CHOLERA EPIDEMIC IN IRAQ DURING 2015

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Summary:

Background: Cholera became an endemic disease in Iraq, strikes in epidemic form nearly every ten years, but with irregular outbreaks. Iraq is facing great disasters of destruction of the infrastructures with shortage of electricity and safe water for drinking especially in the poor districts and the refugee camps that helps for the appearance of water-borne diseases including cholera. Also the sewage disposal systems has greatly damaged or obstructed.

Aim: It is to shed light on the epidemiology, the pattern of cholera cases that appeared suddenly during the thirty eighth week of October in Baghdad districts and spread to many other governorates. The outcome of cases was also mentioned. It is also a descriptive analysis for the additive cases on daily bases through addition or discarding of cases of suspected cholera according to the reference laboratory testing.

Subjects, Methods, and Materials:

The study is a descriptive analysis; is that the data (officially supplied from the Center of Disease Control/ Ministry of Health) is dynamic and every day and week there are new cases and discarded cases till at the end of month the final report was done. As Iraq is an endemic country for cholera, the case definition in the endemic countries according to the WHO is: (Acute watery diarrhea for more than three bowel motions with or without vomiting in a patient aged 5 years or more).

Accordingly, cases with the above complaints who attended the hospitals and health facilities are examined for stool cultures and sero- typing for Vibrio cholerae in the Central Public Health
Laboratory (CPHL). Those who are stool culture-positive will be reported here as cholera cases. Follow up of the hospitalized cases for their outcome are reported; diarrheal cases reported from all governorates of Iraq together, with the positive cases of cholera are mentioned also. Epidemiological curves for cholera and acute diarrheal diseases for the years 2013, 2014 and 2015 are presented for comparison.

**Results:**

The number of acute diarrhea cases together with cholera cases for the year 2015, their ages and gender are reported according to the distribution by weeks. The trend of cholera in Iraq since the year 1990-2014 is reported. The total number of admitted cases of cholera from the 23rd September till 6/11/2015 that were laboratory confirmed are 2651 cases comprising of 1477 males and 1174 females, with all age groups were included. The sero typing of the isolates show that the Vibrio cholera was O1 sero type Inaba with few cases only of Ogawa sero type. This final figure was corrected every day through the addition of new cases and discarding of others; the number includes all cholera cases in Baghdad and fourteen other governorates. There were only two cases died with CFR of 0.075%. It appeared, the trend of attack of cholera in Iraq was classical i.e. during the months of September and October and not in the hot months of Sumer as that appeared during the years of 1990 and 2007.

**Conclusion and Recommendation:**

Communicable diseases surveillance needs an immediate notification, daily, weekly and monthly reports, with Syndromes Surveillance when the situation is complex. Epi-info software is to be used to collect surveillance data via fixed systems and submitted to the center by using the internet. Health education campaigns should be adapted to the local cultures and their habits; they should promote practices of personal hygiene with concentration on hand-washing with soap and detergents. The storage and preparation of food should be safe, together with encouraging of breastfeeding for lactating women. Innovative WASH interventions are needed to prevent cholera, together with the surveillance and diagnostics through laboratory net work; the use of rapid diagnostic tests (RDTs) is needed. Oral cholera vaccine (OCV) should always be used as an additional public health tool with mass vaccination campaigns to be launched for people especially in the camps or when facing disasters of mobilization or facing flood and sewage contamination.

**Keywords:** Bacteria, cholera, dehydration, shock, Vibrio cholerae

**Introduction:**

Cholera is an acute diarrheal bacterial disease that attacks in an epidemic and outbreak forms; it remains a major public health problem in many parts of the world, causing an enzymatic diarrhea.1-5 If not treated, it might result in severe dehydration and hypovolemic shock. Two sero groups, O1 and O139, cause outbreaks of cholera; the O1 causes the majority of outbreaks, while O139 was first identified in Bangladesh in 1992, and is confined to South-East Asia 6-9; it appeared in Iraq for the first time during the epidemic of 1999. In severe form, cholera is characterized by sudden onset, profuse painless watery stool (rice-water stool), nausea and
profuse vomiting early in the course of illness. In untreated cases, rapid dehydration, acidosis, circulatory collapse, hypoglycemia in children, and renal failure can rapidly lead to death. Resuscitation by the proper fluid and electrolytes is the key role in saving lives; while the antibiotics role is important in decreasing the time of the diarrhea, shortening the hospitalization period and decreases the percentage of microbial carriage 8-10. The diagnosis of cholera is done by the conventional culture method and this would need for no less than two days for isolation and identification of the microbe. The rapid diagnostic tests (RDTs) can be widely used and help in the quick identification and reporting of the cholera cases even in the absence of laboratory facilities.1-3

