the 252 participants, 221 (87.6%) knew the causes of food poisoning, and most of them (93.1%) visited doctor to seek healthcare during the food poisoning episode (Table 3). Study participants who strongly believed that '*food poisoning illnesses is a serious health problem and may lead to death*' were more likely to visit a doctor (93.7%) to seek healthcare (Table 3).

Table 4 shows results of bivariate and multivariable logistic regression analysis of factors associated with participant' healthcare-seeking behaviour (visit to a doctor) during

**Table 1.** Demographic characteristic of the study participants (N=252).

CHARACTERISTICS	N (%)
Age	
Above 30	70 (27.8)
30-26	68 (27.0)
25-20	60 (23.8)
<20	54 (21.4)
Gender	
Male	130 (51.6)
Female	122 (48.4)
Educational level	
Master	10 (4.0)
Bachelor	193 (76.6)
Preparatory year	49 (19.4)
Field of study	
Health sciences	145 (57.5)
Computer sciences	20 (7.9)
Administration and business	33 (13.1)
Languages and theoretical studies	36 (14.3)
Others	18 (7.2)
Place of resident (city)	
Riyadh	78 (30.9)
Abha	77 (30.6)
Dammam	57 (22.6)
Jeddah	40 (15.9)

foodborne illness. The knowledge of participants regarding causes of food poisoning was found to be a significant predictor in utilisation of healthcare during foodborne illness (OR = 2.14, 95% CI 1.14-4.0). In multivariate analysis, participants who had knowledge of causes of food poisoning and who strongly believed that *'food poisoning illnesses is a serious health problem and may lead to death'* were more likely to seek healthcare from a doctor (adjusted OR = 1.98, 95% CI 1.04-3.78; and adjusted OR = 2.15, 95% CI 1.33-2.71, respectively).

## Discussion

To our knowledge, this is the first study on utilisation of healthcare services during episodes of foodborne illness among students in Saudi Arabia. The knowledge about healthcare-seeking behaviour of the students is of importance as they are the representatives of youth population and their behaviour will influence their attitude towards the healthcare-seeking for any

health issues in future. Moreover, the cases of foodborne illness are higher in age group 15 to 45 years,<sup>10</sup> so the students especially studying in SEU are the best representative of the high risk population as the age of maximum students studying in this university lies between 17 and 45 years.

Of the 252 participants who reported symptoms of foodborne illness, 176 of them (69.8%) reported that they sought care from a doctor, which was higher than that reported in Italy (8.9%),<sup>13</sup> New Zealand (22.0%),<sup>15</sup> France (33.0%),<sup>14</sup> and China (56.1%).<sup>12</sup> This difference may be due to the presence of higher number of healthcare facility in the community, easy accessibility of physicians and high coverage of the social security system which may have impacted the healthcare-seeking behaviour of the study participants.

Most of the participants in the present study stated that *'food poisoning illnesses is a serious health problem and may lead to death'*, and 60% of them strongly believed that *'medication without prescription for food poisoning may negatively affect the health of the individual'* which reflects high level of awareness among the student population regarding risk of food poisoning and the findings are comparable with previous studies.<sup>21,24-28</sup> In recent years, Saudi government had focussed on health education messages especially on food safety and hygiene for prevention of foodborne diseases, which may be the reason behind the presence of high level of awareness among the students.

The results of the present study highlight that students' knowledge and perception plays a critical role in assessing healthcare services in the event of foodborne illness irrespective of their demographic characteristics and supports the TRA model which states that action results from the person's attitude attained through the knowledge. A study from United Kingdom reported that people were inclined to consult a doctor when they had a higher perceived severity of the disease<sup>20</sup> and supports the HBM which states that perceived severity in health tend to better utilisation of health services.<sup>16,29</sup> There are a number of studies which used symptomatic approach to assess the utilisation of healthcare.<sup>14,30,31</sup> However, few studies reported fear of over-diagnosis as a reason for not utilisation of health services.<sup>32,33</sup>

## Limitations

The present study provides valuable information on the healthcare utilisation pattern and its associated factors during foodborne illness, however it has some limitations. The data collected relied on participants' self-reported experience with foodborne illness. The study population (students) may not represent a true picture of the healthcare-seeking behaviour among general communities especially those living in rural areas. The economic status of the study participants was not included in the model, which may influence the healthcare-seeking behaviour.

Despite the above limitations the study shows a statistically significant relationship between students' knowledge and their health-seeking behaviour.

