Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2019, 8(6): 80-87

Assessing Physician Knowledge and Attitude on Food Borne Illnesses in Kingdom of Saudi Arabia

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ABSTRACT

Background: *Foodborne diseases are considered to be one of the emerging public health issues in the entire world. Poor standard of living is one of the main risk factors for the foodborne illness. The cases of foodborne diseases increase as a result of new emerging pathogens. It is evident that good knowledge of physicians helps in good diagnosis and treatment. Therefore, the objective of the current study is to evaluate the knowledge and attitude of public and private primary health care physicians and its association.* ***Methods:*** *This was a cross-sectional study conducted in the selected public and private primary health care centers in the city of Abha located in the southwestern region of Asir in the Kingdom of Saudi Arabia from October 2017 to March 2018. A total of 84 public and private healthcare centers were included in the study. A structured questionnaire was developed by using the existing literature.* ***Results:*** *Total of 125 physicians from both public and private primary health care centers participated in this study. No significant difference was found between the physicians operating in private and public primary health care centers in terms of knowledge and attitude. Results indicate that knowledge varies according to age, gender and years of experience.* ***Conclusion:*** *The knowledge and attitude of both public and private primary health care physicians are adequate but still there is a necessity to conduct training programs in a regular interval for enhancing the knowledge about the foodborne illness among physicians.*

Keywords: Knowledge, Attitude, Foodborne disease, Primary health care center

INTRODUCTION

Foodborne illness is a preventable, global public health issue [1]. The patterns of foodborne illness have been dramatically changed over a period of years due to lifestyle and behavioral changes in the population. In some areas, the incidences of foodborne illnesses are completely absent but in certain other areas; the outbreak of foodborne illness is due to new emerging pathogens [2].

Foodborne illnesses are developed as a result of eating or drinking contaminated items, usually by various pathogens such as bacteria, virus, parasites and also the presence of toxins poisonous chemicals in food [3]. Symptoms such as nausea, vomiting, and diarrhea often occur within 48 hours of this consumption [4]. However, none of the symptoms of foodborne illnesses are specific. Therefore physicians must take into consideration the history, epidemiologic features, and objective findings to make an accurate diagnosis [5]. Investigating and controlling foodborne disease outbreaks requires a multidisciplinary approach with a focus on the areas of clinical medicine, epidemiology, laboratory medicine, chemistry, and food microbiology as well as food safety [6].

Numerous outbreaks of foodborne illnesses are poorly investigated, if at all because these skills are unavailable [6]. The World Health Organization (WHO) estimated that globally one in ten people fell sick every year due to food contamination and 420,000 die every year from the foodborne diseases [7]. The children under 5 years are more vulnerable to foodborne illness and approximately 125000 children die annually due to contaminated food [7].

The foodborne pathogens are the leading cause of morbidity and mortality in both developed and developing countries [8]. Latest records and statistics from the Saudi Arabian Ministry of Health showed more childhood cases of *Salmonella* food poisoning with a total of 363 cases which accounts of nearly 50% of all 744 recorded cases in 2016 and almost the same number of adults have been documented [9]. The previously published literature indicates that the number of outbreaks of food poisoning cases has increased over the years [10].

Furthermore, the Ministry of Health revealed that Asir region reported 94 cases out of the total 2,113 cases of foodborne diseases, also, the total cases of *Salmonella* food poisoning in Asir region were 27 cases out of all 744 reported cases in Saudi Arabia [9]. Prevention is the first step in combating foodborne illnesses [11]. Information to prevent food contamination should be well socialized to general community continually [12].

General practitioners are the first point of contact and trusted the primary source of information for the public in the country [13]. General practitioners and laboratory investigations play a very important role in diagnosing foodborne illness. While physicians play a critical role in surveillance for and prevention of potential food-related disease outbreaks, only a few individuals who experience a foodborne illness seek medical care. Strengthening of food safety policies and statutory disease notification systems is vital to avoid substantial under-reporting of diagnosed cases and long delays in notification [14]. Moreover, clinical microbiology laboratories play an important part in the detection of these illnesses by identifying and reporting the infections to public health officials, who use the data to detect foodborne outbreaks [15].