Cholera remains especially an overlooked disease in the developing countries and in the endemic areas. The real number of cholera cases worldwide is underestimated, is that 1.3- 4.0 million cases are occurred each year with 21- 143 thousands of deaths. The case fatality rate (CFR) according to the epidemic of 2014 has ranged between 0.01- 25.71%. The highest CFR are reported mainly from the poor countries due to a confusion of the case definition where the severe cases only are regarded as cholera cases 11-15, also due to a delayed or poor medical care and management 1, 3, 6. Unsanitary environment and conditions and poor water supply with unhealthy water available for drinking in the year 2015 is estimated to be present among 2-4 billion people all over the world 11, 13-15. Lack of the security conditions impedes the implementation of an appropriate surveillance and control activities especially now in many Middle East countries including Iraq and Syria. There were a total of 190 549 cholera cases reported by the WHO from forty two countries during the year 2014, with CFR of 1.17% 16. There might be an under estimated reporting of the real number of cholera cases because of its negative reflect on travel, trade and food export from the affected countries. The lack of laboratory facilities for the diagnosis and absence of expert health teams dealing with the disease might result in over reporting of acute diarrheal cases as cholera because of confusing case definitions 16-19. The oral cholera vaccine (OCV) is now available, its efficacy and protection time are still not finally addressed, and it can be given for people at any age including one year old 15.

Despite Iraq was free of cholera during the year 2014, in the year 2015, it has faced an epidemic of cholera started during the mid of September till 6/11/2015 (time of reporting this paper, and the number is still increasing). The total number of laboratory confirmed case of cholera was 2651cases with two deaths only.

The work reported here has shed light on this epidemic, together with the laboratory results and the surveillance data of information, together with the epidemiological curve on cholera since 1990.

Subjects, Methods, and Materials:

The study reported here is a descriptive Analysis is that the data is dynamic and every day and week there are new cases and discarded cases according to the CPHL results till at the end of month there will be a final report. The data is officially supplied from the Center of Disease Control/ Ministry of Health) and presented in the Sub-Regional Meeting on Scaling Up preparedness and response to current outbreak of cholera in Iraq and neighboring countries, 16-17 October 2015, Beirut, Lebanon. As Iraq is an endemic country for cholera, the case definition
of the disease is followed for its detection. The case definition in the endemic countries by the WHO is mentioned above and was followed carefully.

Accordingly, cases with the above conditions who attended hospitals and health facilities are examined for stool cultures and sero-typing for Vibrio cholerae in the Central Public Health Laboratory (CPHL). Those who are stool culture-positive are reported here as cholera cases. Follow up of the hospitalized cases for their outcome, and the health facilities they managed in are reported. Diarrheal cases reported from all governorates of Iraq together, with the positive cases of cholera are mentioned also. Epidemiological curves for cholera and acute diarrheal diseases for the years 2013, 2014 and 2015 are presented for comparison.

The number of acute diarrhea cases together with cholera cases for the year 2015, their ages and gender are reported according to the distribution by weeks. The trend of cholera in Iraq since the year 1990-2014 is reported.

**Results:**

In the year 2015, Iraq by all its governorates has faced an epidemic of cholera started during the third week - on of September. The total number of admitted cases of cholera till 6/11/2015 that were laboratory confirmed are 2651 cases, and two reported deaths only. The deaths were one male from Baghdad and one female from Babylon; their ages were 50 years and thirty years respectively; they died because of irreversible circulatory collapse and renal failure due to their delay in reaching the hospital. The number of cases included in this analysis was 1691 till the eleventh of October 2015, added to it through the official daily record by the MoH, and addition of confirmed cases of 960 cases of cholera till the sixth of November 2015 to bring the total to 2651 confirmed cases. As it is shown in the Fig. 1, the epi curve of acute diarrheal cases for the all ages has started to sharply increasing from the 23rd of September (week 37); the index case was from Abu Graib province of Baghdad. The peak number of cases was in the week 39 to decline steadily after that. The epi curve for diarrheal cases for the years 2013-2015 is comparable in Fig. 2 that shows sharply increasing during the week 39 for the year 2015. The number of stool tested for cholera for the year 2015 was increased when cholera was suspected as it is shown in the Fig. 3; this was sent to the CPHL for confirmation of the presence of vibrios. It appeared from Fig. 4 and 5 that all age groups were involved by the acute diarrhea and those below five years old are parallel to those exceeding this age.

The same thing was seen for the gender that both males and females were affected by the disease without significant difference (1477 males and 1174 females), Fig.6.