**Table 2.** Association between demographic factors with students' practice towards foodborne illness (N=252).

DEMOGRAPHIC FACTORS	STUDENTS' RESPONSE TOWARDS FOODBORNE ILLNESS PRACTICE <sup>a</sup> N (%)			
	VISIT TO DOCTOR N= 176 (69.8%)	VISIT TO PHARMACY N= 19 (7.5%)	TREATED BY FAMILY/ PEERS N=23 (9.1%)	DIDN'T DO ANYTHING N=34 (13.5%)
<b>Age</b>				
Above 30	44 (25.0)	10 (52.6)	6 (26.1)	10 (29.4)
30-26	50 (28.4)	6 (31.6)	4 (17.4)	8 (23.5)
25-20	41 (23.3)	2 (10.5)	7 (30.4)	10 (29.4)
<20	41 (23.3)	1 (5.3)	6 (26.1)	6 (17.7)
<b>Gender</b>				
Male	92 (52.3)	15 (78.9)	3 (13.0)	20 (58.8)
Female	84 (47.7)	4 (21.1)	20 (87.0)	14 (41.2)
<b>Educational level</b>				
Master	8 (4.5)	1 (5.2)	0 (0.0)	1 (02.9)
Bachelor	136 (77.3)	12 (63.2)	21 (91.3)	24 (70.6)
Preparatory year	32 (18.2)	6 (31.6)	2 (8.7)	9 (26.5)
<b>Field of study</b>				
Health sciences	104 (59.1)	9 (47.4)	16 (69.6)	16 (47.1)
Computer sciences	14 (7.9)	1 (5.3)	1 (4.3)	4 (11.8)
Administration and business	25 (14.2)	2 (10.5)	1 (4.3)	5 (14.7)
Languages and theoretical studies	23 (13.1)	3 (15.8)	4 (17.4)	6 (17.6)
Others	10 (5.7)	4 (21.0)	1 (4.4)	3 (8.8)
<b>Place of residence (city)</b>				
Riyadh	46 (26.1)	0 (0.0)	6 (26.1)	5 (14.7)
Abha	55 (31.3)	11 (57.9)	1 (4.3)	10 (29.4)
Dammam	48 (27.3)	6 (31.6)	12 (52.2)	12 (35.3)
Jeddah	27 (15.3)	2 (10.5)	4 (17.4)	7 (20.6)

<sup>a</sup>Students response to the question 'what did they do when they experienced a foodborne illness'.

## Conclusion

Better knowledge of food poisoning showed association with higher healthcare-seeking behaviour during foodborne illness. Severity of foodborne illness can be prevented if the community seek healthcare services timely and adopt control measures. Education programmes should be continued to improve the knowledge of causes and risks associated with food poisoning as knowledge brings change in attitude and leads to action. Further research should focus on exploring whether low care seeking behaviour stems from challenges to access healthcare services versus recognition of and response to food poisoning illness symptoms. Research can also be extended to healthcare-seeking behaviour of general population and physicians' attitude while treating the foodborne illness cases.

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## Authors Contribution

MAM made substantial contributions to conception and design, and was in charge of data collection and curation, and the writing of the manuscript. MAM performed the statistical analysis and approved the submitted version of the Manuscript.

## Ethics Approval and Consent to Participate

This study was approved by the Institutional research ethics committee, Saudi Electronic University, Riyadh, Kingdom of

**Table 3.** Association between knowledge, and attitude with students' practice towards foodborne illness among students (N=252).

FACTORS	STUDENTS RESPONSE TOWARDS FOODBORNE ILLNESS PRACTICE <sup>a</sup>				
	VISIT TO DOCTOR N= 176	VISIT TO PHARMACY N= 19	TREATED BY FAMILY/ PEERS N=23	DIDN'T DO ANYTHING N=34	P VALUE
Know the causes of food poisoning (n=221)	164 (93.2)	18 (94.8)	19 (82.6)	20 (58.8)	.043*
Differentiate between food infection and food intoxication (n= 115)	89 (50.6)	8 (42.1)	7 (30.4)	11 (32.3)	.094
Strongly believe that food poisoning illnesses is a serious health problem and may lead to death (n=204)	165 (93.7)	16 (84.2)	17 (73.9)	10 (29.4)	.032*
Strongly believe that medication without prescription for food poisoning may negatively affect the health of the individual (n=204)	159 (90.4)	14 (73.7)	17 (73.9)	14 (41.2)	.051

<sup>a</sup>Students response to the question 'what did they do when they experienced a foodborne illness'.

\*Statistically significant ( $P < .05$ ).

**Table 4.** Bivariable and multivariable logistic regression analysis of factors associated with students' better<sup>a</sup> practice towards responding foodborne illness (N=252).

FACTORS	UNADJUSTED OR (95% CI)	ADJUSTED OR (95% CI)	P VALUE
Knew the causes of food poisoning	2.14 (1.14-4.00)	1.98 (1.04-3.78)	.036*
Differentiate between food infection and food intoxication	2.09 (0.93-4.67)	2.16 (0.95-4.91)	.065
Believed that food poisoning illnesses is a serious health problem and may lead to death	3.61 (0.33-1.71)	2.15 (1.33-2.71)	.014*
Believed that medication without prescription for food poisoning may negatively affect the health of the individual	1.17 (0.56-2.38)	1.12 (0.52-2.38)	.766

Independent variables for the Multiple Logistic Regression model analysis include age, gender, education, field of study and place of residence.

<sup>a</sup>Students visit to doctor when experienced foodborne illness.

\*Statistically significant ( $P < .05$ ).

Saudi Arabia (SEUREC-CHS11408). The written consent was taken from all the study participants before participation.

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## Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

## Supplemental Material

Supplemental material for this article is available online.

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