The physician knowledge, ordering, and clinical interpretation influence the estimation of foodborne illnesses and even though there is a common guideline for the diagnosis and treatment of foodborne illness, it varies across physicians and also varies between the public and private physicians. Attitudes among physicians can convey the communication process that occurs between the patient and the doctor which is very much needed for effective prevention and control of foodborne illness [16]. There is no study done in the Kingdom of Saudi Arabia assessing the knowledge and attitude of physicians regarding foodborne diseases. Therefore, the current study aimed at assessing physicians' knowledge and attitude concerning foodborne illnesses in Abha, Kingdom of Saudi Arabia with a specific objective of determining the association between knowledge and attitude of public and private primary health care physicians.

MATERIALS AND METHODS

Study Design

This is a cross-sectional study.

Study Setting and Participants

This study was conducted in the selected public and private primary health care centers in the city of Abha located in the southwestern region of Asir in the Kingdom of Saudi Arabia from October 2017 to March 2018. A total of 84 public and private healthcare centers were included in the study.

Data Collection and Analysis

The sample size was calculated by using the Raosoft sample size calculator. The margin of error was 5% with a confidence interval of 95%, a response distribution of 50% and a total population size of 180; the minimum sample size was 123 and the sample size was rounded to 125. Multistage cluster sampling was used in the study to select participants. Official permission was obtained from the Ministry of Health-Asir region to conduct this study in the public and private primary health care centers in the city of Abha. A list of all public and private primary health care centers in Abha was compiled. There are 45 government-owned primary health care centers and 43 private primary health care clinics. Abha city was divided into the center, east, west, north and south administrative regions, and both the governmental and non-governmental primary health care centers were listed, based on the above mentioned 5 administrative regions.

Total 15 public and 15 private primary health care centers, based on these regions were selected by using the simple random sampling method. The selected public primary health care centers were contacted to participate. A separate permission letter from the administration of the respective private primary health care clinics was acquired for collecting the data. The physicians from the particular public and private primary health care centers were enrolled in the study by using the simple random sampling technique.

Test-retest reliability was done by Alpha (Cronbach's) test reliability for internal consistency and equaled 0.741. Test

reliability was applied to a pilot of 15 public and private primary health care physicians before the study. The data analysis was carried out by using SPSS (Version 16.0, SPSS Inc. Chicago, IL, USA). Frequency tables were used to describe the diagnostic practices of foodborne illness among the public and private primary health care physicians. Qualitative data was summarized in percentages and non-parametric tests of significance (Chi-square test) were applied to nominal scales. Pearson correlation between the two variables was applied. The p-value was two-tailed and statistical significance was set at <0.05.

Ethical Permission

Ethical permission was obtained from the research ethics committee, College of Medicine, King Khalid University, Abha, Kingdom of Saudi Arabia.

Inclusion Criteria

Physicians who agreed to participate in the study with written informed consent were included.

Tools for Data Collection

Each physician was interviewed using a structured questionnaire. A self-administered modified questionnaire was developed by conducting an extensive literature search from various databases. Furthermore, this questionnaire was validated by conducting the pilot study, 10% of the total sample of 13 physicians was rounded to 15 physicians, and these had all been administered with this questionnaire for the purpose of validation.

RESULTS

Total of 125 physicians from selected public and private primary health care centers participated in this study. Table 1 shows the demographic characteristics of physicians, 41.6% of physicians from both public and private primary health centers are between the age group of 35-44 years followed by 33.6% who are in the range of 45-54 years. About 68.8% of the physicians from both public and private primary health centers are males, 35.2% of the physicians from both public and private primary health centers are specialized in family medicine followed by 18.4% who are pediatricians, 62 and 63 physicians from public and private primary health centers participated in this study.

