



Cholera Epidemic Risk Factors Among Patients Admitted to Merjan Teaching Pediatric Hospitals in Hilla City at 2015

عوامل خطر الإصابة بمرض الهيضة في الوباء الذي حصل في محافظة بابل بين المرضى المنومين في مستشفيات بابل الحكومية

By

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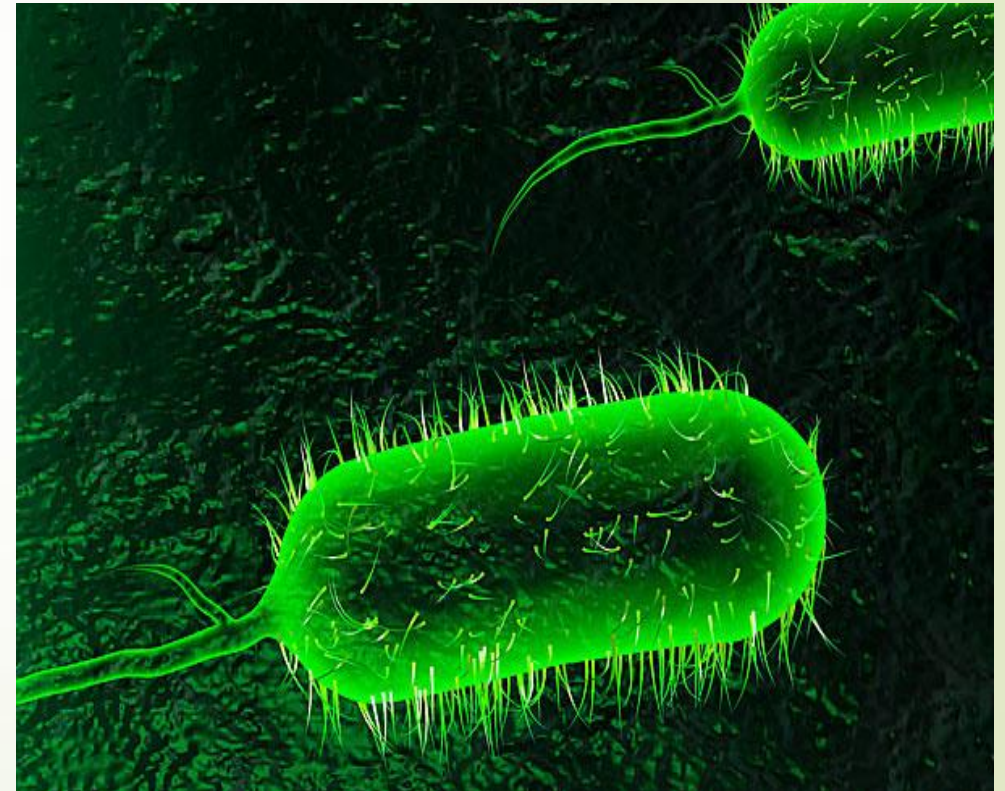
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Introduction

Introduction

- **Cholera** is an acute diarrheal disease caused by the bacterium, *Vibrio cholera*; an infection in the intestine that can kill even a healthy adult in a matter of hours. It is considered to be endemic in many countries including Iraq. It has economic and social impact, several epidemics occurred in Iraq during the last two decades.



Introduction

- Only 20% of the infected peoples have overt clinical symptoms .
- All people are susceptible to this diarrheal disease. The disease can spread by contaminated water or food leading explosive epidemics.
- Cholera remains especially an overlooked disease in the developing countries and in the endemic areas. The real number of cholera cases worldwide is underestimated. 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.

Introduction

- Cholera is considered to be endemic disease in many parts of Iraq
- The recent outbreak that occur in Iraq during August-November 2015, reported a total of 2,810 laboratory confirmed cases.
- During the last two epidemics of cholera in Iraq. Babylon province had reported the highest incident cases in the country, this means that cholera disease is still a high priority public health problem that need solution especially in Babylon province.

Introduction

- The climatic factors in Iraq may play a role in V. cholera outbreaks. Furthermore, most of wastewater treatment in Iraq has not been functioned according to golden roles due to the difficult situations, other demographics, social, and other environmental risk factors might associated with distribution of this disease .Describing cholera epidemics and identifying the risk factors of this disease help prevent and control of similar future epidemics.
- Going through the literatures this study is the first case-control study conducted on cholera disease in Iraq .

