Full Length Research Paper

Awareness of food borne pathogens and food poisoning among consumers in Taif - Kingdom of Saudi Arabia

Firas Mahmoud Faleh Hayajneh

Department of Pharmacology, College of Pharmacy, Al Taif University, Taif, Kingdom of Saudi Arabia.
E-mail: firashope@yahoo.com.

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Microbial pathogens cause millions of cases of foodborne disease all over the world and result in many hospitalizations and deaths. For this reason an effective consumer education programs to promote safer food handling practices and other averting behaviors can increase the consumer awareness of microbial pathogens. In this paper the awareness of consumers of food poisoning and its clinical signs, risky foods, practice and proper selection of ready food and major microbial pathogens as food safety problems in Taif region is tested, a pretested self-administered questionnaire was used anonymously among representative samples in Taif city in different points of the city. 71% of the samples tested think they have been affected by food poisoning, 49% of the samples have information about salmonella as a foodborne pathogen while 16% only have mentioned Campylobacter as a foodborne pathogen. The awareness varies among pathogens and the variations appear to be related to differences in the number and severity of illnesses associated with these pathogens. The present investigations revealed that awareness of microbial pathogens was associated with food safety Perceptions, awareness of potentially risky foods and substances associated with potential food safety hazards, food safety related behaviors, and demographics. There are different effects of variables on awareness of the tested pathogens.

Key words: Food poisoning, Salmonella, diarrhea, canned food, awareness.

INTRODUCTION

Food poisoning is a group of illnesses acquired by consumption of foods contaminated with a variety of causes ranging from infective organisms or their toxins to chemical contaminants whether metallic or organic (Yagob, 2004). Foodborne illnesses result from consumption of food containing pathogens such as bacteria, viruses, parasites or the food contaminated by poisonous chemicals or bio-toxins (Al-Goblan and Jahan, 2012).

Foodborne illnesses comprise a broad spectrum of diseases and are responsible for substantial morbidity and mortality worldwide. It is a growing public health problem in developing as well as developed countries. It is difficult to determine the exact mortality associated with foodborne illnesses. However, worldwide an estimated 2 million deaths occurred due to gastrointestinal illness, during the year 2005. More than 250 different foodborne illnesses are caused by various pathogens or by toxins (Fleury et al., 2008).

Foodborne diseases remain a major public health problem across the globe. The problem is more severe in developing countries because of lack of personal hygiene and food safety measures. As much as 70% of diarrheal diseases in developing countries are believed to be of foodborne origin (Amany, 2013).

As observed in other countries, a large proportion of food poisoning outbreaks are never reported to the health system in the Kingdom of Saudi Arabia (KSA). However, on the basis of reported outbreaks, it can be seen that number of reported food poisoning outbreaks has increased steadily during the period 1411-1422 Hijra from 186-482 accidents (Figure 1) (Yagob, 2004).

Food-borne pathogens are the leading cause of illness and death in developing countries, killing approximately 1.8 million people annually (Iyer et al, 2013). Each year, microbial pathogens cause as many as 76 million cases of foodborne illness, 324,000 hospitalizations and 5200
deaths in the United States (Chung-Tung et al., 2005).

The proportion of notified cases varies with the type of pathogen involved, in addition to other surveillance system factors. Although laboratory based reporting systems are not true representative of the true burden of disease in population, but still they are considered to be the most reliable indicators for trend of food poisoning, especially in countries with good surveillance mechanism (Yagob, 2004).

A study conducted in Qassim province, Saudi Arabia, analyzed the foodborne illness surveillance data for the year 2006. During the study period, 31 foodborne illness outbreaks comprising of 251 cases, were reported. The most common etiologic agent was Salmonella spp, followed by Staphylococcus aureus. Commercially prepared foods were consumed by the majority (68.9%) of the cases. Meat and Middle Eastern meat sandwich were the commonly implicated food vehicles (Al-Goblan and Jahan, 2010).

