

# Public awareness of cholera in Baghdad: A demographic study of educated Iraqi citizens

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## ABSTRACT

The aim of this study is to analyze cholera public awareness among educated Iraqi population. We carried out an educated population-based survey using a special questionnaire at 2016. The sample included 190 educated adults (31 males and 159 females) in Baghdad. The results of this study highlights that the public awareness of cholera disease among educated Iraqi citizens was high about general information, low about transmission ways, and moderate about control, protection and treatment. All study population (100%) agree that the cholera is non- communicable disease, infect child more than the other and transmission is correlated with habitat. Our work has led us to conclude that the awareness of cholera disease among the educated category of Iraqi citizens need to improve, especially about transmission ways, control, protection and treatment.

**Keywords:** Cholera, awareness, Iraq.

## 1. INTRODUCTION

*Vibrio cholerae* is the main cause of cholera disease. Cholera is an acute secretory diarrhea caused by the ingestion of food or water contaminated with toxigenic Gram-negative *Vibrio cholera* bacterium [1-4]. Cholera infection caused by *Vibrio cholera* O-group 1 or O-group 139. Other serogroups with or without the cholera toxin gene can cause a cholera like illness. *V. cholera* O1 is the source of global pandemic, while the O139 remains localized to a few areas in Asia [5]. Cholera has a short incubation period, from a few hours to 5 days, but commonly 1-2 days. It is infects all ages and both genders [6]. The bacterium can live naturally in any environment especially in brackish rivers and coastal waters [7]. Cholera is one of the fastest known killer diseases, which remains a global threat to public health through 1.3 and 4.0 million cases of cholera annually. Although cholera is vastly underreported, the WHO estimates that there are 3-5 million cases per year [8].

Cholera history thought to be back to the 5th century BC, existed on the India. Last century, cholera was

considered to be among the most diseases subject. In 1884, Robert Koch first isolated *V. cholerae* in pure culture in work that began in Egypt and continued in Calcutta (Kolkata), India. The next decade is likely to see a considerable rise in cholera disease studies. The ongoing seventh cholera pandemic began in Indonesia in 1961 and spread through Asia to Africa, Europe, and Latin America. Cholera is now endemic in many countries [9, 10].

Cholera is spread in Asia and Africa, with periodic outbreaks such as recently in Haiti [11]. Cholera is endemic in approximately 50 countries in Africa, South and Southeast of Asia, the Middle East, South and Central of America [12]. In addition, it can emerge in dramatic epidemics. From 2010 through 2014, 91 cases of cholera were confirmed in the United States among people who had traveled to the Caribbean, India, Pakistan, Southeast Asia and West Africa. More than 260 individuals were speculated to have died of cholera in four Northern states of Nigeria with over 96 individuals in Maiduguri, Biu, Gwoza, Dikwa, and Jere

council areas of Bauchi state. Outbreaks usually occur when war or civil conflict disturbs public sanitation services [7]. Series of cholera outbreak was reported between 1970 and 1990 [13]. The last outbreak of cholera recorded in Ile-Ife, Osun State, in Nigeria [7].

In Iraq, there have been several epidemics of cholera during the last 10 years, thousands of people were infected during the 2007 and 2009 [14, 15]. In 2015, there are 2,810 cholera cases were recorded by governmental associations in Baghdad [16]. During November–December 2015, cholera outbreak response in Iraq, the Iraqi Ministry of Health targeted  $\approx$ 255,000 displaced persons with 2 doses of oral cholera vaccine (OCV). Two-dose OCV coverage in the 3 northern governorates (91%; 95% CI 87%–94%) was higher than that in the 7 southern and central governorates (80%; 95% CI 77%–82%). The experience in Iraq demonstrates that OCV campaigns can be successfully implemented as part of a comprehensive response to cholera outbreaks among high-risk populations in conflict settings [17].