Objectives

- To describe the epidemiological features of the cholera epidemic in Hilla city
- To identify some cholera associated risk factors among patients admitted to Merjan teaching hospital and pediatric hospitals in Hilla City-Babylon province, Iraq

Methodology of data collection and approaches

Ethical considerations

The research protocol was approved by the Scientist Committee of ethics in Babylon University - Medical College , and the similar committee of Babylon Health Directorate- Iraqi Ministry of Health

Verbal informed consent was obtained from all patients or their parents or legal guardians for both cases and controls after explaining the objective of the study. This study was conducted according to the protocol and ethical principles with their origins in the Declaration of Helsinki

Study Designs



- **Descriptive cross sectional study** was applied to describe the epidemic (during the year 2015) in Hilla city- Babylon province. A person, place and time epidemiological model was used to achieve this task :
- person (demographic characteristics) such as family income crowding, level of education, beside the behavioral characteristics of patients and control groups), place of residence of patients at districts and sub districts levels and the time trend of the occurrence of disease by (months).
- **Hospital-based case-control study** was conducted to determine the associations between certain potential risk factors of cholera among patients admitted to three public hospitals in Hilla city.
- The study was conducted from the beginning of February through the end of May, 2016

Randomization

- Systematic random sample technique was used in selecting both groups, for each case two age and sex matched controls was selected in the same way. Hundred fifty stool culture positive cases and three hundreds cholera free controls were enrolled in this study.

Inclusion criteria for cases

_cases with signs and symptoms of cholera were considered when confirmed by culture from the central health laboratory in Baghdad.

-All ages were included.

_patients who are living in Hilla city –Babylon province.

_patients accepted to participate in this study .

_patient or (his , her)parents who responded to the phone call

Exclusion criteria for cases:

- patients with signs and symptoms of cholera but have negative stool culture
- _patients who are not living in Hilla city –Babylon province.
- _patients or their guardians or parents who were hesitate or refuse to participate or to complete the data.

Inclusion criteria for control group:

- _All patients who were attending the hospitals and proved by stool culture (central laboratory) that they are vibrio cholera free subjects , who mentioned that they did not receive antibiotics at least within the last five days before the stool culture.
- _patients who are living in Hilla city , accept to participate in this study and within the same age of cases(within 2years of age)