All the Iraqi provinces and governorates are attacked by the cholera and the disease was reported from all Baghdad areas, Babylon, Najaf, Karbala, Muthanna, Nasireyah, Basra, Diwanyah, Wasit, Misan, Kirkuk and the Anbar governorates, (Fig.7). Figures 8 and 9 show the distribution of suspected cholera cases by weeks of hospitalization and the confirmed cases of cholera according to the different provinces. This shows the peak number of the admitted and confirmed cholera cases all over Baghdad and the other Iraqi governorates was during the week 39, starting from the week 38 and then started to steadily escalating down in the weeks 40, 41 and afterword’s. The laboratory – confirmed cases of cholera among all the acute diarrheal cases
from all the governorates is shown in the Fig. 10 and in the Table 1. The sero types of the isolates were of O1, sero type Inaba, with very few cases of Ogawa.

The epidemiological trend of cholera in Iraq since the year 1990 till 2014 has shown in the figure 11, that shows the years of 1999 and 2007 were of the major epidemics but with the absence of cases during the year of 2014 before the epidemic of 2015.

![Epi - Curve of suspected V.C](image)

Figure (1): EPI- Curve of suspected cases of cholera in Iraq during 2015 (Ref. no.22, MoH, Directorate of Preventive Medicine, Section of Control of Infectious diseases)
Figure (2): Trend of acute diarrhea cases in Iraq by weeks for years 2013-2015 till week 39, (Ref. no. 22)
Number of AD & Number of Stool tested for V.C by weeks 2015

Figure (3): Number of diarrhea cases with number of stool samples tested for cholera till the week 39, (Ref. no. 22)

Distribution of AD cases by age group by weeks 2015

Figure (4): Distribution of cholera cases by age group by weeks of their hospitalization, (Ref. no. 22)
Figure (5): Distribution of suspected cholera cases by age group, (Ref. no. 22)
Figure (6): Distribution of suspected cholera cases according to their gender, (Ref. no. 22)

Figure (7): Distribution of suspected cholera cases according to the provinces & governorates, (Ref. 22)
Figure (8): Distribution of suspected cholera cases by weeks of hospitalization, (Ref. no. 22)

Figure (9): Confirmed cases of cholera according to the provinces, (Ref. no. 22)
### CONFRIMED CHOLERA CASES

<table>
<thead>
<tr>
<th>DOH</th>
<th>CASE</th>
<th>%</th>
<th>DOH</th>
<th>CASE</th>
<th>%</th>
</tr>
</thead>
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<td>13.8</td>
<td>WASIT</td>
<td>53</td>
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<td>THIQAR</td>
<td>14</td>
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<td>DIALA</td>
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<td>11.5</td>
<td>SULAIMANYIA</td>
<td>1</td>
<td>0.06</td>
</tr>
<tr>
<td>BABIL</td>
<td>512</td>
<td>31.6</td>
<td>ERBIL</td>
<td>3</td>
<td>0.1</td>
</tr>
<tr>
<td>MUTHANA</td>
<td>188</td>
<td>11.5</td>
<td>SALAHIDIN</td>
<td>1</td>
<td>0.06</td>
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<tr>
<td>BASRA</td>
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<td>DUHOK</td>
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<td>0.1</td>
</tr>
<tr>
<td>MISAN</td>
<td>12</td>
<td>0.7</td>
<td>KIRKUK</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>KERBLA</td>
<td>64</td>
<td>3.1</td>
<td>TOTAL</td>
<td>1691</td>
<td></td>
</tr>
</tbody>
</table>

Table (1): Distribution by percentages of the confirmed cholera cases according to the provinces, (Ref. no. 22)
Figure (10): Distribution of suspected and confirmed cases of cholera, (Ref. no. 22)

**Trend of Cholera in Iraq since 1990 - 2014**

![Graph showing the trend of cholera in Iraq from 1990 to 2014](image)

Figure (11): Epidemiological trend of cholera in Iraq between 1990-2014 (Ref. no. 22)

**Discussion:**

Surveillance on cholera must be shared on the regional and global levels through an integrated disease surveillance system. The information should be dealt with in feedback at the local and global levels of sharing data 1-7, 11, 17, 19. The impact on cholera strikes and transmission was significant in all emergency settings and endemic outbreaks.

Notification of all cases of cholera is no longer mandatory under the International Health Regulations, even though, public health issues related to cholera must continuously be assessed against the criteria of the Regulations to draw a conclusion if an official notification is needed 17, 19, 20.