Table 1 General demographic characteristics of physicians who responded to the knowledge and attitude questionnaire regarding foodborne illness (n=125)

Questions Asked	Answer Level	Total (%)
Age (Years)	25-34	N=18 (14.4%)
	35-44	N=52 (41.6%)
	45-54	N=42 (33.6%)
	>54	N=13 (10.4%)
Gender	Male	N=86 (68.8%)
	Female	N=39 (31.2%)
Which of the following best describes your area of specialty?	Emergency medicine	N=20 (16.0%)
	Family medicine	N=44 (35.2%)
	Internal medicine	N=17 (13.6%)
	Pediatric medicine	N=23 (18.4%)
	OB/GYN	N=06 (4.8%)
	Others	N=15 (12.0%)
What is the primary setting of your practice?	Public hospital	N=62 (49.6%)
	Private hospital	N=63 (50.4%)
How long have you been practicing your specialty?	<5 Years	N=29 (23.2%)
	6-10 Years	N=38 (30.4%)
	11-15 Years	N=30 (24.0%)
	>15 Years	N=28 (22.4%)
On average, how many patients do you see per week?	1-10	N=06 (4.8%)
	11-25	N=17 (13.6%)
	26-50	N=21 (16.8%)
	51-75	N=13 (10.4%)
	>75	N=68 (54.4%)

Each week, approximately how many patients with a foodborne illness do you treat?	1-5	N=68 (54.4%)
	6-20	N=40 (32.0%)
	21-50	N=13 (10.4%)
	51-100	N=01 (0.8%)
	>100	N=03 (2.4%)

About 30.4% of the physicians from both public and private primary health centers are practicing their specialty for 6 to 10 years, and only 24% of physicians have 11-15 years of experience, 32% of the physicians from both public and private primary health centers reported that 6-20 cases of foodborne diseases are treated by them in a week.

Physicians' response to the KAP questionnaire about foodborne illness is presented in Table 2. Only 54.4% of the physicians from both public and private primary health centers are aware of the etiology of foodborne illness, 64% of the physicians from both public and private primary health centers are known about the incubation period of *Clostridium botulinum,* 33.6% of the physicians from both public and private primary health centers are conscious regarding the first choice of treatment for naturally acquired gastrointestinal anthrax.

Table 2 Physicians responses to the knowledge and attitude questionnaire (n=125)

Questions Asked	Answer Level	Total(Percentage)
Which of the following provide important clues to the possible etiology of a food-associated illness?	Incubation period	N=09 (7.2%)
	Duration of illness	N=05 (4.0%)
	Predominant clinical signs and symptoms	N=37 (29.6%)
	Travel history	N=06 (4.8%)
	All of the above	N=68 (54.4%)
The incubation period of *Clostridium botulinum* is:	5-10 hours	N=24 (19.2%)
	12-72 hours	N=80 (64.0%)
	4-5 days	N=13 (10.4%)
	6-10 days	N=08 (6.4%)
Which of the following is the first choice of treatment for naturally acquired gastrointestinal anthrax?	Rifampin	N=07 (5.6%)
	Penicillin	N=42 (33.6%)
	Erythromycin	N=30 (24.0%)
	Tetracycline	N=46 (36.8%)
Antibiotics could not be useful in treating *Staphylococcal* food poisoning because:	the toxin is not affected by antibiotics	N=33 (26.4%)
	antibiotic will not help in dehydration	N=09 (7.2%)
	it is a short-term illness	N=11 (8.8%)
	All the above	N=72 (57.6%)
Salmonella is most frequently acquired from:	Beef	N=12 (9.6%)
	Poultry	N=35 (28.0%)
	Human-to-human	N=02 (1.6%)
	Fish	N=15 (12.0%)
	All of the above	N=61 (48.8%)
The target microorganism in canning is:	*Clostridium botulinum*	N=48 (38.4%)
	Streptococcus thermophillus	N=34 (27.2%)
	E-Coli	N=36 (28.8%)
	Lactobacillus bulgaricus	N=07 (5.6%)
The major causative agent of traveler's diarrhea is:	*Listeria*	N=21 (16.8%)
	Shigella	N=08 (6.4%)
	Salmonella	N=13 (10.4%)
	Staphylococcus	N=17 (13.6%)
	Escherichia	N=66 (52.8%)
Foodborne illness can be a serious problem in immunocompromised patients.	Strongly agree	N=59 (47.2%)
	Agree	N=57 (45.6%)
	Neutral	N=05 (4.0%)
	Strongly disagree	N=01 (0.8%)
	Disagree	N=03 (2.4%)