Cholera risk factors represented by human behaviors, environmental hygiene, personal hygiene, and food preparation [18]. Cholera transmission is due to fecal contamination of food and water [7]. The risk is increased for those who drink untreated water, do not follow hand washing recommendations, do not use latrines or other sanitation systems, or eat raw or poorly cooked food, especially seafood. Health care and response workers in cholera-affected areas, such as in an outbreak or after a disaster, may also be at increased risk of cholera [19-21].

The National Awareness and Early Diagnosis Initiative (NAEDI) consists of several work streams to help ensure delivery of the Cholera Reform Strategy. One of these has focused on developing a validated measure of public awareness of cholera signs and attitudes to help seeking, and benchmarking current levels on a national basis to provide a baseline against which to evaluate policy initiatives designed to improve awareness [22]. Few researchers have addressed the awareness of cholera disease in Iraq [17, 23, and 24].

CVD 103-HgR, a single-dose oral cholera vaccine (Vaxchora, PaxVax), is licensed and available in the United States. The vaccine was previously marketed under the names Orochol and Mutacol in other countries. The Advisory Committee on Immunization Practices (ACIP) recommends CVD 103-HgR vaccine for adult travelers (age 18–64 years) to an area of active cholera transmission [25, 26]. No information is available on the use of Vaxchora during pregnancy, lactation, immunocompromised people and HIV-positive peoples [27, 28].

In this paper we analyze the public awareness of cholera among Iraqi educated citizens and recommend the best ways to increase this awareness.

## 2. MATERIALS AND METHODS

Data were collected as survey from January to December 2016. We use a variation of likert procedure, in our questionnaire we use two short questions for all points we want to determine by answer “agree” and “disagree.”

### 2.1 Demographic and Socio characteristics

The survey includes many socio-demographic questions, of which the following are used in the present work: gender (male, female); age group (20-30, 31-40, 41-50, 51 and over); educational level (BSc, MSc and PhD); and occupation (medical and academically).

### 2.2 Cholera awareness

An 18-item short-form was constructed to survey cholera awareness status in educated Iraqi citizens. The short-form was designed for record the personal information of study sample as age, gender, educated level and occupation. The short-form includes three information axes about cholera: firstly general information about cholera; secondly cholera transmission ways tertiary cholera control, protection and treatment. We prepared a questionnaire Likert modified scale to determine the form of health awareness among some groups of Iraqi society different ages and various areas of Baghdad. Number of forms were 200 distributed through the period from January until December 2016. Questionnaire form included questions as follows:

1. Age
2. Gender
3. Occupation
4. Educational level
5. Short questions (total 19) divided to three axes

Answers of Likert modified scale we designed in this study were “Agree” and “Disagree” to make the survey easy to apply and fast .

### 2.3 Statistical Analysis

Statistical significance was analyzed by using of SPSS v23 software program. Normality test, Descriptive statistics and significance level were calculated for gender, age, educational level and occupation.

## 3. RESULTS AND DISCUSSION

Of the study population 190 subjects completed and returned the questionnaire. 83.7% of them were females and 16.3% were males. The response rate was 100% at all study sample. The highest rate of who tested was 51 and over age in percent 78.9%. Most of tested sample were have academic occupations in percent 55.8%. The highest rate of education level of tested sample was MSc in percent 47.4% (Table1).

**Table 1:** Demographic characteristics of study sample (n=190 person) represents the number of forms according to the geographical distribution of sex and age groups.

| General items            | N   | %    |
|--------------------------|-----|------|
| <b>Gender</b>            |     |      |
| Male                     | 31  | 16.3 |
| Female                   | 159 | 83.7 |
| <b>Age</b>               |     |      |
| 20-30                    | 11  | 5.6  |
| 31-40                    | 15  | 7.9  |
| 41-50                    | 16  | 8.4  |
| 51 and over              | 148 | 78.9 |
| <b>Occupation</b>        |     |      |
| Medical                  | 84  | 44.2 |
| Academically             | 106 | 55.8 |
| <b>Educational level</b> |     |      |
| BSc                      | 84  | 44.2 |
| MSc                      | 90  | 47.4 |
| PhD                      | 16  | 8.4  |

