

## CHOLERA OUTBREAK IN WASIT GOVERNORATE, IRAQ 2017

Taqi Mohammed Jwad Taher <sup>1</sup>, Wejdan Saeed Assi <sup>2</sup>, Mohammed A. Jalal <sup>2</sup> & Firas Turki  
Rashed Sarray <sup>2</sup>

<sup>1</sup> Department of community medicine, College of Medicine, Wasit University, Iraq

<sup>2</sup> Wasit Health Directorate, Ministry of Health, Iraq

Corresponding author: [ttahir@uowasit.edu.iq](mailto:ttahir@uowasit.edu.iq)

### ABSTRACT

**Introduction:** Cholera is a major public health ongoing problem, causing significant morbidity and mortality particularly in developing countries. The main objective of the current study was to assess the distribution of cholera in Wasit governorate during the 2017 epidemic. **Methods:** This study was designed as a descriptive cross-sectional study. All patients were registered in health directorate records. The data collection lasted from 2<sup>nd</sup> of January 2018 till 28<sup>th</sup> February 2018 by formal registration for records of the directorate of Wasit health\ section of communicable diseases\ epidemiological surveillance unit. All registered cholera confirmed cases were included and frequency tables were done using SPSS program version 23. **Results:** The results showed that only (25) positive cases of cholera from (6175) total of stool samples taken from (20954) of acute diarrhoea recorded during 2017, and the highest percentage of cases (66.7%) were registered in September. The highest percentage of cases (32%) appear within the age category (>45) years while the lowest percentage was in under five years children(8%). Women constituted about (68%) of all cases. All cases were in Al-Suwaira health care district and all cases were of the type Inaba. All patients were recovered with no fatality. Even, the highest attack rate of cholera nationally and in Wasit was in 2015 outbreak.

**Conclusion:** Cholera still one of the endemic diseases in Iraq that caused an outbreak at different times. Although, it still under control and need further work for special situations where the infection most likely distributed.

**Keywords:** Cholera, Outbreak, Wasit.

## Introduction:

Cholera is an infection characterized by diarrhoea, the leading cause is a toxigenic serogroup of the bacterium *Vibrio Cholerae*, which is one of the main causes of death due to dehydration. Many factors as poverty, lack of adequate water supply, and poor sanitation can play an important role in the transmission of cholera infection (WHO, 2017). As a disease, cholera considers as one of the highly virulent diseases because it may trigger acute, serious, watery diarrhoea. After consuming infected food or water, it takes 12 hours to 5 days for a person to start showing symptoms (Azman AS et al., 2013).

With the presence of easy ways to treating diarrhoea initiated from cholera with the appropriate rehydration facilities including oral rehydration and intravenous fluid, the case fatality rate for cholera must be decrease as possible as to less than 1%, but it is still exceeding 5% in most vulnerable settings (WHO, 2017). World-wide estimation of cholera cases was 1.3 million to 4.0 million cases of cholera and 21 000 to 143 000 deaths every year (Ali M et al, 2015).

Over the past few years, the number of cholera cases confirmed to the World Health Organization (WHO) has remained high. In 2017, 1 227 391 cases, including 5654 deaths, were reported from 34 countries (WHO,2018). In several ways, the year 2017 was very significant in cholera history because of the passage of 200 years since the first documented cholera pandemic in 1817. The present pandemic is considered the seventh pandemic which continues to being reported as

the longest one. Thousands of people were killed in the last epidemic all over the world especially in Yemen (2261), followed by the Democratic Republic of the Congo (1190) and Somalia (1007) (WHO, 2016).

Even people from all age groups can be affected by cholera, but nearly half of deaths occur in children less than five years of age. Current predictions of the number of cholera cases range from 1.4 to 4 million with a range from 21,000 to 143,000 dead patients due to cholera (WHO, 2017).

The presence of a large number of refugees and internally displaced people who live in camps and peri-urban slums where basic water and sanitation standards have not been met made these areas as typical places for initiation and spread of cholera infection (WHO, 2019). Cholera infection can be avoidable and easily treated. The presence of vaccines can play a vital role in prevention, both two forms of oral cholera vaccines (killed whole-cell) are accessible and suggested in endemic areas, cholera outbreaks, and in high-risk humanitarian crises. Vaccines alone are not helpful so it must be used in combination with other strategies for prevention and control (WHO, 2017).