Many of my patients are "at-risk" for infectious diseases, including foodborne diseases.	Strongly agree	N=40 (32.0%)
	Agree	N=47 (37.6%)
	Neutral	N=17 (13.6%)
	Strongly disagree	N=09 (7.2%)
	Disagree	N=12 (9.6%)
Assuring that patients receive education about the prevention of foodborne illness is part of the physician's role.	Strongly agree	N=53 (42.4%)
	Agree	N=49 (39.2%)
	Neutral	N=08 (6.4%)
	Strongly disagree	N=07 (5.6%)
	Disagree	N=08 (6.4%)
My patients would be interested in learning how they can prevent foodborne diseases.	Strongly agree	N=31 (24.8%)
	Agree	N=69 (55.2%)
	Neutral	N=24 (19.2%)
	Strongly disagree	N=0 (0.0%)
	Disagree	N=01 (0.8%)
Educating patients about food safety will result in a decrease in foodborne illness.	Strongly agree	N=59 (47.2%)
	Agree	N=46 (36.8%)
	Neutral	N=08 (6.4%)
	Strongly disagree	N=4(3.2%)
	Disagree	N=08 (6.4%)
My patients are likely to comply with the recommendations I provide on the prevention of foodborne illness.	Strongly agree	N=36 (28.8%)
	Agree	N=57 (45.6%)
	Neutral	N=32 (25.6%)
	Strongly disagree	N=0 (0.0%)
	Disagree	N=0 (0.0%)
My patients feel that I am a valuable resource for advice on prevention of foodborne diseases.	Strongly agree	N=53 (42.4%)
	Agree	N=55 (44.0%)
	Neutral	N=12 (9.6%)
	Strongly disagree	N=04 (3.2%)
	Disagree	N=01 (0.8%)

About 26.4% of the physicians from both public and private primary health centers know that the toxin is not affected by antibiotics, 28% of physicians from both public and private primary health centers are aware of the *Salmonella* infection and followed by nearly 38.4% of them are familiar with the concept of canning, 52.8% of the physicians from both public and private primary health centers have knowledge in terms of traveler's diarrhea.

About 92.8% of the physicians from both public and private primary health centers agree that the foodborne illness can be a serious problem in immunocompromised patients, 69.6% of the physicians from both public and private primary health centers are agreed that many patients are at risk for infectious diseases. About 81.6% of the physicians from both public and private primary health centers agreed that educating the patients about the prevention of foodborne illness is part of their job, 80% of physicians from both public and private primary health centers approved their patients are interested in learning about the preventive measures of foodborne diseases, 84% of the physicians from both public and private primary health centers believe that awareness among the patients will decrease the burden of foodborne illness in the country, 74.4% of the physicians in this study agree that their patients will follow their recommendations in order to prevent the foodborne illness. About 86.4% of physicians from both public and private primary health centers have confidence that they are the best and valuable source of information for preventing the forborne diseases thereby increasing the awareness among their patients.