It is to strengthen the Local capacities for collecting, and analyzing data, also to improving the diagnosis are need for comprehensive control activities. This will help the populations living in high-risk areas to be identified in order to benefit from the control measures. Iraq is one of the EMR countries, located in the South West of Asia and has borders with Turkey, Iran, Kuwait, KAS, Jordan and Syria 21, 22.
The WHO Global Task Force on Cholera Control act to help to support the global strategies to share the capacity building for the global prevention and control of cholera. It is to provide a forum for coordination, exchange of technical activities and cooperation on cholera and water-borne related diseases to strengthen countries’ capacity for prevention and control of these diseases 11, 16-19.

Also the WHO Global Task Force on Cholera Control helps to support the development of research ideas with emphasis on creation of innovative protocols to cholera prevention and control in the invaded countries (Weekly Epid. Rec. WHO, 2 Oct. No. 40. 2015. 90, 517-544.)

Iraq has 18 Provinces and the health authority is organized by the Ministry of Health that controls all health facilities (public & private sectors) on central and peripheral levels. The total population is estimated to be 35 million; it has 19 Directorates of Health, 135 Health Districts and 1350 Health Surveillance Sites 22.

Social mobilization:

Iraq is suffering of repeated external and internal wars since more than three decades; unstable life, destruction of homes and mobilization of its people are dynamic processes. Unsafe life, shortage of electricity, lack of safe water for drinking among wide communities besides, the destruction of it’s infra structures hasn’t been corrected. The ISIS attack on the country since more than one year and its occupation and demolishing of the standards of life for nearly four governorates had led to a huge mobilization of people for temporary camps mostly of tents. In these camps there is great shortage of facilities and requirements for an ordinary life especially a clean water and sewage disposal.

The heavy rain during the end of October 2015 had led to flooding of most of the streets and houses in Baghdad and many of other cities all over Iraq due to a bad or closed or not maintained sewage systems. Another problem facing the country and the health authorities is the masses of people in millions of pilligrims during the days of Ashura and other million visitors to the holy shrines in Karbala and the Najaf governorates especially during the month of Moharram. The food processing in hundreds of tons for these pilligrims in different stations of movement and their water supply for drinking are not an easy process and might disseminate the disease for further locations (The Sub-Regional Meeting on Scaling Up preparedness and response to current outbreak of cholera in Iraq and neighboring countries, 16-17 October 2015, Beirut, Lebanon).

Cholera has become an endemic disease in Iraq; the above mentioned destruction of the infra structures and the mobilization of people had made the outbreaks and epidemics of the disease to happen in the country during the hot months and classically during September. The epidemics were striking nearly every ten years, but with irregular outbreaks 10, 22. Despite cholera stroked 42 countries during the year 2014, with a total number reported to the WHO of 190 549 cases with 2231 deaths but few countries had carried the heaviest burden (Democratic Republic of Congo, Ghana, Nigeria from Africa, Afghanistan, from Asia and Haiti from the America); the overall CFR was 1.17% (Weekly Epid. Rec. WHO, 2 Oct. No. 40. 2015. 90, 517-544). The risk factors involved for the dissemination of cholera and contributing to its long lasting outbreak are inadequate supply of safe water, poor sanitation, inadequate disposal of waste and poor personal
hygiene. The clinical expression of cholera is ranging from severe florid picture to asymptomatic infection; the ratio of infection to clinical disease status ranges from 1:3 to 1:100. The asymptomatic infection during epidemics will help to spread the disease rapidly, to stop the outbreak from spread to the remote areas; an early identification of the initial cases is needed. The prevention of cholera can be done through the application of the control measures on the disease as the rate of cholera carriers varies from 18% - 22% among household contacts and 0.34% - 1.3% through the community. These rates are present even in the absence of clinical disease 18-20.

OCV is included among the strategy of control of cholera; it is promising to be effective to give immunity for six months to five years on revaccination. In 2013; the GAVI board approved a strategic aid to the global cholera vaccine stockpile for endemic and epidemic settings for the years 2014-2018.

**Conclusion and Recommendation:**

Cholera as it is acute communicable diseases, immediate notification surveillance on it needs, daily, weekly and monthly reports and syndromic surveillance when the situation is complex. Epi-info software and internet services are used to collect and distribute the surveillance data to the center with a feedback of the dynamic information. Health education campaigns can be distributed to local and remote cultures to help for the practicing of sound personal hygiene as hand-washing with soap, safe preparation and storage of food and encourage breastfeeding. Innovative WASH interventions can be practiced to prevent cholera, so as the use of rapid diagnostic tests (RDTs) for the diagnosis of suspected vibrios in stool.

Currently there are two WHO oral cholera vaccines (OCVs) (Dukoral® and Shanchol®); both vaccines were used in mass vaccination campaigns with WHO support. OCV can be used as a public health tool in protecting populations at high risk of cholera.

**References:**


22- Ministry of Health, Directorate of Preventive Medicine, Section of Control of Infectious diseases (2015)