Even with a high fatality rate of cholera, it still easily treatable disease. Most cases can be successfully treated by the administration of oral rehydration solution (ORS). While patients who reach a stage of severe dehydration are at risk of shock, so they need urgent treatment by intravenous fluids. Such patients also need to receive proper antibiotics (WHO, 2019).

The first appearance of cholera in Iraq was during the epidemic of 1999 (AL-Abbassi A M et al., 2005). Then Iraq suffered from the endemicity of this disease with the appearance of epidemic attacks and outbreaks in different periods.

For a long period, the whole infrastructures in Iraq were destroyed including electricity and safe drinking water, in addition to severely damaged or blocked sewage disposal networks particularly in the places where refugees and poor people live. The camps and poor regions consider as focus points for the spread of all water-borne diseases such as cholera (AL-Abbassi A R, & Amena SM, 2015).

Wasit was one of the Iraqi governorates that suffer from the cholera outbreak in 2015, confirmed reported cases in Wasit 67 (2.3% of the total cases in Iraq) (AL-Abbassi A R, & Amena SM, 2015), and the last epidemic was in 2017, in order to control further spread of the disease and prevent a future outbreak, this study was achieved.

The main objective of the study was to know the distribution (person, time, and place) of cholera in Wasit in 2017. In addition to comparing the results of the positive cases between Wasit medical institution laboratories with the central public health laboratory to ensure the validity of the results done in Wasit. Other objectives were to describe the serotype of vibrio cholerae cases present in Wasit and to illustrate the outcome of positive cases.

## **Methods:**

**Study Design:** A descriptive cross-sectional study.

**Duration of Study:** Carried out from the period 2<sup>nd</sup> January till 28<sup>th</sup> February 2018 in Wasit province.

**Study population and sample:** Study population include all cases with acute diarrhoea in Wasit province during the surveillance period. Those patients with a feature of probable cholera (watery diarrhoea with or without vomiting) were subjected to stool culture according to the passive surveillance program. Positively diagnosed cases from the whole Wasit population (around 1,500,000 people) during the epidemic in Wasit ( from May through November 2017) were reported in the database of health directorate.

Cases were diagnosed by stool sample which transported by special media (Cary Blair media) and then incubated in the medium of Alkaline Phosphate Water (APW) for one night then inoculated in Thiosulfate Citrate Bile Salt (TCBS) agar for culture. Further confirmation to the results in the central public health laboratory was performed according to Ministry of Health instructions.

**Data Collection:** Data collected from the records of epidemiological surveillance unit for all confirmed cases reported according to the notification, database, and verification methods. This study was applied to describe the disease information about cholera patients during the last epidemic (that occurred during the year 2017) in Wasit province. A person, place, and time epidemiological model was used to achieve this task in; age, sex, place of

residence, and the time trend of disease occurrence by (months). The outcome of all cases also registered.

After obtaining the official approval from the ethical committee in Wasit university and agreement from Wasit Health Directorate, data were collected from the official Wasit directorate registry of epidemiological surveillance that belongs to the communicable disease control section/ public health department.

**Statistical Analysis:** Data were computed and analysed by using SPSS version 23. Frequency tables and descriptive statistics used for data presentations.

**Results:**

Out of (6175) total of stool samples taken from (20954) of acute diarrhoea recorded during 2017, only 25 cases of cholera were confirmed in Wasit governorate.

**Cholera cases by age in Wasit 2017**

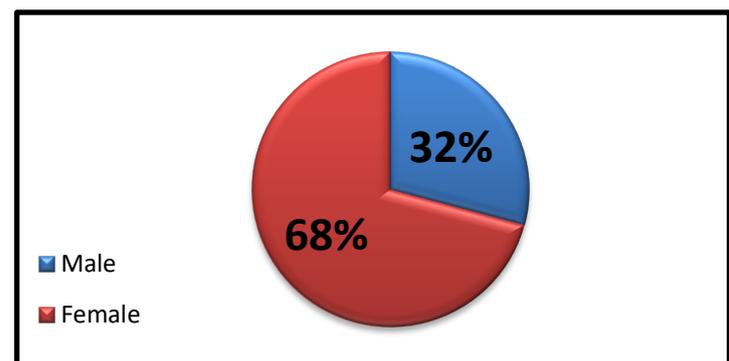
The current study shows the distribution of cholera cases in Wasit provinces as it was reported in health directorate from health institutions in Wasit to the centre of the communicable disease which consists of 25 cholera patients.