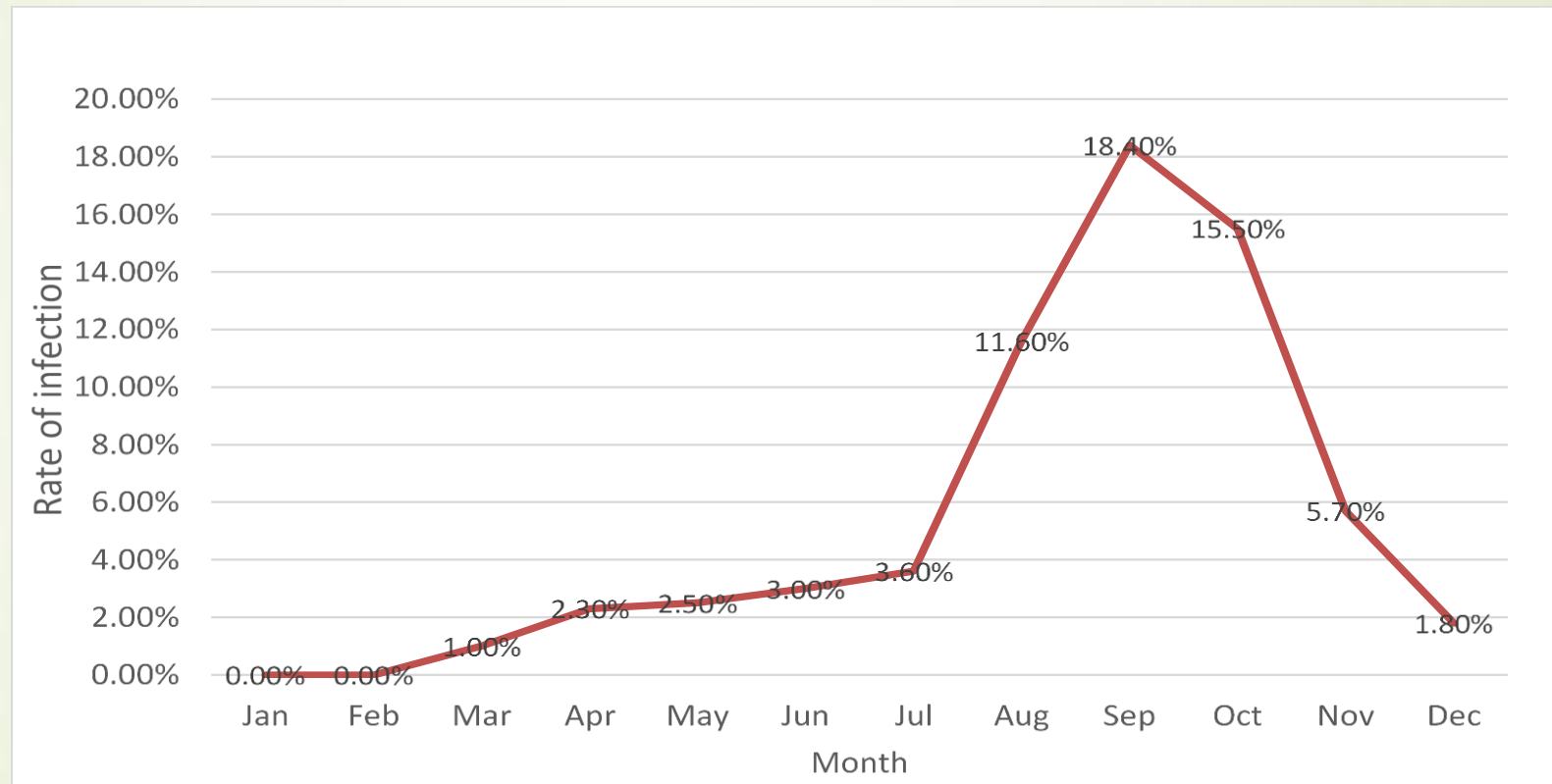
Exclusion criteria for control group

- _patients who are not living in Hilla city –Babylon province.
- _patients or their guardians or parents who were hesitate or refuse to participate or to complete the data.
- _patients who recieved antibiotics within the five days before stool culture.

Statistical analysis was carried out using SPSS version 20.
Categorical variables were presented as frequencies and percentages

