Epidemiological study of cholera in Qazvin city during summer of 2011

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ABSTRACT

Cholera is an acute intestinal infection caused by consuming food or water contaminated with the bacterium Vibrio cholerae. Two main epidemiological characteristic of disease is tendency for create of sudden outbreaks and the ability to causing a pandemic. The objective of this study is to describe the epidemiology of the disease. This survey is a descriptive cross-sectional study based on reports from the health centers and hospitals covered by city health centers. Rectal swab is obtained from all suspected cases. After reporting each positive case, health team was sent to the location and it completed the epidemiological form. Data were analyzed by version 16 of SPSS software. All reported patients were 44 cases. Epidemic lasted from 4 August to 18 September 2011. Ogawa was the predominant pathogenic serosubtype. 47.7% of all patients admitted to the hospital and 52.3% were treated as outpatients. Most of the patients were in age group >60 years and there were no reports of disease in age group under 15 years. 2 of the 44 patients had mild symptoms of diarrhea, 13 patients had moderate and 29 cases had severe diarrhea. Not affection of age groups less than 15 years indicates epidemic patterns of disease in the city. Severity of symptoms is important in case finding; then, in disease surveillance system we should obtain rectal swab specimen from all cases of diarrhea with severe symptoms.

Key words: Cholera, Epidemic, Qazvin City

INTRODUCTION

Cholera is an acute intestinal infection caused by consuming food or water contaminated with the bacterium Vibrio cholera [1], and usually is not transmitted directly from person to person. The incubation period of cholera is normally 1 to 3 days but may take a few hours to 5 days [2]. Infection is usually mild or without symptoms, but sometimes it can be very severe [3]. Most important symptoms include watery diarrhea, nausea (feeling sick), vomiting and cramps, especially in the abdominal, legs, and arms [4, 5]. Two main epidemiological characteristic of disease are its tendency for create of sudden outbreaks and the ability to causing a pandemic that may progressively affect many countries and spread across continents. So far, seven pandemics of the disease have been recorded and despite efforts to control cholera, the disease is still a major public health problem in many developing countries [6, 7]. And is considered one of the key indicators of social development [8]. In countries where cholera is endemic, about 1.4 billion people are at risk of cholera. And approximately about 2.8 million cases of cholera in endemic countries and 87,000 cases in non-endemic countries occur annually. The number of deaths from cholera in endemic and non-endemic countries, respectively, is estimated at about 91,000 and 2,500 cases [9]. In Iran, with the economic, social and cultural development, and access to safe drinking water, the trend of disease is declining but every 5 to 6 years, outbreaks of disease occur in the country [10]. Cholera is a diarrheal disease that can be caused by serogroups of V. cholerae [11]. So far, 206 serogroups of V. cholerae have been identified which only the O1 and O139 serogroups are capable of creating epidemic and other items that are called NAG (Non Agglutinating Groups), cause sporadic watery diarrhea [12].When environmental conditions such as temperature, water salinity, and access

to nutrients be appropriate, V. cholerae will begin to multiply. Transmission of the disease occurs through contaminated food and water and hands. [13]. Cholera produces enterotoxin that causes abundant, painless, watery diarrhea that can quickly lead to severe dehydration and if treatment is not rapidly given, loss of water and salts can lead to kidney failure, shock, coma, and death in the patients. Vomiting also occurs in most patients [1, 7]. From many factors that play a role in the incidence of cholera, climate change, population movements and displacement, access to safe water, hygiene, sanitation, cultural problems, antibiotic resistance patterns and entry and exit of foreign nationals can be noted [14]. Several outbreaks have been reported in Iran so far. In the cholera epidemic of 1969, over 16,000 people were infected with cholera. In recent years, the largest epidemic of cholera in the country which occurred in 1998, more than 10,000 people were affected and 109 patients died during this epidemic. In 2005, 1,150 people were diagnosed with the disease and 11 patients died [15]. In the last cholera epidemic that Occurred in 2011 in country, 1,187 people were diagnosed with the disease and 12 patients lost their lives [16]. The purpose of this study that conducted during an epidemic of cholera in city of Qazvin in summer of 2011 was to describe of the disease by demographic characteristics and frequency of some risk factors.