The highest percentage of cases (32%) appear within the age category (>45) years, while in (1-4) years age group it is 8% as (table 1) showed.

**Table 1: Frequency distribution of cholera cases by age in Wasit in 2017.**

Age class	Male	Female	Total	percentage
1-4	1	1	2	8
5-14	4	0	4	16
15-24	2	2	4	16
25-34	3	0	3	12
35-44	3	1	4	16
>45	4	4	8	32
<b>Total</b>	<b>17</b>	<b>8</b>	<b>25</b>	<b>100</b>

Figure 1 below showed that females have the highest rate (68%) of disease among all cases.



**Figure 1: Frequency distribution of cholera cases according to sex in Wasit 2017.**

The figure 2 showed that the highest percentage of cholera cases (66.7%) reported in September, while May showed the least percentage of cases (8.3%) of all cases.

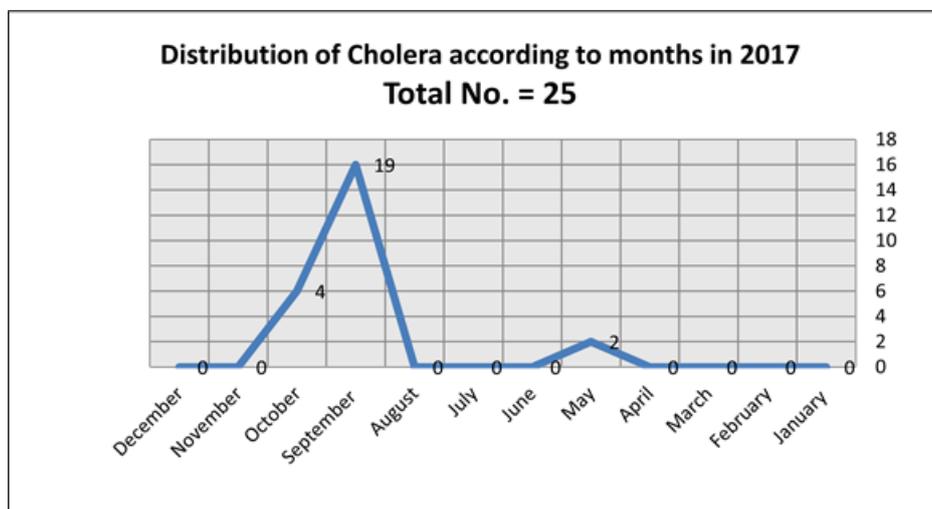


Figure 2: Frequency distribution of cholera cases according to months in 2017 in Wasit.

***Cholera cases from 2012 to 2017 and attack rate in Iraq and Wasit governorate:***

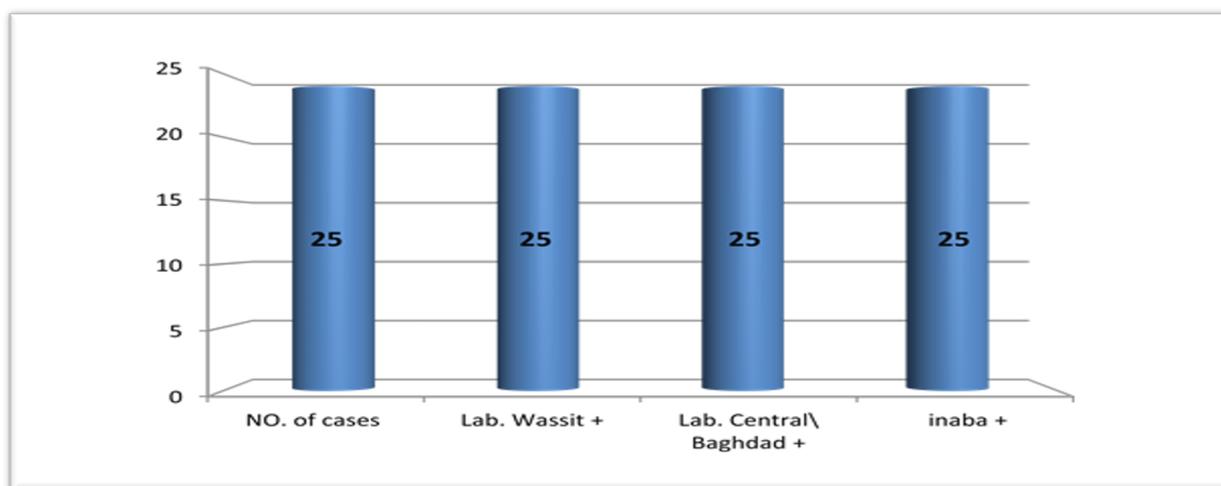
The current study showed the highest attack rate per/100000 of the population was 8.2 in 2015 nationally, while the highest attack rate per/100000 of the population was 4.95 at 2015 regionally. The highest number of cholera cases in Wasit was in 2015 (67 cases) followed by 2017(25) cases as shown on table 2 below.