Table 3 shows the distribution of physicians according to knowledge and attitude of foodborne illness; only 1.6% physicians from both public and private primary health centers have an excellent knowledge about the foodborne illness followed by 21% of them with good knowledge, 84% of physicians from both public and private primary health centers have a positive attitude regarding foodborne diseases.

Table 3 Distribution of physicians according to knowledge and attitude about foodborne illness (n=125)

Food Borne Illness	Total (Percentage)
Knowledge Score	
Poor (<3)	41 (32.8%)
Average (3-4)	56 (44.8%)
Good (5-6)	26 (20.8%)
Excellent (7)	02 (1.6%)
Attitude Score	
Negative Attitude (<4)	04 (3.2%)
Neutral (4)	16 (12.8%)
Positive Attitude (5-7)	105 (84%)

DISCUSSION

The present study was carried out in the selected public and private primary health care centers in the Abha city. Total of 125 physicians participated in this study from 15 public and 15 private primary health care centers. This study results confirmed that 67.6% of the physicians are conscious regarding the foodborne illness. This result is supported by the study done in China among the physician which showed that 66.75% of the study participants were having adequate knowledge about the foodborne diseases [17].

Likewise, a study conducted in Egypt among the primary health care physicians revealed that 61.3% of the subjects in the study were having satisfactory knowledge which is slightly less than the results of this study [18]. The study also found that 84% of the public and private primary health care physicians are having a positive attitude towards foodborne illness. On the other hand, a study conducted by Lu, Lingling, et al., in China among physicians' knowledge, attitudes and practices of food-borne diseases and surveillance proved that only 10% of the physicians have a positive attitude towards foodborne diseases; which is desperately less than the current study results [17].

The present study results declared that 92.8% of the physicians perceive foodborne illness can be a serious problem in immunocompromised patients. Likewise, a study conducted by Wong, et al., in the United States among the physicians as a practices and perceptions survey regarding the food safety found that 92% of the study participants considered foodborne disease was a severe issue among the patients with immune problem which very well supports the results of the extant research [19].

The unique finding of the current study is that the knowledge level and attitude among the primary health care physicians do not vary based on the primary setting of clinical practice. This study demonstrated a positive correlation between knowledge and socio-demographic variables such as years of experience. A study in China among the physicians determined that the physicians with more years of experience had a lower knowledge score which is totally opposite to the findings of the existing study [17].

There was a positive correlation between the age and knowledge of physicians regarding foodborne diseases in this study. Similarly, a study conducted in Sudan among the health care workers confirmed a positive statistical correlation between the age of the participants and the knowledge score which is in accordance with the results of the existent study [20]. The present study showed a significant correlation between the gender and knowledge of physicians about the foodborne illness. However, the knowledge of primary health care physicians did not vary on the basis of gender in a study carried out in northern Saudi Arabia which is also in contrast to the results of the present study [21].

The study has some limitations that include low participation rate among the physicians and the data presented in this research is of self-reported.

CONCLUSION

The knowledge and attitude of public and private primary health care physicians regarding the foodborne diseases are satisfactory however, it is recommended for the physicians to update their knowledge on foodborne illness. There is a need to provide proper training and short-term course for both public and private primary health care physicians about foodborne diseases. It is also suggested that refresher courses should be a recurrent mode in order to refresh their knowledge within the stipulated time period, and evaluation should be done in the form of a short test to understand the outcome of this training programs. There is a need to conduct further research in this area in the form of a one-one interview for better assessment of knowledge and attitude of physicians related to foodborne illness.

DECLARATIONS

Authors' Contributions

AK conceived of the study, developed the research design, completed data collection, performed statistical analyses, SK contributed to the literature review and the interpretation of the results, and drafted the manuscript; SUK the contributed to the interpretation of the results and helped in drafting the manuscript. All authors have read and approved the final version of the manuscript and agreed with the order of presentation of the authors.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

This research was funded by the Deanship of scientific research, Saudi Electronic University, Riyadh, Kingdom of Saudi Arabia.

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