### 3.1 Cholera general information

The results of this study indicate that the awareness of cholera is high in educated Iraqi citizens about the axes including the general information of disease. Highest rate of educated peoples agree that the cause of cholera is bacteria (77.9%) against 22.1% didn't agree that. No significant differences between who agree that the cause of cholera is bacteria or not. Also high rate of tested sample were know the symptoms of cholera (97.9%) against 2.1% didn't know the symptoms of cholera. No significant correlation was found between who thought that the symptoms of cholera are well known or not. All tested sample (100%) agree that the cholera infects all population and disagree that the cholera is communicable. More than half tested sample (62.1%) disagree that the cholera infects limited gender. This result is significant exclusively at a 0.05 level. In addition, all tested sample (100%) agree that the cholera infects children more than the other (Table2).

### 3.2 Cholera transmission way

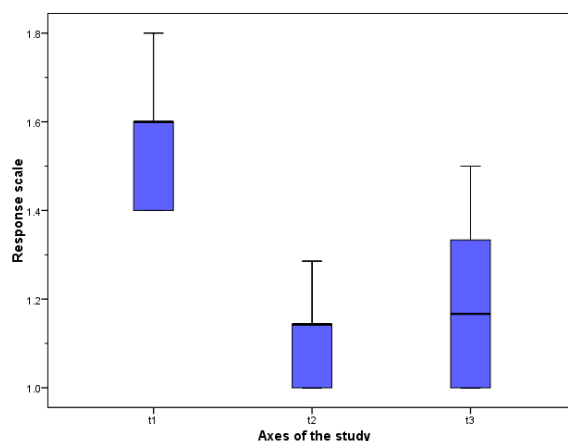
About the cholera transmission ways, the results of this study refer to low awareness in educated sample about it. High rate of tested sample (86.3%) thought that the cholera transmission ways is known for any one. No significant identified between who thought that the cholera transmission ways are known for all and not. High rate of people (85.8%) agree that the insects has a role in cholera transmission way. No significant revealed between who thought that the cholera transmission way is correlated with insect or not. High rate of people (86.3%) agree that the food and drink are correlated with cholera transmission. This result is significant only at a 0.005 level. All tested sample agree that the cholera transmission is correlated with the place of life. More than half (60.5%) of tested sample thought that the cholera transmission is correlated with time of the year against (39.5%) thought other than that. This result is significant only at a 0.005 level. Also, more than half tested sample (79.5%) thought that the animals has role in cholera transmission ways

with significant differences between those and who thought other than that. High rate (93.7%) of study sample agree that the cholera can transmission from mother to sons with significant detected between those and who thought other than that (Table2).

### 3.3 Cholera control, protection and treatment

About the awareness about control, protection and treatment of cholera, high rate (90%) of tested people thought that the cholera protection is able and any one can avoid it. This result is significant only at a 0.005 level. Also, high rate of people (93.7) agree that the medications of cholera are available for handling. This result is significant only at a 0.005 level. Almost half of tested sample (53.2%) says that the control of cholera may affect by economic and social status of person how at risk of cholera infection. No significant revealed between these two answers. Low rate (8.9%) of tested people agree that the governmental process enough to control the infection of cholera. This result is significant only at a 0.005 level. Medium rate (77.9%) of people thought that the schools are play big role to prevalence the awareness of cholera control in the community. This result is significant only at a 0.005 level. Most of tested sample in this study (94.2%) agree that the social media are play big role in cholera control subject in the community. This result is significant only at a 0.005 level (Table2).