**Table 2: Distribution of cholera cases from 2012 to 2017 and the attack rate in Iraq and Wasit governorate.**

Years	Iraq			Wasit			%
	No. of Cholera	Attack Rate per /100,000	No. of death	No. of Cholera	Attack Rate per /100,000	No. of death	
2012	653	1.92	0	1	0.072	0	0.153
2013	1	0.003	0	0	0	0	0
2014	0	0	0	0	0	0	0
2015	2868	8.2	2	67	4.85	0	2.33
2016	3	0.008	0	0	0	0	0
2017	505	1.33	3	25	1.81	0	4.95

Concerning geographical distribution according to all six primary health care districts ( Kut1, Kut 2, Al-Hay, AL- Suwaira, Al- Azyzia, and Al-Numania) in Wasit governorate, all 25 cases of cholera in Wasit were reported from AL- Suwaira primary health care district.

In figure 3 below, all cholera cases were from Inaba species. All cases diagnosed by the Wasit institutional laboratories were corresponding to the confirming test done by the central health laboratory.



**Figure 3: Diagnosis of cholera cases according to Wasit health institutions and central public health laboratories 2017.**

100% of the cases mentioned using tap water for different home uses. The final progress of all cases in 2017 was complete recovery.

## Discussion:

Iraq has been experiencing repeated wars both externally and internally for a long time which leads to home destruction, immigration of people, lack of electrical power, insufficient of healthy water supply, as well as the degradation of its infra-structures (AL-Abbassi AR, & Amena SM, 2015). All these factors caused Iraq to suffer from cholera, and the last attack was in 2017 in which Baghdad (Alrisafa) and Babylon took the first and second ranks in the number of cases reported respectively followed by Wasit governorate as the third (Hussein A A, 2018).

The age distribution of cholera patients in this study showed the highest percentage in those older than 45 years old with the lowest percentage in children between (1-4) years old probably due to using a bottle or boiled water in feeding them. A study conducted in another province (AL- Hilla) in 2015 found that people between (5-20) years old were most affected, with no significant difference between males and females (Malik Z, & Bae H, 2017).

Nearly two-thirds of patients were females which may reflect bad hygiene and living situation for women in cholera affected places, likely because women are more engaged in domestic work in the home and responsibility of caring for sick persons in the family (WHO, 2007).

Out of the positive *Vibrio cholera* cases recruited in a descriptive study to cholera cases in Iraq 2017, there were (18.71%) age less than 15 years and (81.29%) in age over 15 years, with significant differences ( $P < 0.0001$ ). Among positive cases, of which 78 (45.60%) were in males and 93 (54.40 %) were females. On the other hand, statistical analysis did not show significant differences (Hussein A A, 2018).

Cases were distributed in different months of the year, but the peak was on September, these results are similar to those of study done in Hilla city in 2015 (Malik Z, & Bae H, 2017), and that can be explained by the presence of Inaba serotype which is a common type that occurs in Iraq (Mukhapadhyay AK et al., 2016). The serotyping of the isolates cholera cases in 2015 showed that the *Vibrio cholera* cases in Iraq were of serotype Inaba with the presence of a few cases of Ogawa (AL-Abbassi AR, & Amena SM, 2015). Previous cholera outbreaks in Iraq showed the same seasonal distribution during September and October months of the year which is compatible with the classical trend of the disease (AL-Abbassi AR, & Amena SM, 2015).

Annual distribution of the disease may show no or little control of the risk factors that lead to cholera, like inactive sewage disposal and using disinfectant water in daily life activities like cooking or drinking.

All cases of cholera reported in one primary health care district (AL- Suwaira) which gave an idea about this place that complains from insufficient sewage disposal and water supply in addition to low social and economic class for most of the citizens as mentioned in the WHO report (Hussein AA, 2018).