MATERIALS AND METHODS

This survey is a descriptive cross-sectional study based on reports from the health centers and hospitals covered by city health center. In all suspected cases of Eltor, according to guidelines for disease surveillance, rectal swab specimen was prepared in Cary-Blair Transport Medium and either directly or in the form of decentralized (from covered health centers) are sent to the reference laboratory and study in the city health center. According to national guidelines for disease surveillance, the suspect case is described as "Anyone over 2 years old that due to acute watery diarrhea, suffering from severe dehydration or die" (17). It should be explained that in the hospitals covered by city

health center, Eltor experiments are performed in the hospital laboratory. If the microbial growth occurs, the results include required specifications of microbes such as serogroup, biotype and serotype, is reported into disease prevention unit of city health center. Therefore the present study is performed based on analysis of data submitted from all public and private health centers covering by city health center, laboratory data and epidemiology forms. How to complete the epidemiology forms as follows: Immediately after positive reports from laboratories, a medical team consisting of experts of disease prevention and environmental health were sent to the site and in addition to microbial sampling, measurement of chlorine in water and training about health behavior for prevention of friends and family from disease, were completing the form. In fact, all people diagnosed with the disease were enrolled. For ethical approvals, data in coding format were entered into the SPSS software version 16 and descriptive information was extracted and survey forms were also confidentially archived.

RESULTS

Qazvin city is located at a distance of 150 km from Tehran. According to population and housing census of statistical center of Iran in 2011, the city has a population of 566,773 that 464,323 people live in the city and 101,913 people are living in rural areas. In 2011 from total of 4997 cases of diarrhea were reported from health centers covered by Shahid Bolandian Health Center of Qazvin, numbers of 1268 cases were suspected to cholera. In all of these suspicious cases, rectal swab samples were collected and sent to the laboratory, of which 44 cases (3.47%) were diagnosed with the disease. Figure 1 shows the epidemic curve of disease.
The first confirmed case of the disease was reported in the city of Qazvin on 4 August 2011. Of which immediate control actions by the Qazvin province health center and Shahid Bolandian health center of Qazvin, intensified. Based on recorded and reported data, period of epidemic were 46 days from 4 August to 18 September 2011.
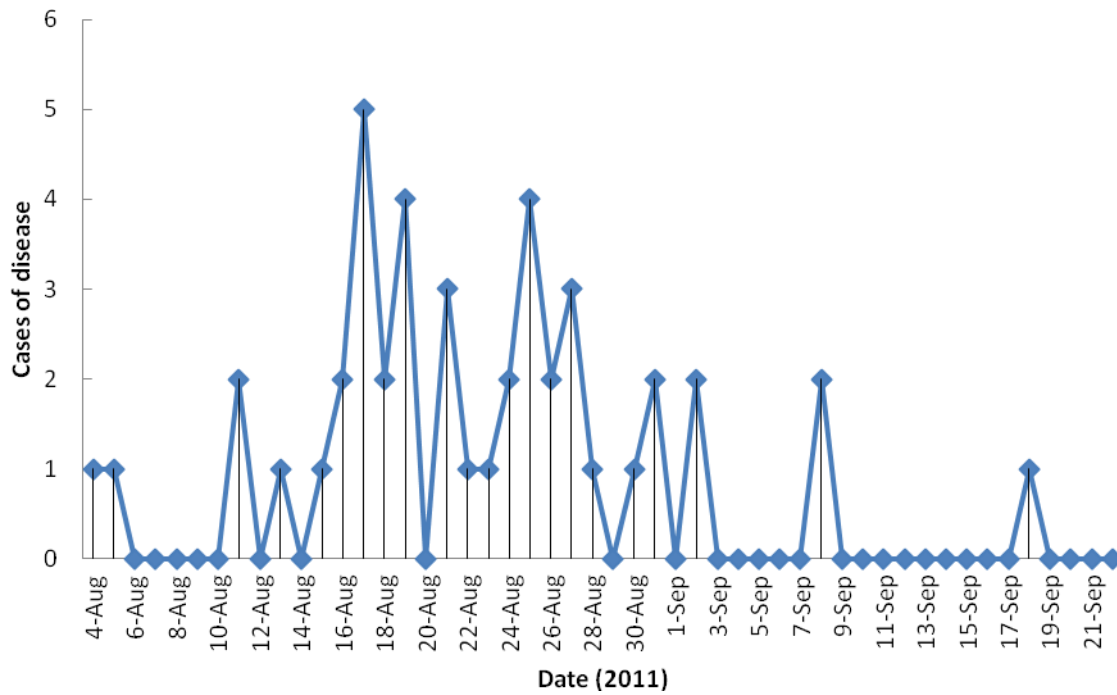
Figure 1: Positive cases of cholera according to date of symptoms