Abstractly, the highest rate of cholera awareness in educated sample of Iraqi citizen was recorded in the first axes of study which concentrated on the general information about cholera disease. The lowest rate of cholera awareness in educated sample of Iraqi citizen was recorded in the second axes of study which concentrated on the cholera transmission ways. The medium rate of cholera awareness in educated sample of Iraqi citizen was recorded in the third axes which concentrated on the control, protection and treatment of cholera disease (Figure1)



**Figure 1:** Abstract of tested sample response scale divided to three axes [test1 (t1) = general information about cholera, test 2(t2) = cholera transmission ways, and test 3(t3) = cholera control, prevention and treatment]

**Table 2:** Answers of study sample (n=190) to awareness cholera questions with significant level.

| Aces   | Agree (%)  | Disagree (%) | Significant |
|--|------------|--------------|-------------|
| <b>General information about cholera</b>                       |            |              |             |
| Q1. Cholera is bacterial disease                               | 148(77.9)  | 42(22.1)     | P=0.404     |
| Q2. Cholera symptoms are known                                 | 186 (97.9) | 4(2.1)       | P=0.069     |
| Q3. Cholera infects all population                             | 190(100)   | 0(0)         | -           |
| Q4. Cholera is communicable disease                            | 0(0)       | 190(100)     | -           |
| Q5. Cholera infects limit gender                               | 72(37.9)   | 118(62.1)    | P=0.000     |
| Q6. Cholera infects child more than the other                  | 190(100)   | 0(0)         | -           |
| <b>Cholera transmission ways</b>                               |            |              |             |
| Q7. Cholera transmission ways are known                        | 154(86.3)  | 36(13.7)     | P=0.367     |
| Q8. Cholera transmission is correlated with insects            | 163(85.8)  | 27(14.2)     | P=0.646     |
| Q9. Cholera transmission is correlated with food and drinking  | 164(86.3)  | 26(13.7)     | P=0.000     |
| Q10. Cholera transmission is correlated with habitat           | 190(100)   | 0(0)         | -           |
| Q11. Cholera transmission is correlated with climate           | 115(60.5)  | 75(39.5)     | P=0.000     |
| Q12. Cholera transmission can occur from animal to human       | 151(79.5)  | 39(20.5)     | P=0.000     |
| Q13. Cholera transmission can occur from mother to son         | 178(93.7)  | 12(6.3)      | P=0.001     |
| <b>Cholera control, protection and treatment</b>               |            |              |             |
| Q14. Cholera protection is able                                | 171(90)    | 19 (10)      | P=0.000     |
| Q15. Cholera treatment is available                            | 178(93.7)  | 12(6.3)      | P=0.001     |
| Q16. Cholera control may realized by economy and social status | 101(53.2)  | 89(46.8)     | P=0.706     |
| Q17. Cholera control may realized by Government                | 17(8.9)    | 173(91.1)    | P=0.004     |
| Q18. Cholera control may realized by schools                   | 148(77.9)  | 42(22.1)     | P=0.002     |
| Q19. Cholera control may realized by social media              | 179(94.2)  | 11(5.8)      | P=0.001     |

To increase the awareness of cholera disease, the UNISEF was supported a campaign in Haiti at 2010. This campaign includes some activities like putting up posters to teach people how to protect themselves from cholera infection, handing out Aquatab purification tablets and general information about cholera disease in public places, announces through radio, television and SMS. This campaign has ultimate goal represented by ensure that households must have at least one person have general information about cholera, knows how to prevent cholera, what he will do if cholera case or symptoms occur in his family. Also, the campaign include some community meetings and try to distribute the main information about cholera in health centers, schools and public markets [29].

Public awareness of cholera symptoms in Iraqi citizen was high score (79.9%). This may due to some activities on governmental level which were in line with result of an article discuss the awareness of

cholera transmission, symptoms and prevention among high-risk population [30]. Tested population in this work have full awareness and agree that the cholera disease is infects all population levels like child, young, and adults. Our result is practically the same as one proposed by [31]. Also, all tested population was disagree that the cholera disease is communicable disease. The result we record is reported also in [32]. We noticed low awareness in tested sample of educated citizen that they agree with the suppose cholera is infect limited gender with percent 37.9% while the percent of who disagree that the cholera is infect limited gender was 62.1% with significant differences. We noticed high percent of people didn't know that the cholera is not infect limited gender, this point need to increase awareness by different ways as social media, TV, schools, newspapers, and printed information about cholera disease [33]. All tested sample of this study was agree that the cholera disease is infect children more than other young and adults.