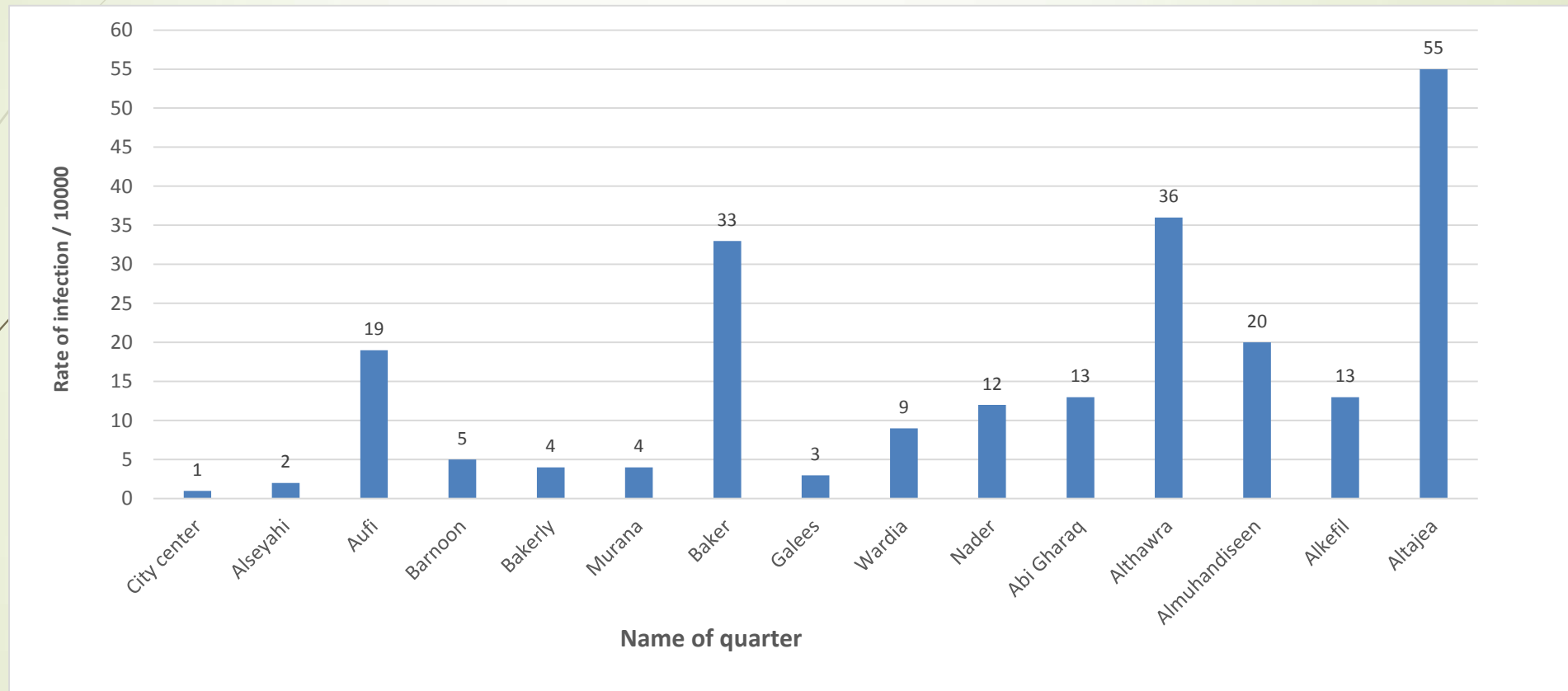
Results

Results



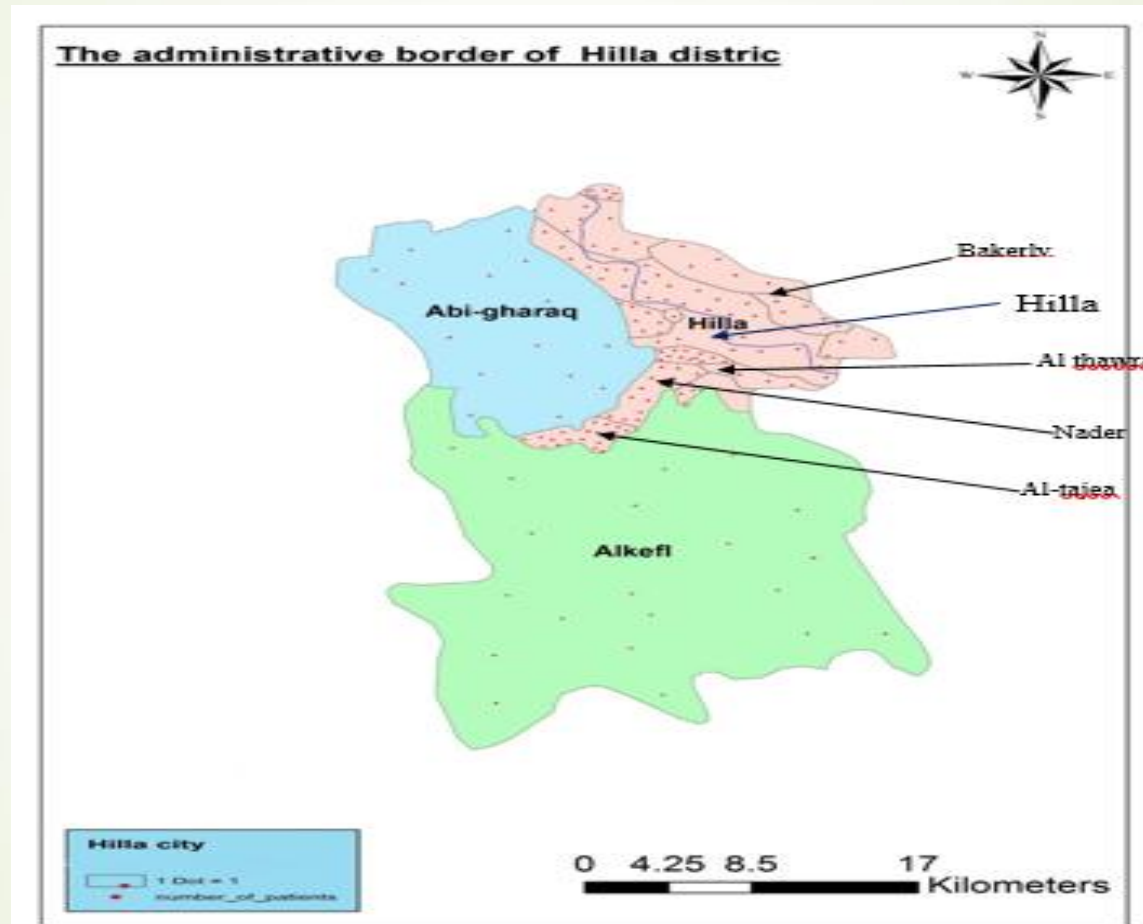
Distribution of cholera cases according to months in Al Hilla city