Table 1: Eltor positive cases according to age group, sex, residential area of patients and status of treatment

Age groups	Number of Cases	Gender		Residential area		Status of treatment	
		Male	Female	Rural	Urban	Hospitalization	outpatient
0 – 14	0	0	0	0	0	0	0
15 – 19	3	0	3	1	2	1	2
20 – 24	1	0	1	0	1	0	1
25 – 29	9	3	6	0	9	2	7
30 – 34	3	0	3	1	2	2	1
35 – 39	3	1	2	0	3	2	1
40 – 44	4	1	3	1	3	2	2
45 – 49	5	2	3	1	4	2	3
50 – 54	1	1	0	0	1	1	0
55 – 59	2	2	0	0	2	2	0
60 – 64	4	4	0	0	4	2	2
65 – 69	4	3	1	1	3	2	2
70 – 74	3	2	1	1	2	2	1
75 – 79	2	1	1	0	2	1	1
80 ≤	0	0	0	0	0	0	0
Total	44	20	24	6	38	21	23

Ogawa was the most predominant serotype of disease (97.73%). Table 1 shows Eltor positive cases according to age groups, sex, and residential area of patients and status of treatment. Of 44 reported patients, 20 cases were females (45.45%) and 24 were males (54.55%). Residential area of 6 cases were in rural (13.64%) and 38 cases were living in urban area (86.36). Of all patients, 21 cases admitted to hospitals (47.73%) and 23 cases (52.27%) were treated and cared as outpatients. Distribution of disease according to age groups is shown in Figure 2. Most of the patients were age group 60 years and above, so that 13 patients (29.55%) were in this age group then age group of 29-25 year had high frequency (20.45%). Necessary to explain that there were no reports of disease in age group under 15 years. In terms of,

distribution of clinical signs of disease in 44 cases, 2 patients had symptoms of mild diarrhea (3 times per day), 13 patients had moderate (up to 5 times per day) and 29 cases had severe diarrhea (more than 5 times per day). Between jobs, housekeeping was the most frequent (41.72%). In terms of education, the highest prevalence was observed in the illiterate people (37.64%). In terms of nationality, Iranian patients were 95.45%, and the remainders were Afghan immigrants. In terms of exposure to risk factors, 35 patients had consumed not disinfected vegetable (79.55%) and 32 cases (72.73%) had used unwashed and not disinfected fruit. 5 Number (11.36%) of patients had a history of contact with patients.
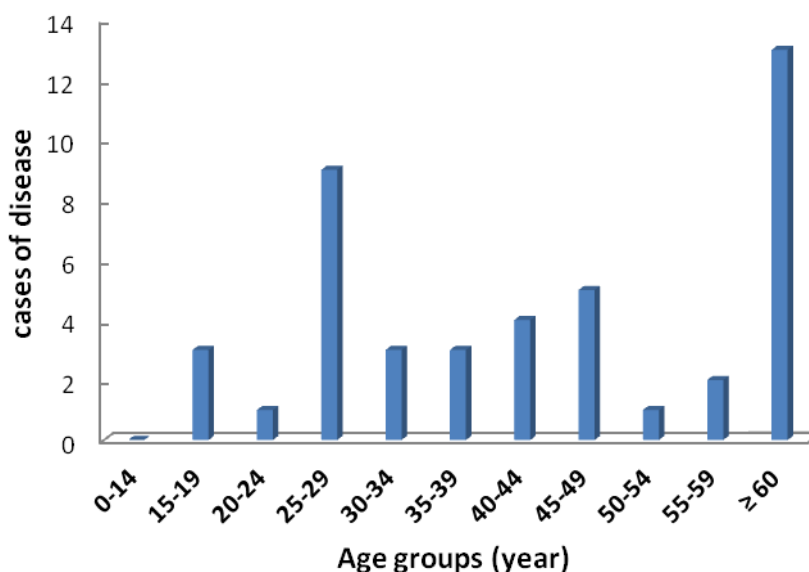
Figure 2: Distribution of disease according to age groups during the epidemic of cholera in Qazvin city during summer 2011