Our result was inspired by other study about this subject which suggest that OSP-specific memory B cell responses can occur following cholera, even in the youngest children, and may explain in part the age-independent induction of long-term immunity following naturally acquired disease [31].

About the awareness of cholera transmission ways, high percent (86.3%) of tested group agree that these ways are known for people. No significant differences between who agree that the cholera transmission ways are known and who disagree with that. In general, we thought that the cholera transmission ways are related with knowledge of relationship between host and cause of disease. Our results are reminiscent of the one proposed by [34] who suggest that the knowledge of interactions between the host the bacterial pathogen will assistants to propel and quench cholera outbreaks. Another study found that the hygiene awareness and improved access to chlorinated water have had positive results in cholera decreasing [35]. High percent (85.8%) of study sample was agree that cholera transmission is correlated with insects but no significant differences between them and who disagree with that. In fact this result indicate that awareness of insect's role in cholera transmission still need to raise. Our results are awes a lot to the one proposed by [36] which win in proved of test the hypothesis that house flies may be capable of specifically harbouring ingested *Vibrio cholerae* in their digestive tracts. The results of this study found high percent (86.3%) of study sample were agree that the Cholera transmission is correlated with food and drinking with significant differences comparing with they were disagree against this point. We suggest that this point need to increase education because its well-known the role of food and drink in cholera transmission and epidemiological studies have shown that food plays an important role in the transmission of *Vibrio cholerae* [37]. All tested peoples in this study agree that the cholera transmission is correlated with place of living or habitat. Our result are more or less identical to previous study discussed the spatial and demographical spreading of cholera [38]. Moderate percent (60.5%) of tested sample agree that the cholera transmission is correlated with time of infection with significant differences against they disagree with that. Our result bears a close resemblance to previous study suggested that the climate change is play role in cholera transmission [39]. High percent (79.5%) of study sample agree that the cholera transmission can occur from animal to human with significant differences against they disagree with this question. This result is based on a study explained the relationship between animals and humans and cholera transmission [40]. High percent (93.7%) of tested sample agree that cholera can transmission from the mother to son with significant differences against who disagree with them. It's known that the baby does not get cholera in the uterus, and they are not born with any problems like diarrhea or vomiting. The baby suffers from the effects of its mother's dehydration and Mother's milk has never been reported to transmit

cholera, even though mother herself may be suffering from cholera [41]. But, as it known cholera spread from person to person through hands, bed sheets and other linen or from food which has been handled by a carrier so that baby can get cholera from contact with hands of his mother if she were infected with cholera [42].

High percent of tested population (90%) agree that cholera control is able with significant differences between them and those disagree of this question. Our result is a variation on other study which include mention successfully multiple programs and strategies describe cholera control [43]. High percent of tested population (93.7%) agree that cholera medications are available with significant differences between them and those who disagree of this question. Our results proceed very much in the same way as indicated in [28] which discuss cholera treatment and vaccine. Moderate percent of tested population (53.2%) agree that cholera control may realized by economy and social status with no significant differences between them and those who disagree with this idea. Our results agree with study which discuss the factor effect on cholera disease as economy and social status of the country [6]. High percent of tested population (91.1%) disagree that the cholera control may realized by government with significant differences between them and those who agree with this fact. Our result not follow what is indicated of findings in meeting about cholera control in Switzerland [44]. High percent of tested population (77.9%) agree that cholera control may realized by schools with significant differences between them and those who disagree with this question. We refined result by [45] which evaluate the role of school in malaria control. Lastly, high percent (94.2%) of tested population agree that cholera control may realized by social media increasing of awareness. Our result was loosely based on findings of study about the social media role in cholera control [46]

#### 4. CONCLUSION

Our work has led us to conclude that the awareness of cholera disease among the educated category of Iraqi citizens need to improve, especially about transmission ways, control, protection and treatment. Also, cholera control can only be activated if people will change their behaviors and no longer practice risk behaviors regarding cholera. Appropriate media, such as radio, television or newspapers should be involved in disseminating health education messages.

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