Results



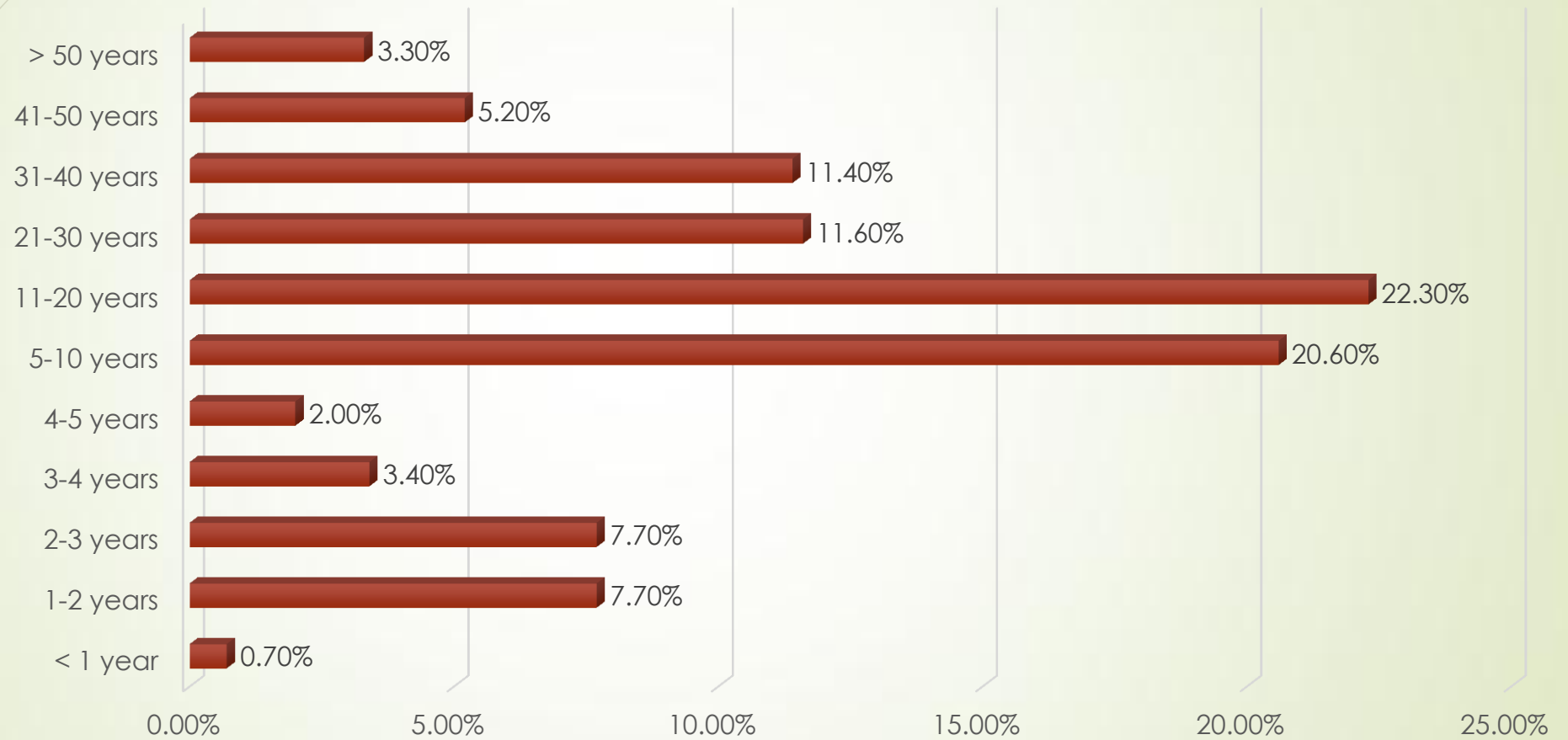
Distribution of cholera cases rates by sub-districts of Hilla city