In this study, all cholera patients mentioned the use of tap water which is in contrast to other studies that showed the disease is more prevalent in patients who drink unsafe water from wells or rivers (Malik Z, & Bae H, 2017). This study revealed that the recovery rate was 100% percentage in Wasit province which is of no different from the case fatality rate of the Iraqi

epidemic in 2015 which reach only 0.075% (AL-Abbassi AR, & Amena SM, 2015).

#### **Conclusion and recommendations:**

Cholera is an endemic disease in Iraq, but outbreaks can occur in different governorates. Wasit is one of these affected places by the last epidemic in 2017, so the need for urgent work for prevention and control by surveillance, providing suitable investigation for diagnosis, and early treatment measures. In addition to improving health institutions' capacities at all levels especially those in the peripheral regions.

Enhance cooperative works between related agencies, in particular, sewage disposal of contaminated water and disposal of hazardous items. Maintain strong and consistent contact between the health sector and other stakeholders to apply an intersectoral approach for the management of cholera and other diarrhoeal diseases.

The main epidemiological features of the cholera outbreak in Wasit in 2017 was it affected mainly adult females rather than other groups, especially in months of autumn due to a suitable environment for the present serotype. The attack was concentrated in one primary health care district although all of them mentioned using tap water for daily life activities and drinking. Arising the need for increasing awareness in special areas and population about using treated or boiled water in different activities especially cooking food and washing, take care of personal hygiene, and washing hands. Even so, this outbreak hit Wasit province but it still under the control with no fatality rate.

#### **Conflicts of Interest:**

The author declare no conflicts of interest.

#### **References:**

- Al-Abbassi, AM., Ahmed, S., & Al-Hadithi, T.(2005). Cholera epidemic in Baghdad during 1999: clinical and bacteriological profile of hospitalized cases. *East Mediterr Health J*, 11(1-2):6-13. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/16532666>
- Al-Abbassi, AR., & Amena, SM. (2015)The cholera epidemic in Iraq during 2015. *TOFIQ. Journal of medical Sciences*, 2(2): 27-41.
- Ali, M., Nelson, A., Lopez, A., & Sack, D. (2015). Updated Global Burden of Cholera in Endemic Countries. *PLOS Neglected Tropical Diseases*, 9(6), e0003832. doi: 10.1371/journal.pntd.0003832
- Azman, A., Rudolph, K., Cummings, D., & Lessler, J. (2013). The incubation period of cholera: A systematic review. *Journal Of Infection*, 66(5), 432-438. doi: 10.1016/j.jinf.2012.11.013
- Hussein, A. A. (2018). Distribution of Vibrio Cholera in Iraq during 2017. *IOSR Journal of Pharmacy and Biological Sciences*, 13(5): 58-61. DOI: 10.9790/3008-1305025861
- Malik, Z., & Baiee, H. (2017). Epidemiologic Features of Cholera Epidemic In Al Hilla City-Babylon Province-Iraq 2015. *Journal Of University Of Babylon for Pure and Applied Sciences*, 26(2):208-216. Retrieved from [https://www.journalofbabylon.com/index.php/JU\\_BPAS/article/view/532](https://www.journalofbabylon.com/index.php/JU_BPAS/article/view/532)
- Mukhopadhyay,A.K., Al Benwan K., Samanta, P., Chowdhury, G., & Albert, M.J. (2016). *Emerg Infect Dis.*, 22(9): 1693–1694. doi: 10.3201/eid2209.160811.
- WHO. (2007). Addressing sex and gender in epidemic-prone infectious diseases. Retrieved 10 April 2019, from <https://www.who.int/csr/resources/publications/SexGenderInfectDis.pdf?ua=1>.
- WHO. (2016). Number of reported cholera cases. Retrieved 1 January 2020, from [https://www.who.int/gho/epidemic\\_diseases/cholera/cases\\_text/en/](https://www.who.int/gho/epidemic_diseases/cholera/cases_text/en/)
- WHO. (2017). Interim Guidance Document on Cholera Surveillance. Retrieved 29 May 2019, from [https://www.who.int/cholera/task\\_force/GTFCC-Guidance-cholera\\_surveillance.pdf?ua=1](https://www.who.int/cholera/task_force/GTFCC-Guidance-cholera_surveillance.pdf?ua=1).

- WHO. (2018). Weekly Epidemiological Record, 21 September 2018, vol. 93, 38 (pp. 489–500). Retrieved 29 May 2019, from <http://www.who.int/wer/2018/wer9338/en/>
- WHO. (2019). Cholera. Retrieved 30 July 2019, from <https://www.who.int/news-room/fact-sheets/detail/cholera>