The burden of food-borne disease remains substantial. It is estimated that one in four Americans is affected by a significant food-borne illness each year (Tauxe, 2002). Data indicating trends in food-borne infectious disease are limited to a few industrialized countries, and to even fewer pathogens (Mead et al., 1999).

**MATERIALS AND METHODS**

**Study area**

The study was conducted in Al Taif, the third city of Saudi Arabia. It covers about 540 km², of which 18.2 km² is rural. It lies between 2200 and 2500 m above sea level (Hayajneh et al., 2014).

**Sampling method**

The sample random sampling technique was employed to select the respondents from Al Taif city. Respondents were selected during questionnaire administration in different parts of the town and peasant associations around the town. During the questionnaire administration, any member of the households who was willing to participate in the interview was taken as a sampling unit.

**Questionnaire**

The questionnaire covered awareness of pathogens as problems in food, food safety perceptions, food handling and consumption practices, awareness and consumption of potentially risky foods, food allergies, foodborne illness experience, in this study we focused on the analysis of awareness of some pathogens (namely Campylobacter, Listeria, and Escherichia coli). Specifically, the survey asked “Have you ever heard of (a pathogen) as problem in food?” The possible responses were “yes” and “no”.

**Methods**

A self-administered questionnaire was designed to be used anonymously, validated and pretested, then reviewed by experts from the College of Pharmacy, Taif.
University. The questionnaire was originally drafted in English, then translated to Arabic language, and was tested for consistency. The structured survey was developed to elicit the general knowledge, attitude about food poisoning, causes of food poisoning in Taif city, Kingdom of Saudi Arabia during the period from July to September 2014.

A total of 100 persons were randomly selected from different areas in Taif city. Data collection was carried out during day and evening periods under the supervision of the investigator. The questionnaire was prepared in such a way that questions and responses were simple and direct. The representative samples (persons) filled up the questionnaire, with help from the investigator or investigators. The representative samples took about 10–15 min to complete the questionnaire.

**Table 1. Awareness against canned food.**

<table>
<thead>
<tr>
<th>Education level</th>
<th>Does expired canned food cause food poisoning</th>
<th>Do you check expiry date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>No idea</td>
<td>Yes</td>
</tr>
<tr>
<td>Secondary</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>High school</td>
<td>3</td>
<td>42</td>
</tr>
<tr>
<td>University level</td>
<td>2</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>95</td>
</tr>
</tbody>
</table>

**Table 2. Awareness of the most common causes of food poisoning.**

<table>
<thead>
<tr>
<th>Food poisoning organism</th>
<th>Gender</th>
<th>No idea</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis</td>
<td>Male</td>
<td>8</td>
<td>23</td>
<td>54</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Clostridium</td>
<td>Male</td>
<td>8</td>
<td>18</td>
<td>59</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>E. coliO157</td>
<td>Male</td>
<td>8</td>
<td>20</td>
<td>57</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>2</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Campylobacter</td>
<td>Male</td>
<td>8</td>
<td>14</td>
<td>63</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Bacillus</td>
<td>Male</td>
<td>8</td>
<td>23</td>
<td>54</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>Male</td>
<td>8</td>
<td>26</td>
<td>51</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Listeria</td>
<td>Male</td>
<td>8</td>
<td>21</td>
<td>56</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Salmonella</td>
<td>Male</td>
<td>8</td>
<td>40</td>
<td>37</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0</td>
<td>9</td>
<td>6</td>
<td>15</td>
</tr>
</tbody>
</table>

**Statistical analysis**

The collected data was properly coded and entered into an excel spread sheet, which was later on entered into SPSS version 17, which was used to analyze the results.

**RESULTS AND DISCUSSION**

This survey provides information and reveals many critical features about the knowledge, attitudes and practices of the people living in Taif area, Kingdom of Saudi Arabia towards food and foodborne diseases (Table 1).

The survey also revealed a similar lack of knowledge among people living in Taif region, Table 2 shows that


Estes Reynolds, George Schuler, William Hurst & P.T. Tybor,
Preventing Food Poisoning and Food Infection, http://www.ces.uga.edu/pubcd/b901-w.html.