Results



frequency distribution of 150 confirmed cholera cases during 2015 cholera epidemic in Al-Hilla city by districts

Results



Distribution of cholera cases according to age

Results

Odds Ratios of some demographic characteristics (age, sex, residence, educational level) for cholera cases and control group.

| Variable | Cholera | | χ^2 | <i>P</i> values | Odds ratio |
|--------------------|----------------------------|---------------------------|----------|-----------------|---------------------|
| | Patients (n=150) (%) | Control (n=300) (%) | | | CI= (95%) |
| Age | | | | | |
| < 15 | 86(57.3) | 172(57.3) | 0.770 | 0.380 | 0.84 (0.53-1.27) |
| 15 – 45 | 51(34.0) | 84(28.0) | 2.364 | 0.124 | 1.69 (0.86-3.31) |
| > 45 | 13(8.7) | 44(14.7) | | | |
| Sex | | | | | |
| Male | 79 (52.7) | 170 (56.7) | 0.647 | 0.421 | 0.85 (0.57-1.26) |
| Female | 71 (47.3) | 130 (43.3) | | | |
| Residence | | | | | |
| Urban area | 96 (64.0) | 203 (67.7) | 0.603 | 0.437 | 0.85 (0.56-1.28) |
| Rural area | 54 (36.0) | 97 (32.3) | | | |
| Educational level | | | | | |
| Child | 7 (4.7) | 27 (9.0) | 4.299 | 0.038* | 1.38 (1.15-4.94) |
| Illiterate | 50 (33.3) | 74 (24.7) | 1.769 | 0.184 | 0.52 (0.20-1.35) |
| Primary school | 29 (19.3) | 59 (19.7) | 6.407 | 0.011* | 2.27 (1.10-5.75) |
| Secondary school | 26 (17.3) | 28 (9.3) | 0.336 | 0.562 | 0.76 (0.31-1.89) |
| University/diploma | 38 (25.3) | 112 (37.3) | | | |

* p value ≤ 0.05 is significant

Results

Odds Ratios of some socio-economic characteristics (crowding, family income, displaced family and source of water supply) for cholera cases and control group

| Variable | Cholera | | χ^2 | <i>P</i> values | Odds ratio |
|--|-------------------------------------|-------------------------------------|------------------|--------------------|--|
| | Patients (n=150) (%) | Control (n=300) (%) | | | CI= (95%) |
| Family members < 6 members** ≥ 6 members | 61 (40.7) 89 (59.3) | 154 (51.3) 146 (48.7) | 4.560 | 0.033* | 1.54 (1.03-2.29) |
| Family income Not enough Enough | 99 (66) 51 (34) | 168 (56) 132 (44) | 4.144 | 0.042 | 1.525 (1.015-2.293) |
| Displaced family Yes** No | 49 (32.7) 101 (67.3) | 24 (8.0) 276 (92.0) | 44.769 | <0.001* | 5.58 (3.25-9.56) |
| House rooms < 3 rooms** ≥ 3 rooms | 132 (88.0) 18 (12.0) | 288 (96.0) 12 (4.0) | 10.286 | 0.001* | 3.27 (1.53-6.99) |
| Source of water River & Well** Tap water RO | 23 (15.3) 11 (7.3) 116 (77.3) | 10 (3.3) 35 (11.7) 255 (85.0) | 15.065 16.833 | <0.001* <0.001* | 7.32 (2.68-19.99) 5.06 (2.33-10.97) |