DISCUSSION

Epidemic of cholera in Qazvin city occurred in a period of approximately 45 days during the summer which the majority of outbreaks that have been occurred in the country also were higher in warm season and summer [13, 18]. This finding indicates that in summer due to warm weather and favorable conditions for proliferation of V. cholerae and more contact with surface water and increase of water and vegetable consumption by people, infection risk is higher [19-21].

The epidemic curve within a month after the onset, completely dropped and cases of disease reduced. On the one hand it could be due to cooling of weather and on the other hand represents quick and timely control actions by the city health center in order to control the epidemic. According to World Health Organization guidelines for control of cholera outbreaks, often the best controlling action is diagnosis and treatment of patients and health education [5]. These actions were well carried out by the city health center. In countries and regions where cholera is endemic, cases tend to occur mainly in the age group below 15 years, while adults due to repeated infections in the past years and the acquisition of relative safety, less affected by the disease [22, 23]. But in this study, according to the higher infection in age group 60 years and above (29.55%) and no infection in age group of under 15 years, it can be concluded that this age group is not at risk and the pattern of disease in the city, is epidemic. Also according to the national survey which was conducted based on reports from 25 medical universities in the 2011 epidemic, only 9% of patients were in the age group below 15 years [10]. The predominant serotype from 1977 to before the outbreak of 2005 was Ogawa while during the cholera epidemic of 2005, 98% of the pathogenic serotype was Inaba [12, 24].

In this epidemic also all cases were caused by Eltor biotypes and the most predominant serotype was Ogawa type (97.73%) which is consistent with national survey that 99% of disease was the Ogawa type [10]. In terms of gender, 54.55% of the cases were male that results vary with the national survey of the epidemic in 2011 but is consistent with the study of Zahraei et al [10, 12]. In terms of location, 86.36% lived in urban areas while according national statistics, 67% of patients were in urban. In the 2005 epidemic, 78.6% of the cases were living in urban area [12]. In this epidemic, the percentage of people admitted to hospital was higher than outpatient's cases that is unlike the results of other literature [10, 18, 24, 25] and it can be due to various reasons. Including that disease in this city, has been involved with people over 60 years who have underlying medical condition and have less power against the disease symptoms. Also most patients had lower levels of education and didn't have sufficient knowledge to deal with illness and consume more water and electrolytes if the symptoms occur. In this study, 79.55% of patients had history of using vegetables as raw and not disinfected. Based on national study in 2011, water wasn't the main way of transmission but most patients had a history of eating raw and not disinfected vegetables. So that cultivation of vegetables in the cities of Qom and Karaj, Qazvin, Rasht and Tehran

revealed infection with Ogawa V.cholerae that its reason was preparation of vegetables that had irrigated with human sewage from south Tehran (Vavan, Islamshahr, Shahr Rey and Varamin). Considering epidemic pattern of disease in this city as well as being on the path between cities, maintaining readiness to deal with future epidemics in the city is required.

CONCLUSION

The results of this study indicate that health system preparedness to deal with possible epidemics is important. Symptoms of disease as moderate or severe diarrhea in case finding are important and should pay special attention to this point in the disease surveillance system and the rectal swab samples from all severe diarrheas should be taken. Since one of the possible risk of transmission of disease was use of fruits and vegetables without proper washing or effective disinfection, therefore observance the principles of hygiene (includes four steps: cleaning, parasite removal, washing and disinfection) in the use of vegetables and fruits is essential and unavoidable.

ACKNOWLEDGMENT

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