Results

Odds Ratios of some behavioral and environmental factors among cholera cases and control group

| Variable | Cholera | | χ^2 | <i>P</i> values | Odds Ratio |
|---|----------------------------|---------------------------|----------|-----------------|----------------------|
| | Patients (n=150) (%) | Control (n=300) (%) | | | CI= (95%) |
| Washing hands after homework Yes No | 140 (93.3) 10 (6.7) | 284 (94.7) 16 (5.3) | 0.327 | 0.568 | 0.789 (0.34-1.78) |
| Washing fruits and vegetables Yes No | 136 (90.7) 14 (9.3) | 277 (92.3) 23 (7.7) | 0.368 | 0.544 | 0.807 (0.40-1.61) |
| Keeping food in suitable place Yes No | 130 (86.7) 20 (13.3) | 261 (87.0) 39 (13.0) | 0.01 | 0.92 | 0.97 (0.54-1.73) |
| Do you wash dishes in river? Yes No | 32 (21.3) 118 (78.7) | 32 (10.7) 268 (89.3) | 9.32 | 0.02 | 2.27 (1.32- 3.88) |

Results



Comparison of Patients with Cholera and Control by presence of family history of diarrhea in the past 5days, vaccine status, knowledge about the transmission and the causative agent for cholera

| Variable | Cholera | | χ^2 | <i>P</i> values | Odds ratio |
|--|----------------------------|---------------------------|---------------|-------------------|-------------------------------------|
| | Patients (n=150) (%) | Control (n=300) (%) | | | CI= (95%) |
| family members presenting with diarrhoea in the past 5 days | | | | | |
| Yes | 136 (90.7) | 130 (43.3) | 92.696 | <0.001* | 12.70 (7.00-23.04) |
| No | 14 (9.3) | 170 (56.7) | | | |
| Vaccine against cholera | | | | | |
| Yes | 0 (0.0) | 13 (4.3) | 6.786 | 0.009* | 1.53 (1.43-1.64) |
| No | 150 (100.0) | 287 (95.7) | | | |
| Knowing the causative factor of cholera | | | | | |
| I know | 8 (5.3) | 49 (16.3) | 10.938 | 0.001 | 3.46 (1.59-7.52) |
| I do not know | 142 (94.7) | 251 (83.7) | | | |
| Way of cholera transmission | | | | | |
| I know | 88 (58.7) | 171 (57.0) | 0.114 | 0.736 | 1.07 (0.72-1.59) |
| I do not know | 62 (41.3) | 129 (43.0) | | | |

Conclusions and recommendations

Conclusions

1. The peak frequency incidental cholera cases occurred in September
2. The disease was distributed all over the districts of Babylon governorate and Hilla city, the highest attack rates were reported in Al-Tajea, then Al-Thawra followed by Backer districts. While the city center had the lowest attack rate
3. The most affected age group was (5-20) years with no difference between males and females
4. People with very low level of education, poor or living in crowded houses, people belonged to internally displaced families, people who were not vaccinated against cholera and those using river and well as a source of drinking water were at high significant risk of getting this serious disease, these factors were considered as a significantly associated preventable risk factors for cholera disease in Hilla city during this epidemic

Recommendations



- ❖ Education programs that can target poor and uneducated peoples should be put in place using different types of mass media in addition to enhancing the role of religious and community leaders in transmission the healthy knowledge regarding the personal hygiene.
- ❖ Provide a proper sanitation and water supply to the people at high risk of cholera such as those living in AL-Tajea district through regular well organized campaigns to provide safe and adequate water by safe tankers through involvement different governmental and non-governmental sectors .
- ❖ Improving and empowering active and passive surveillance local system in collaboration with WHO and other United Nation agencies through urgent and proper training of health staff in the field of applied epidemiology and electronic surveillances of infectious diseases.

Recommendations

- ❖ Increase level of public and health service providers' awareness about the importance of oral cholera vaccine, this preventive approach should be used more extensively especially for highly susceptible and at risk groups.
- ❖ Reapplication of public health intervention approach district team problem solving(DTPS) which was adopted by WHO and implemented successfully in different countries included Iraq to overcome high priority public health problems such as infectious diseases epidemics.
- ❖ Strategic integrated plans should be put by policy and decision makers to improve the environmental sanitation, the provision of safe and adequate water supply for all the population in AL Hilla city and Babylon province.

**Thank you for
your attention**